

Rocky Vista University presents
RESEARCH DAY 2023

THE USE OF ARTIFICIAL INTELLIGENCE IN MEDICAL RESEARCH

October 20, 2023

EVENT PROGRAM

TABLE OF CONTENTS

Welcome Letter	1
Schedule of Events	2
Keynote Speaker: Dr. Cole Zanetti	3
Keynote Speaker: Dr. Sanjeev Bhavnani	4
Oral Presentations Schedule	5
Index of Oral Presentations	6
Oral Presentations Rubric	7
Index of Posters	8
Poster Presentations	16
Abstract Rubric	211
Research Competition Judges	212
Intramural Grants	213
Publications & Presentations	215
Thank You	217

WELCOME LETTER

Welcome to Rocky Vista University's 12th Annual Research Day!

Thank you to both our visitors and participants for making Research Day a memorable event as we explore the use of artificial intelligence in medical research and review the scholarly works that our students, faculty, and staff have produced. The advancing of artificial intelligence in all aspect of our world makes this a particularly pertinent issue to medicine. We are excited to discover the many benefits and pitfalls of these new tools in this forum!

Research Day will begin with Opening Comments at 8:00 am with Dr. Ed Bilsky, PhD, Provost at RVU. We will have two Poster Sessions this year; Session 1 will be 8:10 - 9:10 am, and Session 2 will be 12:40 - 1:40 pm. The Utah Poster sessions will be held throughout the first floor, and the Colorado sessions will be held on the second and third floor atria. Oral Presentation Session 1 will take place from 9:15 - 10:00 am and then again from 11:15 - 12:30 am. Oral Presentations can be viewed on Zoom or in Auditorium I on both campuses. We are privileged to have two incredible Keynote Speakers this year. Our first Keynote Speaker Dr. Cole Zanetti will present his talk titled, "Guiding AI to better enable our values in healthcare" from 10:00 - 11:00 am. Our second Keynote Speaker, Dr. Sanjeev Bhavnani will present his talk titled, "Artificial Intelligence and the Digital Transformation of " from 2:00 – 3:00 pm. There will be two scheduled breaks where snack tables will be set up from 11:00 - 11:15 am and again from 1:40 - 2:00 pm near the posters. The Awards Ceremony and Dr. Brooks' closing remarks at 3:00 pm will conclude Research Day.

We would like to express our gratitude to all those who have helped, volunteered, and participated in Research Day. Again, thank you for joining us today and we hope you find yourself intellectually entertained.

Happy Researching!



Amanda Brooks, PhD
Vice Provost of Research and Scholarly Activity
Professor of Molecular Biology
Rocky Vista University

SCHEDULE OF EVENTS

8:00 - 8:10 AM	Welcome to RVU's 12th Research Day <i>Zoom</i>
8:10 - 9:10 AM	Poster Session I <i>In Person - CO - 2nd & 3rd Floor Atria</i> <i>In Person - UT - 1st Floor</i>
9:15 - 10:00 AM	Oral Presentations Session I <i>Auditorium 1</i> <i>Zoom</i>
10:00 - 11:00 AM	Keynote Speaker: Dr. Cole Zanetti <i>Auditorium 1</i> <i>Zoom</i>
11:00 - 11:15 AM	Snack Break <i>Tables near posters</i>
11:15 - 12:30 PM	Oral Presentations Session II <i>Auditorium 1</i> <i>Zoom</i>
12:40 - 1:40 PM	Poster Session I <i>In Person - CO - 2nd & 3rd Floor Atria</i> <i>In Person - UT - 1st Floor</i>
1:40 - 2:00 PM	Snack Break <i>Tables near posters</i>
2:00 - 3:00 PM	Keynote Speaker: Dr. Sanjeev Bhavnani <i>Auditorium 1</i> <i>Zoom</i>
3:00 - 3:30 PM	Awards and Closing Remarks <i>Auditorium 1</i> <i>Zoom</i>



Zoom

KEYNOTE SPEAKER

Abstract

Guiding AI to better enable our values in healthcare

Dr. Cole Zanetti

We will review the different types of AI that currently exist and how each impacts healthcare today. We will discuss the necessity of AI in healthcare along with the potential risks with different types of AI. We will review how important it is for us to guide this technology and the study of this technology to focus on creating time, addressing health equity, personalized medicine, whole person care and humanizing care.

KEYNOTE SPEAKER

Abstract

Artificial Intelligence and the Digital Transformation of Healthcare

Dr. Sanjeev Bhavnani

While the application of new digital health technologies and artificial intelligence algorithms in medicine and research are exciting, and the prospects of improving patient care with new devices is promising, we must take responsible approach to develop and deploy new innovations in healthcare. To do so requires a broad collaboration that bring together research, engineering, and clinical domains.

This talk will provide:

- An overview of the current ecosystem of digital health and machine learning devices and clinical trials.
- How new devices can be used by patients with delivery of healthcare remotely at home.
- Important equity priorities for machine learning algorithms.
- A glimpse of what is to come from the lens of what regulatory agencies and policy are anticipating for the future.

ORAL PRESENTATIONS SCHEDULE

SESSION I: AUDITORIUM 1 OR ZOOM



9:15 - 9:25 AM	#4	<i>From Classroom to Crisis: Evaluating the Impact of Mass Casualty Event Training in Medical Schools on Disaster and Global Medicine Competence</i>	UT
			CO
9:26 - 9:36 AM	#7	<i>Abdominal Tuberculosis: A Case Report</i>	
9:37 - 9:47 AM	#5	<i>Sudden Cardiac Death in a 22-year-old Male Endurance Athlete</i>	UT
9:48 - 9:58 AM	#8	<i>Changes in Cognition and Mood Following Sleep Extension in Adolescents with Habitually Insufficient Sleep.</i>	CO

SESSION II: AUDITORIUM 1 OR ZOOM



11:15 - 11:25 AM	#3	<i>Glucose Metabolism in Soleus Push-Ups</i>	UT
11:27 - 11:37 AM	#9	<i>Exploring Salivary Biomarkers for Autoimmune Predisposition in First Responders</i>	CO
11:39 - 11:49 AM	#10	<i>The Empathy Spectrum: A Multinational Review of its Measurement in Medical Students and its Relation to Healthcare Professional Burnout</i>	UT
11:51 - 12:03 AM	#6	<i>Timing of dietary effects on the epigenome and their potential protective effects</i>	CO
12:05 - 12:15 PM	#2	<i>Counterstrain Point Frequency and Treatment in Medical Students</i>	UT
12:15 - 12:27 PM	#10	<i>Artificial intelligence-driven precision pathology identifies distinct placental findings in severe fetal growth restriction or hypertension</i>	CO

INDEX OF ORAL PRESENTATIONS

1	Artificial intelligence-driven precision pathology identifies distinct placental findings in severe fetal growth restriction or hypertension	CO
2	Counterstrain Point Frequency and Treatment in Medical Students	UT
3	Glucose Metabolism in Soleus Push-Ups	UT
4	From Classroom to Crisis: Evaluating the Impact of Mass Casualty Event Training in Medical Schools on Disaster and Global Medicine Competence	UT
5	Sudden Cardiac Death in a 22-year-old Male Endurance Athlete	UT
6	Timing of dietary effects on the epigenome and their potential protective effects	CO
7	Abdominal Tuberculosis: A Case Report	CO
8	Changes in Cognition and Mood Following Sleep Extension in Adolescents with Habitually Insufficient Sleep.	CO
9	Exploring Salivary Biomarkers for Autoimmune Predisposition in First Responders	CO
10	The Empathy Spectrum: A Multinational Review of its Measurement in Medical Students and its Relation to Healthcare Professional Burnout	UT

ORAL PRESENTATIONS RUBRIC

Assessment/Scoring Rubric for Oral Presentations:

Provide a rank for each criterion on a Likert scale of 1-5

Below are examples of what would classify as excellent, very good, good, ok, and poor

5-Excellent	Maintains eye contact, invites discussion, summaries key points, appropriate use of figures and references, slides are well designed and readable, potential limitations are identified, builds logical arguments based on evidence
4-Very Good	Clear summary, well-rehearsed, some filler words, images are used but may not always be well explained, makes limited jumps in logic
3-Good	Some use of scientific jargon, too many words and not enough images, images used did not support the audience learning, no clear summary, difficult to follow logic at times
2-Ok	Not engaging, too much jargon, did not lead a discussion well, difficult to hear, significant background missing
1-Poor	Unclear and hard to follow, not well practiced, did not stay within time limits, defensive during questioning, not well referenced, take home points unclear, limited background provided

Content and Scientific Merit

Introduction:

- ☐ Defines background and importance of research.
- ☐ States objective, and is able to identify relevant questions.

Body:

- ☐ Presenter has a scientifically valid argument.
- ☐ Addresses audience at an appropriate level (rigorous, but generally understandable to a scientifically-minded group).
- ☐ Offers evidence of proof/disproof.
- ☐ Describes methodology.
- ☐ The talk is logical.

Conclusion:

- ☐ Summarizes major points of talk.
- ☐ Summarizes potential weaknesses (if any) in findings.
- ☐ Provides you with a “take-home” message.

Speaking Style/Delivery

- ☐ Speaks clearly and at an understandable pace.
- ☐ Maintains eye contact with audience.
- ☐ (scripted presentation).
- ☐ etc.).
- ☐ Speaker uses body language appropriately.
- ☐ Speaker is within time limits.
- ☐ professionally.
- ☐ Speaker is dressed appropriately.

Audio/Visual

- ☐ Graphs/figures are clear and understandable.
- ☐ The text is readable and clear.
- ☐ points of the talk.
- ☐ not generated by presenter

Constructive Criticisms (2 required):

INDEX OF POSTERS

COLORADO SESSION 1: 2ND AND 3RD FLOOR ATRIA

1	A Survey on Implementation of the Efast Exam Into Slope-Side Care and Management of US Ski and Snowboard Team Athletes
2	Acetaldehyde Dehydrogenase 2 Deficiency and Associated Esophageal Cancer Risk in East Asian Populations
3	The Influence of Intestinal Parasites on Vaccine Efficacy
4	Initial Treatment of Asthma With a Single Combination Inhaler: Comparing US (NAEPP) Versus Global (GINA) Guidelines
5	Case Report: Pharyngeal Mucocutaneous Leishmaniasis Braziliensis Years After Initial Untreated Cutaneous Lesion: Delayed Pharyngeal Presentation of Leishmaniasis
7	Synchronous Papillary Thyroid Cancer and Colorectal Cancer in a Patient With a CHEK2 Mutation
8	Drug Reaction with Eosinophilia and Systemic Symptoms From Levofloxacin For Treatment Of Necrotizing Pneumonia
9	A Review of Prostate Cancer Screening Guidelines and Impact on Rural Populations
10	Medical Schools' Naloxone Trainings – Improved Knowledge and Attitudes: A Scoping Review
11	Characterization Of the HPG Axis With a Deficiency of FGFR1
12	Modern Day Management of Refractive Errors: Will LASIK Become a Thing of the Past?
13	Comparative Analysis of US and CT in Diagnosing Acute Cholecystitis
14	Preference For Large Language Model or Physician Generated Responses to Women's Health Clinical Prompts
15	Provider Perceptions of Utilizing Submitted Photography to Surveil and Monitor Cutaneous Conditions and/or Lesions
16	Epigenetic Changes Associated With Antisocial Personality Disorder
17	How Safe Is Transnasal Tracheoscopy?
18	Professional Behavior Assessment of Osteopathic Student Doctors By Diverse Healthcare Providers in the Rotational Setting
19	A Review of Cervical Cancer Screening Guidelines
20	Meta-Analysis of Host Responses To SARS-Cov Infection
21	Perioperative Venous Thromboembolism Risk for Below Knee Amputation
22	Acute Chest Pain in a Patient With a Non-Strangulated Hiatal Hernia
23	Approaches to Reducing the Black-White Infant Mortality Gap
24	Contractures, Rheumatoid Arthritis and Multiple Sclerosis: A Difficult Airway Case Report
26	A Review of Dyslipidemia Screening Guidelines in Young Low-Risk Individuals

INDEX OF POSTERS

27	The Role of Race-Based Clinical Decision-Making Tools in Diagnosis and Mortality Disparities Between Black and White Americans With Chronic Kidney Disease.
28	The Impact of Fatigue on the Diversity of the Oral Microbiome
29	Influenza B In Pediatric Bacterial Tracheitis: A 15-Year Case Series of Children Without Artificial Airways
30	The Benefits of Genetic Testing for Prognosis of Disease in a Rare Variant of Grade III Anaplastic Astrocytoma in a Young Adult Male
31	Worsening Coronary Artery Disease Found in a Routine Lung Cancer Screen
32	A Review of Early Colonoscopy in Lower GI Bleeds
33	Navigating Skin Health in a Pandemic: Teledermatology's Role, Accuracy, and Societal Implications
35	Intranasal Emergency Drug Delivery: A Review
36	(Resubmission 173787) Exploring the Link Between UV Nail Lamps and Subungual Skin Cancer: A Call for Research.
37	Distal Esophageal Leiomyoma in A Young Female Patient
38	Manual Medicine as a Therapeutic Agent for Anxiety
39	Intraocular Pressure Measurements Post Ultraviolet Corneal Crosslinking: Handheld Tonometer Vs Rebound Tonometer
40	Use Of Contextual Design to Assess Workflows and Redesign Opportunities After EHR Conversion
41	Efficacy Of Prostate Cancer Screening Guidelines in Early Detection
42	Short Video Training for Delivery Injury Diagnoses
43	How Delivery Method of Surgical Skills Workshop Impacts Tactile & NBME Subject Examination Performance
44	Life Flight Medical Professional's Comfort Level With Pediatric Medical Treatment
45	Anesthetic Challenges in The Management of Splenic Hydatid Cyst Excision
46	Vitamin D For Fall and Fracture Prevention in the Elderly: A Guideline Comparison
47	Pre-Participation Cardiac Screening for Young Competitive Athletes: Comparing US (AHA) And European (ESC And EFSMA) Guidelines
48	Medial Ulnar Collateral Ligament Injury Risk Factors in The Overhead Throwing Athlete
49	Airway Management in Maxillofacial Trauma: Further Defining the Role of Submental Intubation
50	Addressing The Challenge of Period Poverty in Kenya: An Examination of Strategies Used Between 2022 and 2023 Global Health Trips
51	Comparing Umbilical Cord Blood Ph and Lactate Levels to Determine Neonatal Outcomes

INDEX OF POSTERS

52	Exploring Communication Interventions for Incidental Potentially Oncologic Masses Detected on Radiological Masses: A Literature Review
53	Attitudes Of Healthcare Providers to Early Ambulation In Post-Operative Care
54	CAR-NK Immunotherapies For The Treatment Of Human Immunodeficiency Virus (HIV-1) and Production of an HIV Vaccine: A Review
55	Effects Of PEA And Omega-3 Fatty Acids on Immune Markers in First and Second Year Medical Students
56	Current Reproductive Health Status in Females Who Experienced Secondary Amenorrhea As A Component Of Red-S While Participating In Collegiate Athletics
57	Link Between Stress Induced Inflammation and GERD Pathology
58	De Novo Familial Adenomatous Polyposis With Undiagnosed Von Willebrand's Disease: A Case Report
59	Analysis of Factors Influencing Glenohumeral Osteoarthritis Incidence
60	Promoting Equity in Healthcare: Strategies to Overcome Language Barriers
61	Resiliency and Cortisol Awakening Response in High Stress Scenarios
62	Unknown Case: Enlarging Intramammary Lymph Node
63	Average UV Irradiance Comparison Amongst United States to Further Full Body Skin Exam Guidelines

INDEX OF POSTERS

COLORADO SESSION 2: 2ND AND 3RD FLOOR ATRIA

64	West Nile Virus Meningoencephalitis– Considerations for Earlier Investigation
65	Isolating a Distinct Immune Cytokine Profile That Is Associated With Emotional Intelligence Improvement and the Cortisol Awakening Response in Repeated Stress
66	The Tube Over the Needle: Thoracic Trauma Interventions
67	Best Practices for Iliosacral Screw Placement in Sacral Fracture Repair and Avoidance of L5 Radiculopathies
68	Surgical Simulation in Medical Education
69	Back Pain Reveals Rare Case of Multiple Myeloma in 23-Year-Old
70	Investigating Neuropsychiatric Considerations When Treating Anorexia Nervosa Patients With Osteopathic Manipulative Medicine
71	Investigation of How Chronic Stress Due to the Stressful Environment of Medical School Can Manifest in Sleep Disturbances in First and Second-Year Medical Students.
72	Review of Post-traumatic Stress Disorder and Incidence of Autoimmune Disease
73	Comprehensive Geriatric Assessment for Oncologic Treatment
74	Optimal Heart Rate Target for Atrial Fibrillation Management: A Guideline Comparison
75	How Comfortable Are Medical Students With Interpreting Diverse Dermatologic Conditions During Didactic Training?
76	Mycoplasma Pneumoniae and Ureaplasma Infection in Children Requiring Mechanical Ventilation: A Multicentre Study Investigating Clinical Outcome
77	A Comparative Analysis of Evidence-Based and Consensus-Based Guidelines for First-Line Maintenance Therapy of Atopic Dermatitis: Efficacy of Topical Calcineurin Inhibitors vs. Topical Corticosteroids
78	Examining Medical Student and Physician Attitudes Towards Suicidal Patients
79	Intent to Administer Nitroglycerin for Inferior Wall Acute Myocardial Infarction
80	Postural Orthostatic Tachycardia Syndrome (POTS) and Primary Ovarian Insufficiency (POI) as an Adverse Event to HPV Vaccinations
81	Are We Missing Sleep Apnea in Patients With Subglottic Stenosis?
82	Postoperative Opioid Use Following Elective Endonasal Skull Base Surgery: A Retrospective Analysis
83	Synchronized Dynamics of Salivary Neuropeptides in Response to Acute Stress
84	Yoga as an Educational Aid for Osteopathic Medical Students Studying Musculoskeletal Anatomy
85	Bisphosphonate Use in Pediatric Bone Disorders
86	A Patient With Foot Pain Found to Have Leriche Syndrome: A Case Report and Brief Review of the Literature
87	An Unusual Case of Acute Hangman's Fracture

INDEX OF POSTERS

88	Septic Shock, Subacute Endocarditis and HOCM: Anesthetic Management Case Report
89	Xylazine Usage and Awareness Among People Who Use Drugs in the Denver Metro Area
90	Preferences in Screening for Cancer by Resident Physicians
91	Recurrent Staged Reminders Improve Attendance Rates to Virtual Pediatric Weight Management Visits: A Quality Improvement Initiative
92	Understanding the Prevalence of Advance Directives Among Current Physician Assistant Students and Recent Graduates
93	Interrater Reliability and Confirmation Bias in Palpatory Diagnosis - A Literature Review
94	Investigation of Stress Markers and Resilience in Trauma Surgeons
95	From Pandemic to Pump: Unraveling the Tale of Post-covid Cardiomyopathy
96	A Comparison of Colorectal Screening Techniques: Colonoscopy and Cologuard
97	Blood Pressure Control in Patients Presenting With Acute Intracerebral Hemorrhage
98	Discrepancies in Skin Cancer Detection and Outcomes in People of Color: A Scoping Review
99	Unusual Long-term Survival of a Metastatic Uveal Melanoma, a Case Study
100	Neurodegenerative Disorders and Evidence for Gut Associated Pathogenesis Factors
101	Transgenerational Trauma: Can We Stop the Cycle?
102	Diversity Trends in the Field of Orthopedic Surgery
103	Depression as Primary Symptom Presentation of Glioblastoma Multiforme: A Case Series
104	Barriers to Cervical Cancer Screening in Newly Resettled Refugee Women in the United States and a Potential Solution
105	Impact of Social Determinants of Health on Hemoglobin A1c Management in Type II Diabetics: A Systematic Review
106	Consideration for Including Peripheral Nerve Blocks Before Epidural Blood Patch in the Treatment Algorithm for Post-dural Puncture Headaches With Respect to Anesthesia Guidelines
107	A Retrospective Analysis of OMT Techniques Used by Rocky Vista University 3rd and 4th Year Medical Students on Rotations.
108	Virtual Reality (VR) and Cardiac Pathophysiology: Analyzing the Effects of Implementing VR as a Supplementary Educational Modality on Knowledge Retention in Pre-Clinical Students At RVU
109	Cervical Cancer Screening Guidelines: When Should Screening Start?
110	Dendritic Cell Vaccine Efficacy in Grade Iv Glioblastoma Patients Post Standard of Care
111	Factors Contributing to Increased Opioid Overdoses in the COVID-19 Pandemic: A Scoping Review

INDEX OF POSTERS

112	Comparison of Paramedic Point-Of-Care Lung Ultrasound to Chest X-Ray and Computerized Tomography Findings on Patients Presenting With COVID-19 Symptoms
113	Healthcare Providers' Knowledge and Attitudes About Overdose Prevention Sites
114	A Rare Case of Venous Sinus Thrombosis and Pulmonary Embolisms Caused by Myxomatous Erythrocytosis Syndrome Secondary to Uterine Leiomyomas
115	Iron in Cirrhotic Liver
116	Interactive Module's Effectiveness on Empathy and Attitudes of Healthcare Students
117	Analysis of Guidelines Regarding Mental Health Hold Requirements and Duration of Adults From Mountain States
118	A Comparison of Polycystic Ovary Syndrome Guidelines and Biochemical Androgen Testing
119	Consideration of Aspirin for Secondary VTE Prevention After Endothelial Injury: With Respect to American Society of Hematology 2020 Guidelines and the European Society of Anaesthesiology VTE Guidelines Task Force 2018
120	Innovation in Undergraduate Medical Education: A Novel Use Case for ACLM Board Review Course
121	The Intestinal Histologic Effects of a Rare Gastric Bypass Procedure - A Cadaveric Case Study
122	Male Vs Female Reflex to Acetic Acid Induced Visceral Pain
123	A Comparison Review of Hypertension Classification Between the 2017 AAA/AHA and 2020 ISH Guidelines
124	A Review and Comparison of the AAP's 2023 and 2007 Clinical Practice Guidelines for the Evaluation and Treatment of Pediatric Obesity
125	Pregnant Participation Trends in Industry-Sponsored Clinical Phase IV Trials From October 2012 to October 2022
126	Investigation Into Management Deficits in Patient With Life-Threatening GPA, and Future Management Course
127	Comparison of Percutaneous Coronary Interventions Patient Outcomes of Rotational Atherectomy vs Balloon Angioplasty With Stent: A Systematic Review

INDEX OF POSTERS

UTAH SESSION 1: 1st FLOOR

128	Incremental EKG Lead Deviations: The Clinical Significance
129	Transcatheter Aortic Valve Replacement (TAVR) Long Term Comparison
130	Advances and Limitations of High-Intensity Ultrasound Ablation
131	Comparison of 34 Cases of Remote Cerebellar Hemorrhage After Spinal Procedures
132	Novel Onset of Migraine with Visual Aura in College Age Female
133	Disparities in Health Insurance Literacy (HIL) and Evidence for Possible Solutions
134	Utilizing Facial Expressions as a Biomarker for Empathy Measurement in Standardized Patient Scenarios: A Machine Learning Approach
135	Case Study: Peritoneal Encapsulation in a Body Donor
136	The Synergistic Effects of Combined PRK & CXL: A Summary and Recipe Book
137	Caspases as a Potential Therapeutic target for Alzheimer's Disease
138	One Mechanism of Injury - Two Distinct Injuries: Acute Rotator Cuff Tear with Acute Acromioclavicular Joint Separation
139	Aquaporin-4 Ocular Manifestations in the Setting of Joint Abnormalities
140	Malnourishment and Microbiome in Breastfed Babies of Venezuelan Refugees
141	Male Infertility: Balanced Y:1 Translocation of the SRY Gene
142	Analgesia in the Prehospital Environment: Ketorolac vs Fentanyl A Retrospective Chart Review
143	Can the Implementation of AI for Predicting Perioperative Events During General Anesthesia Decrease the Occurrence of Adverse Anesthetic Complications?
144	Remimazolam Sedation for Nerve blocks
145	Diagnostic Ultra-sound in Juvenile Scleroderma
146	Communication about Prognosis across Advancing Childhood Cancer: Preferences and Recommendations from Bereaved Parents
147	Yoga for MSK
148	Fracture Secondary to Hemangioma
149	Multiple System Atrophy Cerebellar Type: A case report
150	Osteopathic Medical Students' Utilization and Perceptions of Artificial Intelligence (AI) Tools in Medical Education: A Survey Study
151	Preference for Large Language Model or Physician Generated Responses to Women's Health Clinical Prompt
152	The Clinical Utility of Perioperative Genetic Testing for the Prevention of Postoperative Nausea and Vomiting
153	Brain Metastases as Only Site of Metastasis in a Prostate Cancer Patient
154	A Review of the Long-term Use of Proton Pump Inhibitors and Risk of Celiac Disease in the Context of HLA-DQ2 and HLA-DQ8 Genetic Predisposition

INDEX OF POSTERS

UTAH SESSION 2: 1st FLOOR

155	Navigating the Visual Maze: The Impact of Visual-Spatial Intelligence on Diagnostic Imaging Success
156	Effect of Cryotherapy on Hormones, Neurotransmitters, and the Microbiome
157	Optimizing Athletic Performance: An Examination of Osteopathic Manipulative Therapy's Effects
158	Adverse Effects of Weight Loss Drugs
159	Non-Arteritic Anterior Ischemic Optic Neuropathy Sequela From Potential COVID-19 Associated Coagulopathy
160	Fatigue and the Oral Microbiome
161	The Use of a Whipple Procedure in a Pancreaticoduodenal Gastrointestinal Stromal Tumor
162	The Use of OMT for Chronic Pain in Musicians
163	Recovery from Post-Total Knee Arthroplasty Infection without Polyethylene Liner Exchange
164	A Case Report: Acute Disseminated Encephalomyelitis Possibly Linked to Guillain-Barre Syndrome Induced by mRNA Covid-19 Vaccination
165	Drugs-Induced Musical Hallucination
166	Tib-Fib Fracture Requiring Surgical Intervention Associated with Deep Fibular Nerve Branch Injury
167	The Use of Hydrodissection in Chronic Neck Pain
168	Elbow Plica: A Case of Advanced Progression
169	Primary Survey to Measure the Differences in Emergency Clinician Intent to Administer Nitroglycerin in the Management of Inferior Wall Acute Myocardial Infarction
171	Palpation Accuracy of Osteopathic Medical Students Determined by Ultrasound Evaluation
172	The Influence of Perioperative and Postoperative Opioid Use on Survival and Recurrence in Surgically Treated Lung Cancer Patients
173	Use of COMT and BDNF Biomarkers to Predict rTMS Efficacy for TRD
174	Exploring the Therapeutic Potential of Cannabis in Inflammatory Bowel Disease: A Comprehensive Literature Review
175	Scope of Practice and Pharmacology of Dexamethasone as a Peripheral Nerve Block Adjuvant
176	Age and Gender Bias Towards Administration of Contraceptive Anesthesia
177	Assessing Migraine Prevalence Amongst First-Year Medical Students
178	Barriers to Healthcare in American Indian and Alaskan Native Populations as Perceived by Osteopathic Medical Students
180	Genetic Analysis of Patients with Nausea and Vomiting in Pregnancy and Hyperemesis Gravidarum

POSTER PRESENTATION

Abstract #1

A Survey on Implementation of the EFAST Exam into Slope-side Care and Management of US Ski and Snowboard Team Athletes

*Zach Ryan MS OMS-II*¹, Harrison Steins MS OMS-II¹, Michael Miller MPH OMS-III¹, Jaron Santelli MD², K Dean Gubler DO MPH¹*

**Corresponding Author: Zachary.ryan@co.rvu.edu*

(1) Affiliation 1: Rocky Vista University COM, Parker, CO

(2) Affiliation 2: US Ski and Snowboard Team, Park City, UT

Modern day ski and snowboard athletes compete at the extreme limits of human capabilities pushing their bodies to speeds up to 85mph in some cases. Such speeds can result in high mechanism injuries including pneumothorax, solid organ lacerations, and cardiac arrests. Through the implementation of Extended Focused Assessment with Sonography in Trauma (EFAST) exams into the capabilities of the medical staff of the US Ski Team (USST) we plan to evaluate the efficacy of incorporating POCUS into slope-side medical management of USST athletes. The addition of this tool may allow for earlier and improved medical management and diagnostic capabilities for athletes suffering acute injury in austere environments.

We evaluated the feasibility and perceived need for incorporating POCUS EFAST exams into slope-side medical management of USST athletes. We surveyed USST medical providers n=80 with 29 respondents (36%) attending the annual Medical Emergencies in Skiing and Snowboarding (MESS) training December 10-11th, 2022 in Beaver Creek, Colorado.

Medical specialties surveyed consisted primarily of orthopedics (n=15), emergency medicine (n=3), and family medicine physicians (n=5). Over half (54%) of participants had formal ultrasound training, 32% had “moderate to expert-level experience” in the prehospital setting, and 33% had “moderate experience” in the austere setting, with most POCUS experience in soft tissue and musculoskeletal imaging.

Of the respondents, 99% reported “moderate to no confidence” in diagnosing pneumothorax, pelvic injuries, and solid organ lacerations on-mountain without imaging modalities. That lack of confidence in diagnoses dropped to 77% when considering using POCUS on-mountain. 27 (93%) respondents perceive POCUS to be a “moderately to very effective” diagnostic tool, while 23 (79%) recognize POCUS is potentially effective in an austere environment and 28 (96%) believed that POCUS would be “moderately to very beneficial” in remote settings.

Our results indicated POCUS has the potential to be a valuable tool for use in the emergency care of USST athletes. Incorporating this modality would improve diagnostic capabilities and management of athletes at risk for life threatening injury. Further research is indicated for the application of POCUS in USST competition.

POSTER PRESENTATION

Abstract #2

Aldehyde dehydrogenase 2 deficiency and associated esophageal cancer risk in East Asian populations: An Overview

Zachary Asatani, OMS II, Amanda Brooks, PhD

Corresponding Author: zachary.asatani@co.rvu.edu

College of Osteopathic Medicine, Rocky Vista University, Parker, Colorado

When alcohol is consumed, *Alcohol dehydrogenase* metabolizes ethanol to a toxic metabolite called acetaldehyde. Mitochondrial *Aldehyde dehydrogenase 2* (ALDH2) is an enzyme produced by the liver that metabolizes acetaldehyde to a significantly less toxic acetate. Approximately, 30-40% of the Asian population have an inherited deficiency for *aldehyde dehydrogenase 2*, resulting in the accumulation of acetaldehyde. The facial flushing response secondary to alcohol consumption is a key biomarker for ALDH2 deficiency. This study focuses on the increased risk of esophageal cancer in East Asian populations with ALDH2 deficiency. In this review, 67 PubMed articles within the last 30 years were reviewed. Each article was based on studies that excluded animal preclinical work. Test subjects were limited to East Asian populations with and without the ALDH2*2 deficiency. A cost-efficient screening strategy has been suggested involving a high-resolution melting analysis. This is considered a sensitive closed-tube method to determine single nucleotide polymorphisms focusing on ALDH2. Ethanol affects epigenetic methylation and acetylation patterns, which are important regulators of gene expression. Ethanol-induced hypomethylation can activate the expression of oncogenes which can result in malignant transformation. Esophageal cancer is diagnosed via upper endoscopy, ultrasound, biopsy, Barium swallow test, and imaging studies. Treatment includes open transthoracic esophagectomy (OTE) or minimally invasive esophagectomy (MIE). OTE is a complex operation and is associated with significant morbidity and mortality. MIE is becoming the standard of care and has a low mortality rate of 1.4%. In 2003, a robot-assisted minimally invasive thoraco-laparoscopic esophagectomy (RAMIE) was developed to overcome the technical limitations of MIE. Results appreciated less median blood loss, lower mean postoperative pain, lower percentage of cardiac and pulmonary complications with RAMIE compared to OTE. Results in this study were limited to East Asian populations who test positive for ALDH2*2 deficiency. Clinicians can utilize current data to customize treatment plans tailored to their patients who come from cultural backgrounds and have increased genetic and epigenetic risks. Recent studies have provided insight to what preventative strategies can be implemented to increase health outcomes and life expectancy in patients with ALDH2 deficiency. Further research should utilize prior risk assessment models to enhance ALDH2 screening techniques and ALDH2 deficient patient surveillance. There remain several gaps in research, including the role of ALDH in oncogenic signaling pathways and its use as a biomarker in cancer development or metastasis and surgical efficacy techniques in esophageal cancer treatment.

POSTER PRESENTATION

Abstract #3

The Influence of Intestinal Parasites on Vaccine Efficacy

Tori Weingarten^{*1}, Jaelyn Gabel¹, Francina Towne, PhD²

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Introduction: An estimated 1.5 billion people are infected with soil-transmitted intestinal helminths worldwide. Numerous studies have found that infection with an intestinal parasite can negatively interfere with vaccination efficacy, with existing theories featuring the imbalance of the immune system. In our literature review, we propose an additional hypothesis centering around parasitic alterations to the microbiome as a driver of reduced vaccine efficacy.

Methods: We searched the literature using PubMed with combinations of the following terms and their variants: vaccine, efficacy, intestinal parasite, microbiome. Bibliographies of articles were searched for additional relevant studies. Studies were included if they compared vaccination between a parasite infected group and healthy controls. A total of 76 studies were included that demonstrate the negative impact of parasites on vaccine efficacy and contributing to the discussion of possible theories.

Discussion: Dysbiosis of the human intestinal microbiome can result in alteration of the immune system. Studies show decreased antibody and T-cell responses to vaccine targets in vaccinated germ free and antibiotic-treated mice, demonstrating the intricate relationship between the microbiome and immune response to vaccines and that commensal bacteria are essential to the vaccine-induced immunity process. There is a significant difference in microbial diversity in hosts infected with intestinal parasites. Several studies have found decreased microbial diversity and an increased abundance of Lactobacillus species with intestinal parasite infections, which have been shown to be associated with increased regulatory T-cells and decreased production of IFN- γ , a cytokine essential in producing vaccine response. Thus, given that parasites change the microbiome and altered microbiomes can lead to decreased response to vaccines, we propose that one of the major mechanisms driving the phenomenon of reduced vaccine efficacy in cases of intestinal parasitic infection is disruption of the microbiome.

Conclusion: Our proposed hypothesis offers an additional avenue of investigation to determine the best way to approach this dilemma. The prevalence of helminthic infections globally highlights the importance of understanding their role in vaccination so that appropriate steps can be taken to ensure that vaccines are effective and capable of protecting from public health threats. Body of the abstract written in paragraph form.

Abstract #4

Initial Treatment of Asthma with a Single Combination Inhaler: Comparing US (NAEPP) versus Global (GINA) Guidelines

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Asthma is the most common chronic illness in childhood and a significant health problem in the United States, as well as globally. If asthma is not treated properly, it can impact quality-of-life and lead to more visits in the emergency room. Current asthma treatment involves the use of inhalers, however each year there are more to choose from, making it difficult for providers to choose the correct treatment. The goal of this project is to educate future healthcare providers on the different asthma treatment guidelines currently available and provide insight into which they should follow for better patient outcomes in the primary care setting. There are several guidelines that exist for asthma treatment with the most prominent being the National Asthma Education and Prevention Program (NAEPP) and the Global Initiative for Asthma (GINA). NAEPP is based in the United States, whereas GINA is international. In recent years, there have been discrepancies on what they each recommend for asthma treatment. This research aims to explore why these discrepancies exist and which guideline uses the most up-to-date evidence-based data. These two guidelines were reviewed and directly compared along with the primary literature cited by each guideline to support their recommendations. The two guidelines were chosen based on recommendations for asthma treatment in UpToDate. The comparison demonstrated that NAEPP guidelines are revised much less frequently and is currently out-of-date compared to GINA guidelines due to the omission of new research. NAEPP guidelines were last published in 1997, 2007, and 2020, whereas GINA guidelines are updated every year. Newer studies named the SYGMA (Symbicort Given as-needed in Mild Asthma, 2021) 1 and 2 trials showed that in those with mild asthma, a new novel strategy for treatment reduces asthma exacerbations. The use of a combination inhaler that contains low-dose glucocorticoid and the fast-acting long-acting beta-agonist (LABA), formoterol, taken as needed for symptom relief is recommended as first-line treatment in GINA guidelines. NAEPP guidelines still recommend first line treatment with a short-acting beta-agonist (SABA) such as albuterol. Given the rapid changes that can occur in the field of medicine, this research suggests that the NAEPP needs to update their US asthma guidelines more frequently for medical providers.

POSTER PRESENTATION

Abstract #5

Pharyngeal Mucocutaneous Leishmaniasis *braziliensis* Years After Initial Untreated Cutaneous Lesion: Delayed Pharyngeal Presentation of Leishmaniasis

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Primary mucocutaneous leishmaniasis (MCL) specific to the head and neck is rare. Relapse of MCL following spontaneous resolution of cutaneous lesions has been described but is an uncommon manifestation of a disease already rarely seen in the United States. We report a case of MCL in the oropharynx of an immunocompetent patient 5 years after spontaneous resolution of initial regional cutaneous lesion. This case highlights the value of remote travel history in evaluation of mucosal lesions refractory to typical medical management whose diagnosis remain elusive following extensive work-up.

POSTER PRESENTATION

Abstract #7

Synchronous papillary thyroid cancer and colorectal cancer in a patient with a CHEK2 mutation

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We present a unique case of a young female who presented with synchronous papillary thyroid carcinoma and invasive rectal adenocarcinoma who was subsequently found to have a sporadic CHEK2 (checkpoint kinase 2) mutation. The patient is a 29-year-old Canadian female with an 8-month history of bright red blood per rectum. She saw two different physicians who did cursory exams and gave her diagnoses of hemorrhoids and possible rectal ulcers, respectively. Due to Canadian health care restrictions, the patient had to pay out of pocket for a colonoscopy. On exam, the colonoscopist found a large rectal tumor. Subsequent work up discovered a stage IIa rectal carcinoma and a synchronous papillary thyroid carcinoma. The patient underwent brachytherapy of the rectal carcinoma followed by a low anterior resection of the rectum, and a total thyroidectomy. Due to her synchronous tumors, a genetic panel was performed, and she was found to be positive for a low-risk CHEK2 mutation. CHEK2 is a gene that codes for the checkpoint kinase 2 protein which responds to DNA damage repair. Mutations of CHEK2 are usually inherited and have been implicated in breast cancers, colorectal cancers, thyroid cancers, kidney cancers, and prostate cancers. Patients with Chek 2 mutations can present with one or more carcinomas. This patient's genetic counselors concluded that her mutation was most likely sporadic given her negative family history. To our knowledge, this is the first case report of a patient with a CHEK2 mutation who presented with synchronous papillary thyroid carcinoma and invasive colonic adenocarcinoma. The occurrence of colorectal cancers and papillary thyroid cancers in those under 30 with no family history is very low, which signifies the rarity of our patient presenting with both cancers at such a young age. Given her young age and the lack of significant family or past medical history, this patient had an 8 month delay between onset of symptoms and diagnosis. Physicians need to be aware of the chance of spontaneous mutations that give rise to carcinomas and work up patients with significant symptoms regardless of age.

Abstract #8

Drug Reaction with Eosinophilia and Systemic Symptoms from Levofloxacin for Treatment of Necrotizing Pneumonia, A Case Report

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Drug reaction with eosinophilia and systemic symptoms, or DRESS, is a medication-induced adverse effect that necessitates early recognition to prevent severe and potentially deadly complications. This report documents the case of a 55-year-old woman undergoing treatment for right lower lobe necrotizing pneumonia for several weeks. After an antibiotic change to Levofloxacin, the patient developed a progressively diffuse morbilliform pruritic rash, peripheral eosinophilia, and several systemic complications, including elevated liver enzymes, consistent with DRESS syndrome. This case highlights the importance of maintaining a differential diagnosis of DRESS, due to its often-evolving symptoms throughout care.

POSTER PRESENTATION

Abstract #9

A Review of Prostate Cancer Screening Guidelines and Their Impact on Treatment Options

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Prostate cancer is the second leading cause of death in men in the United States (US) and guidelines in the last two decades have evolved surrounding the topic of prostate-specific antigen (PSA) screening due to high rates of overdiagnosis, and unwanted side effects due to treatment. Some guidelines recommend that the decision to screen should be a shared medical decision between the provider and patient based on factors such as age, race, or family history of prostate cancer to limit unwanted complications from treatments, while others suggest more routine screening. The purpose of this study was to compare two separate guidelines on prostate cancer screening and determine if differences in screening could have a negative impact on rural communities. We addressed our question by first comparing two separate US guidelines including the United States Preventative Services Task Force and American Urology Association. We then looked at the trend of how prostate cancer diagnoses might have been affected by the changes and differences in the two guidelines. Extensive research was then conducted through databases such as Pubmed and Google Scholar to look for any literature that showed how prostate cancer was being diagnosed and treated in rural communities. Keywords included “prostate cancer screening”, “prostate cancer rural”, and “rural healthcare”. Inclusion criteria included articles with defined “rural” populations and exclusion criteria were studies conducted before the change in guidelines. Overall, there was a decrease in prostate cancer diagnoses since the change in guidelines in 2012, but death rates from prostate cancer remained relatively stable during the same period. There were five studies used in this research that showed prostate cancer trends in rural communities. These showed an overall lower rate in PSA testing, poorer survival, more advanced stage of disease upon diagnosis, but also a higher rate of other comorbid conditions. Rural communities have limited access to quality healthcare and an overall lower health literacy, so it is important to consider these factors when recommending screening for prostate cancer in these communities as diagnosing the disease in an earlier stage can lead to better health outcomes.

POSTER PRESENTATION

Abstract #10

Medical Schools' Naloxone Trainings - Improved Attitudes and Competency: A Literature Review

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The opioid epidemic remains a significant public health concern worldwide. Naloxone, an opioid antagonist, is an essential tool for preventing opioid overdose fatalities. However, medical students' attitudes and competency in naloxone administration/Opioid Overdose Prevention and Response remain understudied and undertrained. This literature review aims to evaluate the effectiveness of naloxone training in improving medical students' attitudes and competency. A literature search was conducted and we evaluated whether each included study demonstrated significant improvement in objective knowledge and subjective (e.g. attitudes, biases, and confidence) improvements regarding naloxone administration in their respective pre- and post-training surveys. Thirteen articles met our criteria and were included in this review. Consistently, the outcomes suggest that naloxone training (whether in-person or online) significantly improves medical students' knowledge, attitudes, and competency in administering life-saving naloxone in cases of opioid overdose. Arming the over 56,000 U.S. M1 & 2 medical students (DO & MD) with understanding of naloxone through installation into medical school curriculum could exponentially increase treatment with naloxone, especially with physicians poised to be impactful trainers themselves.

POSTER PRESENTATION

Abstract #11

Characterization of the HPG Axis with a Deficiency of FGFR1

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Gonadotropin-releasing hormone (GnRH) is an indispensable hormone for the commencement and maintenance of vertebrate reproduction. The development of GnRH neurons depends greatly on fibroblast growth factor (FGF) signaling. Inactivating mutations on FGF receptor 1 (FGFR1) have been shown to reduce GnRH, leading to compromised fertility in humans. However, how FGFR1 deficiency impacts the structural integrity of the GnRH neuronal network, gonadal function, and growth of the reproductive tract in adults was not well understood. This study investigates the organization of GnRH neurons, ovarian structures, and uterine mass in adult female mice globally deficient in FGFR1 (FGFR1-floxed mice). We hypothesized that there would be decreased GnRH neuron numbers associated with altered ovarian structure and uterine growth in FGFR1-deficient mice. This investigation was accomplished by quantifying (1) GnRH neurons in different brain regions, (2) ovarian follicles and corpora lutea, and (3) mass of the uterus, an estrogen- and progesterone-dependent organ. Our results confirmed that there was a 66% reduction in the number of GnRH neurons in FGFR1-floxed mice. Specifically, this reduction occurs uniformly in all brain regions where GnRH neurons reside. This reduction in GnRH neurons was coupled with decreased numbers of maturing or mature ovarian follicles. Surprisingly, the uterine mass of the FGFR1-floxed mice was increased by about 40% due to unknown causes. These results suggest FGFR1 deficiency negatively impacts GnRH neurons in all brain regions and significantly alters the ovarian and uterine function in females. This study highlights how a single deletion of a signaling gene can lead to downstream defects that cause infertility and other reproductive disorders.

POSTER PRESENTATION

Abstract #12

Modern Day Management of Refractive Errors: Will LASIK Become a Thing of the Past?

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Refractive errors, encompassing hyperopia, myopia, presbyopia, and astigmatism, affect millions of people globally. While forms of visual correction have been available for centuries, this literature aims to explore the significant advances in refractive error management over the last two decades. Glasses and contacts have been a staple for early management of ametropia which is likely due to their deeply rooted history in society. However, novel procedures have emerged over the last twenty years broadening the choices in refractive error correction. In this modern age, the patient has a multitude of options, each with its own benefits and associated risks, enabling them to make decisions based on their personal requirements and constraints. A comprehensive search was performed on ClinicalKey, Google Scholar, and PubMed databases, finding peer-reviewed articles that included key words such as cost, benefits, and risks of each method of correction: Glasses, Contact lenses, Laser-assisted in-situ keratomileusis (LASIK), and Implantable Collamer Lens (ICL). The search focused on articles published in the last ten years and included cohort studies, randomized trials, systematic reviews, and meta-analyses. In total, twenty-nine articles containing the afore mentioned criteria were selected. A large majority were published in the last three years except for two publications that spoke to non-wavering facts related to glasses and contacts. While considering a treatment option, the predominant factor that drives patient decision making across the board is the cost associated with each method and usage reflects that. There are more glasses users than contact users, more contact users than LASIK procedures, and more LASIK procedures than ICL procedures. While LASIK was found to have a dominating presence in this arena, as technology develops and new options gain popularity, we may see this technique become outdated. Notably, the ICL has made strides in the recent years to improve upon short comings of LASIK. By compiling these findings and evaluating their strengths and limitations, we aim to empower the patient in educating themselves on their choice of correction as well as clearly lay out the treatment options to guide healthcare professionals in their clinical decision making.

POSTER PRESENTATION

Abstract #13

Comparative Analysis of US and CT in Diagnosing Acute Cholecystitis

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Acute cholecystitis (AC) constitutes a large proportion of all abdominal pain cases, underscoring the critical importance of timely and precise diagnosis. Therefore, this project attempts to investigate the advantages and limitations of two imaging modalities in the diagnosis of AC, ultrasound (US) and computed tomography (CT). The methodology of this study involves a synthesis of the existing literature comparing the two modalities. Our systematic review, analyzing comparative studies published in the past five years, has identified 10 articles assessing CT and US in the diagnosis of AC using the Boolean phrase “ultrasound AND acute cholecystitis AND diagnosis AND CT not cholelithiasis” within Pubmed, SCOPUS, Medline and ClinicalKey. In the selection of these 10 articles, only cases of AC without complications were included. Overall, the objective of our study is to provide guidance to clinicians to make informed decisions in selecting the most appropriate diagnostic imaging modality for suspected AC cases. By compiling and organizing this information, our results will help clinicians expedite their diagnosis and minimize redundant imaging procedures, thus expediting treatment. This will help alleviate financial and other burdens on patients. Ultimately, our investigation aims to add valuable insights into the diagnosis of and therefore appropriate treatment of acute cholecystitis.

POSTER PRESENTATION

Abstract #14

Preference for Large Language Model or Physician Generated Responses to Clinical Prompts

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The advent of Large Language Models (LLMs) and Generative Artificial Intelligence (AI) has started to merge the disciplines of data scientists and physicians to potentially revolutionize patient interactions in healthcare settings. AI models, particularly generative models like Chat-Generative Pre-Trained Transformer (ChatGPT), exhibit an ability to produce human-like responses when prompted, offering a unique integration potential within healthcare.

AI has been shown to be high quality and accurate with medical responses as appraised by healthcare professionals. Considering the prevalent gaps in healthcare accessibility and quality, AI could offer significant benefits to patient groups contending with such barriers.

This report investigates the potential and limitations of employing LLMs and generative AI in composing quality responses in patient interactions, by drawing comparisons with responses given by human physicians.

Our objective is to assess the 2026 cohort enrolled in the Digital Health Track at Rocky Vista University through an educational exercise, contrasting the perceived quality and empathy of LLM responses to those of human physicians.

We will be completing a literature review of previous studies comparing LLMs to physician responses. Using Scopus and PubMed with Boolean phrases “ (patient AND preference OR empathy) AND (chatbot OR “artificial intelligence” OR “large language model”) AND preference.” Our inclusion criteria included a timeframe of the past five years and study designs focused on LLM utilization in healthcare. We excluded non-English articles and non-experimental designs (i.e. book chapters, posters).

We anticipate that LLM responses will be perceived as more empathetic and of higher quality than those of human physicians. Some limitations in our study include the number of available, relevant articles and lack of qualitative analysis of LLM responses.

There are many barriers within the field of medicine which could benefit from the utilization of AI in the generation of high quality, accurate, and empathetic responses to patient concerns. The ability to utilize this rapidly expanding tool within the healthcare field could aid in enhancing patient experiences and increasing healthcare accessibility.

POSTER PRESENTATION

Abstract #15

Provider perceptions of patient submitted photography

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Society has increasingly adopted the use of smartphones and mobile health applications over the past decade (Sim, 2019). While research has primarily focused on the availability and functionality of these applications (Franko and Tirrell, 2012; Fran and Zhao, 2022), an apparent gap in understanding the attitudes and beliefs of those whose daily workflows have evolved in order to interpret and manage various forms of this datum remain. Thus, this study aims to identify and characterize differences in providers' perceptions of utilizing patient submitted photography to surveil and monitor cutaneous conditions/lesions via a 10-question Qualtrics survey developed and adapted from prior literature on the medico-ethical ramifications of patient submitted photography (Kunde et al., 2013), use of patient submitted photography in clinical practice (Abbott et al., 2018), and quality improvement measures for submitted photography (Vodrahalli et al., 2021). The survey was distributed through email, Facebook, GroupMe, or Slack to residents, advanced practice providers, and physicians working within dermatology or primary care (family and internal medicine). In total, 19 people responded, and 15 surveys were fully completed. Descriptive statistics including mean, standard deviation, and standard error were used to assess survey responses for all age groups. A Student's t-test was subsequently used to compare means between individuals 20-40 years old (closely corresponding to the Millennial generation) and 41-60+ years old (closely corresponding to Generation X), with an α of 0.05. Responses to questions 1 and 2, regarding the timeliness of patient care and referrals, and question 6, concerning improving healthcare disparities, were significantly different between age groups ($p=0.02$; $p=0.04$; and $p=0.01$, respectively). Though sample size and lack of practice setting diversity limit the strength and generalizability of these findings, these results suggest age may influence a provider's perception of patient submitted photography, highlighting the importance of developing algorithms and approaches that aid all providers in adopting and benefitting from this tool. Future studies should utilize focus groups and interviews to contextualize these findings and promote age-appropriate integration of patient submitted photography.

POSTER PRESENTATION

Abstract #16

Epigenetic changes associated with antisocial personality disorder

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Antisocial personality disorder (ASPD) is a psychological disorder without clear etiology or underlying associated molecular changes. This personality disorder is characterized by behaviors such as impulsivity, aggressive tendencies, and lack of remorse. Although personality disorders are commonly studied, there are limited options for treatment of ASPD, with a majority of the therapy styles focusing on relieving symptoms rather than treating the underlying causes. Environmental factors affect the methylation patterns of specific genes, each of which is a potential target for treatment that would address the underlying causes of antisocial personality behaviors. The cause of ASPD is multifactorial, consisting of genetic predisposition, epigenetic changes, and environmental factors. Much of the current research focuses on epigenetic links to the above-mentioned antisocial personality traits, but the research does not extend to connect those traits to ASPD as a diagnosis. In this paper, we review and expand on the available literature by using PubMed and Google Scholar to examine peer reviewed, high quality, primary research articles linking development of ASPD to environmental effects of alcohol use, sexual and physical abuse, prenatal parental risk, and experiences of low socioeconomic status and bullying in childhood. Throughout this narrative review, we identify the connection between these same environmental factors to epigenetic changes in the genes MAOA, PPM1G, 5-HTT, HTR1B, OXTR, NR3C1, and SLC6A4, each of which have associated antisocial behaviors such as aggression, impulsiveness, and callous-unemotional traits. This indicates that there is overlap between methylation patterns in these genes due to environmental exposures which may lead to the direct manifestation of ASPD traits. While our research focuses on the epigenetic changes associated with ASPD, there is a large pool of research dedicated to genetic polymorphisms which our paper does not address. However, by understanding the possibility of epigenetic influences and environmental exposures of those with ASPD and ASPD traits, this paper will further drive research to develop treatments, with the goal to decrease the negative effects ASPD has on patients' lives and society as a whole.

Keywords: antisocial personality, epigenetic, hypermethylation, serotonin receptors, oxytocin receptors, aggression

POSTER PRESENTATION

Abstract #17

How Safe is Transnasal Tracheoscopy?

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Introduction:

In-office transnasal tracheoscopy (TNT) is an emerging diagnostic and interventional technique for laryngotracheal disease, that reduces the frequency of surgical evaluation and intervention. Limited safety data are available specifically for in-office TNT. We hypothesize TNT to have a low incidence of hemodynamic events, low complication events, and be well-tolerated.

Methods:

This is a single-institution prospective cohort study of subjects with laryngotracheal disease who underwent in-office TNT. A hemodynamic event occurred when any of the following occurred during or post-procedure: heart rate (HR) >100 beats per minute, systolic blood pressure (SBP) >170 mmHg, diastolic BP (DBP) >100 mmHg, and/or oxygen saturation <90%. Pre-procedure hemodynamic subject data that met event criteria were excluded. Surveys on tolerability, complications, and adverse events less than 24 hours, 72 hours, and 30 days after the procedure were completed. Descriptive statistics were used on preliminary data collected.

Results:

Twenty-six subjects were enrolled with 36 TNT procedures completed. Twenty-three (88%) were females with low comorbidity scores of zero to mild (n=23, 88%). Hemodynamic events occurred 13 (10%) times, with elevated SBP occurring most frequently. Procedure abortion occurred twice (6%), and no subjects required elevation in care. No cardiovascular events occurred during the study period. Anxiety (n=10, 28%) and gagging (n=10, 28%) were the most common physician-reported complications. TNT was well tolerated with an overall rating of 3 on a Likert-scale rating.

Conclusion:

Preliminary results of safety and tolerability of in-office TNT are consistent with anticipated hemodynamic events with low complication rates and acceptable tolerability.

POSTER PRESENTATION

Abstract #18

Professional behavior assessment of Osteopathic Student Doctors by diverse Healthcare Providers in the Rotational Setting

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Background:

In educational settings, health profession students are expected to learn from each other through interprofessional education (IPE) initiatives. In the practice environment of healthcare, developing professional students are expected to practice collaboratively with other providers to achieve common goals as a means for solving a variety of problems and complex issues. Preparing students to work in complex healthcare environments calls for educational innovations to prepare for a collaborative workforce.

Design: A cohort study used the Interprofessional Professional Assessment (IPA) tool to assess professional behaviors of third year Doctor of Osteopathy (DO) students by professionally diverse medical practitioners during one of the student's degree-required clinical experience. Students in the Class of 2024 were invited and oriented to the purpose and method of the study during their coursework. Students self-selected whom to share the link of the IPA tool using the electronic survey tool, Qualtrics®. Survey data was analyzed using Excel® for statistics.

Results: Preliminary results demonstrate a variety of healthcare professionals engaged with 3rd year DO students during the clinical year including nursing, chiropractors, social workers, physical therapists, athletic trainers, dieticians, medical assistants and physician assistants, with nursing engaged with the most. Overall, students were assessed favorably in all areas with the strongest agreement in communicative behavior with 65% of the students receiving a perfect score. Healthcare providers outside of medicine strongly agreed the majority of participants demonstrated interchange of thought, active listening skills, respectful dialogue, and responsive to questions posed by other members. The section of the tool titled as accountability revealed the largest areas of opportunity with low agreement to the questions of coordinating care with other health professions, reviewing relevant documentation from other professionals and contributing to decisions about patients regardless of hierarchy. These findings arose from a variety of providers with one qualitative comment expressing charting was not observed. This lack of

visual collaboration may suggest the practice environment or the productivity payment structure in the healthcare environment creates difficult for various healthcare providers to collaborate.

Conclusion: Some third year DO students from one university demonstrated evidence of collaborative practice during third year clinical education with a variety of professionals using the Interprofessional Professional Assessment. General trends demonstrate communicative providers with an inability to demonstrate accountability between providers.

POSTER PRESENTATION

Abstract #19

A Review of Cervical Cancer Screening Guidelines

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Cervical cancer is the fourth most common cancer in women and 99 percent of cervical cancer is caused by Human Papillomavirus (HPV), the most common sexually transmitted infection worldwide. The Food and Drug Administration (FDA) has approved three types of tests for cervical cancer screening, including: (1) cytology alone, (2) co-testing with cytology and high-risk HPV (hrHPV), and (3) hrHPV alone. The objective of this research was to assess how three organizations, American Cancer Society (ACS), American College of Obstetrics and Gynecology (ACOG), and the United States Preventative Service Task Force (USPSTF), each adapted their recommendations for 21- to 29-year-olds as more recent research was released. We compared the primary literature cited in each guideline along with new research publications that were identified in a PubMed search. Specifically, we used the following keywords: “cervical cancer”, “cervical cancer screening”, “HPV”, and “HPV vaccination”. This search returned only two publications that included 78 countries; however, neither reported the number of participants. Due to the limited number of primary literature, we were not able to conduct statistical analyses. Nonetheless, we found that the USPSTF and ACOG both recommend screening starting at age 21 with cytology alone every 3 years. However, ACS recommends screening starting at age 25 with hrHPV alone every 5 years. All three US cervical cancer screening guidelines made recommendations based on the same studies published by USPSTF in 2018. However, each interpreted the data differently and prioritized different testing goals, such as: ACS expects simplified guidelines to increase compliance, USPSTF is concerned about adverse obstetric outcomes, and ACOG is concerned about limited access to the new testing modalities. To date, the USPSTF is in the process of researching the impact of vaccinations on cervical cancer and updating their guidelines accordingly. Thus, we suggest that clinicians use the more simplified ACS guideline to educate their patient population about cervical screening timelines based on a patient’s age.

POSTER PRESENTATION

Abstract #19

A Review of Cervical Cancer Screening Guidelines

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Cervical cancer is the fourth most common cancer in women and 99 percent of cervical cancer is caused by Human Papillomavirus (HPV), the most common sexually transmitted infection worldwide. The Food and Drug Administration (FDA) has approved three types of tests for cervical cancer screening, including: (1) cytology alone, (2) co-testing with cytology and high-risk HPV (hrHPV), and (3) hrHPV alone. The objective of this research was to assess how three organizations, American Cancer Society (ACS), American College of Obstetrics and Gynecology (ACOG), and the United States Preventative Service Task Force (USPSTF), each adapted their recommendations for 21- to 29-year-olds as more recent research was released. We compared the primary literature cited in each guideline along with new research publications that were identified in a PubMed search. Specifically, we used the following keywords: “cervical cancer”, “cervical cancer screening”, “HPV”, and “HPV vaccination”. This search returned only two publications that included 78 countries; however, neither reported the number of participants. Due to the limited number of primary literature, we were not able to conduct statistical analyses. Nonetheless, we found that the USPSTF and ACOG both recommend screening starting at age 21 with cytology alone every 3 years. However, ACS recommends screening starting at age 25 with hrHPV alone every 5 years. All three US cervical cancer screening guidelines made recommendations based on the same studies published by USPSTF in 2018. However, each interpreted the data differently and prioritized different testing goals, such as: ACS expects simplified guidelines to increase compliance, USPSTF is concerned about adverse obstetric outcomes, and ACOG is concerned about limited access to the new testing modalities. To date, the USPSTF is in the process of researching the impact of vaccinations on cervical cancer and updating their guidelines accordingly. Thus, we suggest that clinicians use the more simplified ACS guideline to educate their patient population about cervical screening timelines based on a patient’s age.

POSTER PRESENTATION

Abstract #20

Meta-analysis of host responses to SARS-CoV infection

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The emergence of SARS-CoV-2 reawakened the need to rapidly understand the molecular etiologies, pandemic potential, and prospective treatments of infectious agents. The lack of existing data on SARS-CoV-2 hampered early attempts to treat severe forms of COVID-19 during the pandemic. This study coupled existing transcriptomic data from SARS-CoV-1 lung infection animal studies with crowdsourcing statistical approaches to derive temporal meta-signatures of host responses during early viral accumulation and subsequent clearance stages. Unsupervised and supervised machine learning approaches identified top dysregulated genes and potential biomarkers (e.g., CXCL10, BEX2, and ADM). Temporal meta-signatures revealed distinct gene expression programs with biological implications to a series of host responses underlying sustained Cxcl10 expression and Stat signaling. Cell cycle switched from G1/G0 phase genes, early in infection, to a G2/M gene signature during late infection that correlated with the enrichment of DNA Damage Response and Repair genes. The SARS-CoV-1 meta-signatures were shown to closely emulate human SARS-CoV-2 host responses from emerging RNAseq, single cell and proteomics data with early monocyte-macrophage activation followed by lymphocyte proliferation. The circulatory hormone adrenomedullin was observed as maximally elevated in elderly patients that died from COVID-19. Stage-specific correlations to compounds with potential to treat COVID-19 and future coronavirus infections were in part validated by a subset of twenty-four that are in clinical trials to treat COVID-19. This study represents a roadmap to leverage existing data in the public domain to derive novel molecular and biological insights and potential treatments to emerging human pathogens.

POSTER PRESENTATION

Abstract #21

Perioperative Venous Thromboembolism Risk for Below Knee Amputation

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Patients who undergo major lower extremity amputation, such as below knee amputation (BKA), are at high risk of venous thromboembolism (VTE) due to prolonged hospitalization, immobility, and other associated surgical risks. However, rates of VTE and associated mortality after major lower extremity amputation are not well defined. United States veterans are disproportionately affected by both diabetes and cardiovascular disease, which puts them at increased risk of amputation. The goal of this study is to describe the rate of VTE events and mortality after BKA in a large cohort of United States Veteran patients.

We performed a retrospective cohort study using available data from the national Veterans Administration (VA) Informatics and Computing Infrastructure for all adult patients nationwide within with VA Central Data Warehouse who had undergone a first-time BKA between October 1, 2016, and January 1, 2023. We defined a VTE event as a new diagnosis of PE or extremity DVT. We excluded patients who had a VTE, underwent an amputation, or were on anticoagulation in the 6 months prior to BKA. Medical comorbidities were identified by the presence of at least two ICD-10 codes present in the patient's records within the 12 months prior to date of BKA. Adjusted hazard ratios (aHR) with confidence intervals (CI) were calculated.

A total of 6,307 patients underwent a first-time surgical BKA. Of these, 132 (2.1%) patients had a new VTE event within 90 days of BKA, of which 81 (61.4%) occurred within 30 days. Patients who experienced a VTE within 90 days post BKA were slightly younger (66 vs. 68 years) and were less likely to have a history of diabetes. Patients with VTE within 90 days of BKA had a 73% increase in mortality (aHR 1.73, 95% CI 1.38-2.17) over those without VTE.

About 2% of patients in our cohort had a VTE within 90 days of BKA. Additionally, patients who had a VTE within this timeframe had significantly increased mortality rates. Future studies are warranted to investigate the role of VTE prophylaxis post-BKA, and to determine whether these results are representative of the United States population.

POSTER PRESENTATION

Abstract #22

Acute Chest Pain in a Patient with a Non-Strangulated Hiatal Hernia

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Acute chest pain resulting in spontaneous idiopathic hemomediastinum is a rare, potentially life-threatening occurrence. Hemomediastinum describes bleeding into the mediastinum, space in the thoracic cavity containing the heart. Three types of spontaneous hemomediastinum have been described: due to bleeding disorders such as hemophilia or anticoagulants, due to mediastinal tumors, and due to sudden increase in intrathoracic pressure. The clinician's differential diagnoses for acute chest pain rarely include complications of hiatal hernias. Considering the frequency of such hernias in the general population, the following case report demonstrates how this condition can progress to a pathological process. The case described herein is a rare case of idiopathic spontaneous hemomediastinum presenting as acute chest pain. An 83-year-old male presented to the ED via ambulance with a chief complaint of acute chest pain after performing sixty push-ups prior to arrival. Pt was hypotensive, and on physical examination was pale however well-nourished with decreased bilateral breath sounds. Emergent radiographic imaging included portable chest X-ray (CXR) and computed topography scan (CT) of the chest with contrast (aortic dissection protocol). CXR demonstrated a large hiatal hernia, a tortuous aorta and chronic changes. CT demonstrated a small portion of stomach found to protrude superiorly into the inferior aspect of the hiatal hernia with extravasation of amorphous hyperdense/hemorrhagic fluid, concerning for gastric mesenteric vessel rupture. Immediate cardiothoracic and intensive care consults were obtained. Cardiothoracic surgery recommended nasogastric tube insertion and decompression. A small amount of gastric aspirate was obtained from the nasogastric tube. The patient was discharged two days later without further incident.

CT provided the rare diagnosis of idiopathic spontaneous hemomediastinum secondary to a mesenteric vessel rupture in a patient with known hiatal hernia. Since he did not suffer recent trauma or falls, the vessel rupture most likely occurred during physical exertion. Push-ups increase intrathoracic pressure and may have contributed to the diagnosis. This case illustrates the importance of high suspicion of underlying pathology secondary to clinical gestalt, mechanism of injury, patient's medical history, and need for early specialty consultation. It additionally demonstrates the vitality of appropriate emergent radiographic imaging, in this case CT, to reduce morbidity and mortality.

POSTER PRESENTATION

Abstract #23

Approaches to Reducing the Black-White Infant Mortality Gap

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Black newborns are more likely to die during childbirth with a mortality rate of 2.3 times that of White newborns in the United States. There are a variety of risk factors that contribute to infant mortality including very low birth weight, pre-maturity, <10 prenatal visits, maternal smoking, and obesity. Many of these risk factors are found at a higher incidence in Black mothers compared to White mothers. The aim of this research is to compare interventions for efficacy in reducing the Black-White infant mortality gap and propose a framework for how combining different interventions could address risk factors associated with Black infant mortality rates. A search was performed using the search terms “Interventions to reduce the Black White infant mortality gap” which yielded 21,400 results. Refining the inclusion criteria to include full Peer-reviewed original research and review articles published in English that evaluated efficacy of interventions from 1987-2023 yielded 39 articles. After reviewing abstracts to determine relevance, 9 reviews and 3 original research papers were used. Three interventions designed to target very low birth weight (VLBW) were examined: incorporating telemedicine prenatal visits, increasing prenatal visits, and coordination of care during and after pregnancy. Interventions that target pre-mature birth weight and pre-maturity were analyzed because targeting these risk factors seems to be the most effective way to reduce infant mortality rates. It was found that providing comprehensive prenatal care reduces the rate of VLBW infants, pre-term births, and overall infant mortality. While none of the studies looked specifically at the Black-White infant mortality gap, it can be theorized that if these interventions are used to provide comprehensive prenatal care to at-risk Black mothers, it can potentially reduce the Black-White infant mortality gap. This paper is limited by the amount of attempted and proposed ideas to reduce the Black-White infant mortality gap as well as significant results in those that did target infant mortality rates. Future research examining these interventions in combination and comparing their effects in at-risk populations as well as comparing their effects between different races is called for to determine their cumulative effects on the Black-White infant mortality gap.

POSTER PRESENTATION

Abstract #24

Contractures, Rheumatoid Arthritis and Multiple Sclerosis: A Difficult Airway Case Report

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Introduction - Difficult airway can be anticipated in patients with cervical contractures, and with rheumatoid arthritis (RA) due to changes in cervical spine and the temporomandibular joint³. Most cases utilize either video-assisted laryngoscopy or fiberoptic bronchoscopy (FOB) for airway establishment^{2,3}. This case highlights the utilization of both techniques after the identification of a difficult airway, thorough airway management planning and proper execution.

Case description – We present a case of a septic 71-year-old female (BMI: 21kg/m²) undergoing exploratory laparoscopy for bowel perforation. The patient had a past medical history of multiple sclerosis, rheumatoid arthritis, aortic stenosis, and osteoarthritis. Preoperative evaluation was significant for severe cervical contractures with nearly 90 degrees of cervical rotation to the right, and the mental protuberance nearly parallel with the plane of her clavicle. Airway examination of the patient showed a Mallampati class IV, thyromental distance of <3 fingers, two finger breaths of mouth opening and poor neck mobility. Due to anticipated potential for hemodynamic instability, midazolam and fentanyl were administered for assistance with preinduction arterial line placement. Induction occurred via etomidate, and rocuronium and patient was able to be bag mask ventilated via two-person technique. While difficult, one provider was able to place the video laryngoscope and achieve a view of the glottic aperture with cricoid pressure. Another anesthesia provider was able to pass tube through cords via fiberoptic bronchoscope and pass a size 7.5 endotracheal tube. The tube was secured, and the patient tolerated the surgical procedure well.

Discussion – While the relationship between patients with rheumatoid arthritis and intubation complications are well documented, case reports in patients with severe RA and coinciding MS with contractures are lacking. In such cases, the use of combined video laryngoscopy and FOB is a valuable technique, with its use increasing in recent years. It should be considered when either technique alone fails, with less experienced operators or when isolated FOB is expected to be difficult such as the presence of emesis or blood within the airway. This combined technique with proper planning and communication can prevent unnecessarily lengthy intubations, improving patient safety when used initially.

POSTER PRESENTATION

Abstract #26

A Review of Dyslipidemia Screening Guidelines in Young Low-Risk Individuals

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Dyslipidemia is the imbalance of lipids such as total cholesterol (TC), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and triglycerides (TG) in the blood. Changes in these markers have been shown to increase the risk of cardiovascular disease (CVD) and cerebrovascular accidents (CVA). When to screen individuals for dyslipidemia varies significantly, as some organizations recommend screening at 20 years-old, while others say 35 years-old, or never. This research focused on whether the most up-to-date literature and organizations' guidelines support universal dyslipidemia screening for adults less than 35 years-old. Dyslipidemia's relation to CVD and CVA has been well established; however, minimal research has weighed those risks with the prevalence of dyslipidemia at younger age groups, which is reflected in the ambivalence of current guidelines. Comparing these guidelines, their supporting literature, and the most up-to-date research, it may become more evident at what age the benefits of screening outweigh the risks. Key word search included "dyslipidemia screening", "young adult lipid screening", "pediatric lipid screening" and "high cholesterol screening" and was performed through Google Scholar and PubMed. Inclusion criteria comprised of studies published 2008 or more recent, >20 patients under the age of 35, and randomized control trials, systematic reviews, and meta-analyses. Dyslipidemia screening guidelines for individuals without additional risk factors were reviewed and compared from the Centers for Disease Control and Prevention (CDC) and the American Academy of Family Physicians (AAFP). Seven publications referenced by these organizations were reviewed, as well as five publications that met the inclusion criteria for the most recent research on dyslipidemia in young adults. Approximately 27 percent of young adults have undesirable HDL, while only 9.2 percent of individuals in the same age group were diagnosed with dyslipidemia. Results of this study demonstrate that there is a wide range of dyslipidemia screening guidelines by some of the largest medical organizations in the US, and that millions of individuals under the age of 35 likely have undiagnosed dyslipidemia. Although ultimately up to the provider and/or their company policy, the benefits appear to outweigh the risks for dyslipidemia screening in young adults to minimize the risk of CVD and CVA.

POSTER PRESENTATION

Abstract #27

The role of race based clinical decision-making tools in diagnosis and mortality disparities between Black and White Americans with chronic kidney disease.

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Black Americans suffer disproportionately more from chronic kidney disease (CKD) than White Americans. One area that has been underexplored is the use of race-based clinical decision-making tools. It is known that there is more racial variation within racial groups than between them, thus the correlation between race and genetics is unclear. Subsequently, race-based clinical tools like the 2009 CKD-EPI GFR calculator risk embedding this false correlation between race and genetics into clinical practice.

The 2009 CKD-EPI GFR calculator adjusts glomerular filtration rate (GFR) values for Black patients which increases the GFR value produced and has since been replaced by a race-neutral calculator in 2021. This project explored how the 2009 calculator may have contributed to underdiagnosis and misclassification of CKD for Black patients and discuss how this may have led to increased mortality from CKD. Finally, the project made recommendations for which GFR calculator is appropriate for clinical use.

Prevalence and mortality data for Black and White Americans pertaining to CKD stage 3-5 were obtained from publicly accessible databases and compared using a t-test. Randomly created values were used to represent serum creatinine values for a sample population of Black and White males and females and were used in the race-adjusted and race-neutral GFR calculator and compared using a t-test. A single set of simulated serum creatinine values was used in the 2009 and 2021 GFR calculators and the percentage of falsely categorized patients was calculated.

Both prevalence and mortality rates were statistically higher for Blacks than Whites (p-value <0.05). The race-adjusted 2009 CKD-EPI GFR calculator produced statistically significantly higher values for Black patients than the race-neutral 2021 GFR calculator. In the representative dataset, 17.8% of males and 12.6% of females had been misclassified as have a CKD stage less severe compared to how the 2021 calculator scored them.

The use of race-based clinical decision-making tools like the 2009 CKD-EPI GFR calculator systematically increase GFR values for Black patients and overestimate their kidney function, which likely contributes to reduced diagnosis and treatment of CKD for this population. It is recommended that the 2021 CKD-EPI calculator be used in clinical practice.

POSTER PRESENTATION

Abstract #28

The impact of fatigue on the diversity of the oral microbiome

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The composition of species within the oral microbiota influences health or disease through alterations in species diversity and varying quantities of pathogenic bacteria. An association between chronic systemic disease and the oral microbiome has been reported although the mechanisms have not been elucidated. Fatigue is a predominant symptom of many chronic systemic diseases and a frequent experience in healthy individuals. An increase in microbial alpha diversity is known to correspond to healthier individuals. However, there is a significant gap in knowledge on how the oral microbiome changes in healthy individuals experiencing fatigue. More so, there is less of an understanding in individuals who experience intense stress and fatigue such as medical students. This research can help improve our understanding of fatigue and suggest a novel path to improve wellbeing and performance.

This study's purpose is to determine if changes in fatigue experienced by healthy individuals are associated with oral microbiome diversity. The study population consists of 37 RVUCOM first year students who will be de-identified and assigned participant ID numbers for all collections and surveys. Throughout the 2023 fall semester, buccal swabs will be collected at three timepoints, first during orientation week which will serve as a control for the participant, second collection at the end of their first block and the third collection around the last week of the semester. Each collection will have a corresponding survey to assess fatigue, stress, sleep, and other factors that affect the oral microbiome.

The results of this study will evaluate association through generalized linear models using fatigue levels, microbial 16s rRNA sequencing, and demographic covariates. Ultimately, the results are expected to show a decrease in alpha diversity of the oral microbiome with increased level of fatigue. The main limitation of this study will not establish causation but will assess if associations are significant to warrant intervention. Subsequent research will investigate associated lifestyle factors and their connection to changes in fatigue and the oral microbiome. A deeper understanding of how oral microbial diversity changes in healthy individuals can lead to a preventive, diagnostic and therapeutic tool that will help improve quality of life.

POSTER PRESENTATION

Abstract #29

Pediatric Bacterial Tracheitis: A 13-year Case Series of Children Without Artificial Airways

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Background: Bacterial tracheitis is a rare, life-threatening obstructive airway condition, necessitating early detection and intervention. Anecdotally, we have observed the disease is more severe during seasons with high rates of influenza B. The goal of this study is to describe a large cohort of children with bacterial tracheitis and identify differences in illness severity based on viral etiology. We hypothesize influenza B is common in children with bacterial tracheitis and associated with more severe disease.

Methods: After institutional review board approval, retrospective chart review was conducted from 2007-2020 at a large, tertiary care children's hospital. Patients with pre-existing endotracheal tube or tracheostomy were excluded.

Results: 30 children (17 males (56.7%)) without artificial airways were diagnosed with acute bacterial tracheitis by laryngoscopy. Mean age was 6.17 years (SD +/- 4.93). Most common presenting symptoms included stridor (86.7%), cough (83.3%) and dyspnea (80.0%). At presentation, 25 patients (83.3%) exhibited leukocytosis, and 3 (10%) were febrile. The most common viruses were parainfluenza (23.3%) and influenza B (23.3%). The most frequent bacterium was methicillin-susceptible *Staphylococcus aureus* (MSSA 20%, no MRSA). 12 patients (40%) required intubation and 15 (50%) required surgical management. Patients with influenza B had no significant difference in disease severity compared to children without, as measured by length of intubation (128 vs 41.6 hours ($p=0.244$)), length of stay (7.16 vs 3.65 days ($p=0.0645$)) and need for surgery (42.9 vs 68.8% ($p=0.363$)).

Conclusion: This represents the first study to evaluate outcomes from bacterial tracheitis in relation to viral etiology. Similar to previous literature, bacterial tracheitis was most prevalent among school-age children with stridor, cough, dyspnea and leukocytosis, and most frequently due to *S. aureus*. Children with concomitant influenza B infection had a non-significant longer

duration of stay and intubation compared to children without; this result may be limited by small sample size in this rare disease.

Significance: Bacterial tracheitis is a life-threatening infection that is rarely encountered by most pediatric specialists but requires prompt diagnosis and management. This large review is useful to help guide management in this uncommon disease process.

POSTER PRESENTATION

Abstract #30

The Benefits of Genetic Testing for Prognosis of Disease in a Rare Variant of Grade III Anaplastic Astrocytoma in a Young Adult Male

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A 26-year-old Asian-American male presented to a neurology outpatient clinic in April 2020 with complaints of progressive headaches and nausea since March 2020. Initial neurology workup with brain magnetic resonance imaging showed a large non-enhancing mass in the right frontal lobe. The size of the tumor resulted in mass effect causing pressure on surrounding brain structures and progression of the patient's symptoms. After undergoing a craniotomy, pathology of the tumor indicated the patient had a primary glioma consistent with the World Health Organization grade III anaplastic astrocytoma. Post-diagnosis, the patient was provided a predictive prognosis of a two-year survival rate, however after genetic testing, the patient was given a prolonged estimated survival of ten years. Genomic sequencing resulted in a diagnosis of isocitrate dehydrogenase 2 mutant astrocytoma, a rare variant of anaplastic astrocytoma. Further treatments included concurrent radiation treatment and oral temozolomide, as recommended for first-line treatment of anaplastic astrocytoma. Targeted therapies resulted in the patient's current clinical stability.

The patient in this case report relays the importance in the use of next generation sequencing when diagnosing patients with primary malignant glial tumors. For this patient, identification of positive prognostic factors of isocitrate dehydrogenase 2 (*IDH2*) mutation, loss of α -thalassemia/mental retardation syndrome X-linked (*ATRX*) gene, and methylation of the O6-methylguanine-methyltransferase (*MGMT*) promoter gene allowed the patient to have a better guide in what to anticipate regarding his disease progression, with an improved outcome and has allowed him to be considered for future clinical trials, depending on the stage of the trial and when the recurrence of his tumor occurs.

The use of genetic sequencing in primary gliomas has been a major development in clinical practice and has affected the management, outcome, and future treatment options for patients with varying subtypes of gliomas. The goal of using next generation sequencing within practice for providers is to have a better idea of prognosis when discussing care goals with patients, as well as help develop a more directed course of action for treatment based on the specific genetic mutations. More specific and targeted chemotherapy regimens will provide treatment options that are more individualized for each patient, providing an overall better outcome.

POSTER PRESENTATION

Abstract #31

Worsening Coronary Artery Disease Found in a Routine Lung Cancer Screen

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Case: Our patient is a 56-year-old male with a past medical history of HIV with AIDS on Prezcoibx and Biktarvy, hypertension, hyperlipidemia, CVA after tuberculosis meningitis, 25 pack year smoking history, and coronary artery disease (CAD). He currently smokes 5 to 7 cigarettes daily. He used cocaine and heroin in the past and currently smokes marijuana daily. His CAD was initially diagnosed in 2013 after an episode of chest pressure that felt like “an elephant sitting on his chest.” CTA showed heavy coronary artery calcification (CAC) and left heart catheterization showed CAD. He was started on aspirin, Plavix, and pravastatin 80 mg (atorvastatin is contraindicated in a patient taking Prezcoibx).

10 years later the patient had a routine low dose CT (LDCT) for lung cancer screening done that revealed dense three-vessel coronary artery calcifications. The patient denied chest pain at the time but admitted to exertional dyspnea that limited him to one flight of stairs. A coronary artery calcium CT scan revealed a score in the 90th percentile. An exercise stress test showed equivocal ST segment changes (patient has baseline ST elevation in inferior leads and leads V2-V3) at a low workload. A nuclear stress test showed abnormal left ventricular perfusion due to 2 large defects, one in the left anterior descending artery (LAD), and the second in the right coronary artery (RCA). Left ventricular function post-stress test was normal with an ejection fraction of 59%. The patient was switched to atorvastatin.

One week later, the patient arrived at the hospital with severe, sharp left sided chest pain. A diagnostic angiography showed moderate calcification of the left main coronary artery, complete occlusion of the ostial LAD, 70% stenosis of the first diagonal of the LAD, and 60 to 70% stenosis of the RCA. Cardiology recommended transferring the patient to a tertiary care center for an emergent coronary artery bypass graft surgery (CABG). Unfortunately, the patient tested positive for COVID-19 and the CABG was put on hold.

3 weeks later the patient presented again to the hospital with sharp left sided chest pain. He was transferred to a tertiary care center for a CABG. A triple CABG was performed (in situ left internal mammary artery to LAD, aorto-radial to distal RCA, aorto-radial to ramus intermedius). The patient was stable during surgery and post bypass TEE showed normal biventricular function. He was transferred to the cardiothoracic intensive care unit on multiple vasopressors and slowly was weaned and extubated. He was then discharged to a short-term rehab facility and eventually home once independence was regained.

Discussion: Routine health maintenance is important both for its intended and potential unintended purpose. One study found that 38.4% of patients were found to have significant CAC

on LDCT. 31.2% of those patients had established CAD at baseline. This is significant because finding new or worsening CAC can change management for patients, including their medications, referral to cardiologist, or even surgery in the case of our patient.

POSTER PRESENTATION

Abstract #32

A Systematic Review of Early Colonoscopy in Lower GI Bleeds

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Introduction: The possibility that earlier endoscopic intervention leads to rapid identification and control of bleeding reducing mortality in patients with Lower GI Bleed (LGIB) makes colonoscopy timing a critical point in management and must be considered with the risk of perforation.

Methods: A literature review was conducted using published papers within PubMed from April 2016 to January 2023 which detected 933 studies without filtration. Filtration, by publication date and year, reduced the pertinent to 35 studies. The studies were carefully examined and selected based upon relevant and up to date information within the literature.

Results: Twenty-two studies were reviewed and analyzed including identifying comorbidities, assessing for hemodynamic stability, risk factors and outcomes.

Discussion: The ACG and the ASGE both recommend early colonoscopy for severe acute LGIB in high-risk patients, although evidence for these recommendations remains weak. Emergent colonoscopy did not show improvement in mortality, rebleeding, and death. Social determinants of health are a large factor in diagnosis and treatment of LGIBs. Although we are learning more about risks and benefits of early colonoscopy, timing of colonoscopy in LGIB in patients is not definitive and needs to be explored further.

Conclusion: Early identification and control of LGIBs are necessary to decrease morbidity and mortality. The role of early colonoscopy with risks and benefits remains unclear despite ongoing studies. Management should be determined on a case-by-case basis.

POSTER PRESENTATION

Abstract #33

Navigating Skin Health in a Pandemic: Teledermatology's Role, Accuracy, and Societal Implications

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Introduction: The accessibility to dermatological care for patients during COVID-19 was greatly improved with implementation of teledermatology. The COVID-19 pandemic has created a need for accessible and quality healthcare. The accuracy of teledermatology is questioned due to its visual aspects but there is little evidence to dispute this prior to COVID-19. This literature review examines the accuracy and accessibility of teledermatology.

Methods: A literature review was conducted using published papers within PubMed from 2022 to 2023 which detected 117 studies without filtration. Filtration, by publication date and year, reduced the pertinent to 21 studies. The studies were carefully examined and selected based upon relevant and up to date information within the literature.

Results: Twenty-one studies were reviewed and analyzed including identifying accuracy, access to care, and productivity during COVID-19.

Discussion: Physicians using teledermatology was able to provide care virtually during the COVID-19 pandemic, without compromising the quality of care and with high concordance of diagnostic rates compared to face-to-face visits. This tool allows dermatologists to open more clinic visits with flexibility to accommodate for various populations for accurate diagnosis and treatment. Teledermatology has provided a way for specialized, accurate care without a need for a specialty personnel on site.

Conclusion: The efficiency and accuracy of teledermatology that was illuminated by the COVID-19 pandemic shows promise for future integration. Teledermatology has the potential to provide specialty care to rural and underserved areas with the efficiency and accuracy of an in-person dermatologist.

POSTER PRESENTATION

Abstract #35

Intranasal Emergency Drug Delivery: A Review

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Introduction: Development of systemic intranasal medications is of growing interest in pharmaceutical research. Intranasal administration offers a less invasive and more rapid delivery of medications compared to intramuscular or subcutaneous routes. Intranasal delivery can also allow some medications with low oral bioavailability to reach the brain. Application of intranasal drugs is an efficient and easily accessible route in both pediatric and adult patients which allows for rapid and acute treatment in public settings.

Purpose of Review/Research Question: This review will discuss current and likely future intranasal medications for acute applications.

Methods: A focused literature review was conducted and used to describe applicable nasal anatomy, mechanism of intranasal drug absorption, current clinical intranasal medications, advantages and obstacles of intranasal drug delivery systems, obstacles and future directions for intranasal drug delivery.

Results: Intranasal delivery for acute care is non-invasive, rapid, and relatively simple to administer. Several characteristics make a drug suitable for intranasal delivery. These include small mass (<1 kDa), simple structure, and lipophilic character. An appropriately small volume is needed to avoid runoff into the throat or out of the nostril. Nasal absorption has been adapted to administer glucagon, naloxone, and midazolam. The most significant obstacles to intranasal drug delivery are presented by the chemistry of the drug molecules that can be formulated for delivery; however, novel formulations including solubility and absorption enhancers can assist in overcoming some of these barriers.

Future Directions (Contributions to the field): Overall, the pharmaceuticals of intranasal systemic drug delivery was valued at \$71.89 billion in 2022 and is expected to expand at a compound annual growth rate of 7.45% from 2023 to 2030. Of the promising intranasal formulations in development, systemic glucocorticoid intranasal delivery for acute adrenal crisis has the potential to be a first-in-class intranasal therapy. An early-stage glucocorticoid formulation currently in clinical trials utilizes nebulized prednisolone instead of hydrocortisone to treat adrenal crisis taking advantage of the greater potency and duration of prednisolone. A follow up trial is planned to test micronized prednisolone powder for rapid achievement of therapeutic plasma concentrations.

POSTER PRESENTATION

Abstract #36

Exploring the Link Between UV Nail Lamps and Subungual Skin Cancer: A Call for Research.

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In nail salons, ultraviolet (UV) lamps emitting UV-A light are used to speed up gel nail polish's drying and curing process. However, it is essential to note that UV light is a known carcinogen (1), which has raised concerns about the increased risk of skin cancers on the dorsum of the hands and under the nails. Although only two case studies have reported the development of squamous cell carcinoma (SCC) on the dorsum of the hand or digits associated with repeated use of UV nail lamps, these cases suggest a potential link (2). Another study examining cadaveric fingernails reported that nails block all UV-B light, but a small amount of UV-A light reaches the nail bed (4). We used both Pubmed and Cochrane databases to search for articles using the keywords "UV nail lamps, SCC, and UV lights". Currently, there is limited and conflicting data on the exposure to UV lamps required to develop subungual SCCs and other skin cancers. Furthermore, the symptoms of subungual SCC can be easily confused with other conditions such as fungal, verruca vulgaris, or chronic infections, resulting in delayed diagnosis and treatment (3). Limitations to this topic include the fact that SCC takes many years to develop and presents late in life. Determining if SCC is directly caused by exposure to UV nail lamps will be difficult to ascertain. However, considering the well-established connection between UV exposure and skin cancer, along with the frequent use and popularity of nail treatments that employ UV lamps, as well as the lengthy periods of time that it can take for skin cancer to develop, we deem it crucial to educate the public about the potential risks posed by UV lamps. Moreover, we call for further investigation of any possible association between using UV lamps and the emergence of skin cancers.

Abstract #37

Distal Esophageal Leiomyoma in a Young Female Patient

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Esophageal leiomyomas are the most common benign tumor of the esophagus and are most typically found in male patients over the age of 40. These tumors are uncommonly found in young patients, typically very slow growing, and have low probability of progression to malignancy. We report a leiomyoma in the distal esophagus of a young woman complicated by the presence of a paraesophageal hernia. This case describes an atypical presentation and the surgical management.

Our patient presented multiple times since March 2020 with concerns of hematochezia, gastroesophageal reflux, vomiting, and cough. Mild symptoms had been recurring since before 2016, at the age of nineteen. The leiomyoma was identified by esophagogastroduodenoscopy in July 2020, with recommendation for observation. With symptom progression in February 2023 of worsening dysphagia, hematochezia, loose stools, epigastric pain, cough, and estimated increase in tumor size to 6 cm, surgical resection was recommended.

Due to the paraesophageal hernia and distal location of the tumor, an abdominal robotic-assisted laparoscopic surgery was performed in July 2023 when the patient was twenty-six. Esophageal dissection was conducted utilizing a Penrose drain for control. Upon entering the mediastinum, the tumor became apparent and was enucleated. The esophagus was closed in layers, the diaphragmatic hiatus tightened by partial reapproximation of the crus of the diaphragm with mesh overlay, and a Toupet partial fundoplication was performed. Botulinum toxin was injected into the pylorus to avoid temporary gastroparesis from these anatomical changes. Post-operative diet was advanced to full liquids prior to discharge. Pathologic analysis of the tumor confirmed a spindle cell neoplasm consistent with benign leiomyoma.

Most esophageal leiomyomas do not occur in our patient's demographic and most resections are performed by thoracoscopic surgery. If this tumor was developing gradually since before the patient was nineteen as the history suggests, it could truly be a pediatric tumor. Rarely are pediatric esophageal leiomyomas localized, as in this case, but they are more commonly found in females. For distal esophageal leiomyomas, an abdominal approach for resection should be considered for surgical management. This case underscores the importance of access to healthcare and investigating a robust differential.

POSTER PRESENTATION

Abstract #38

Manual Medicine as a Therapeutic Agent for Anxiety

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This study offers a comprehensive systematic review of literature, exploring the effects of manual medicine treatment performed for patients with anxiety disorders. The utilization of non-pharmacological treatments as a therapy to relieve anxiety has shown contradictory reports. Thus, our study aims to establish a consensus regarding the application of manual medicine as a viable therapy for addressing anxiety symptoms. Articles were obtained using a systematic search on both PubMed and Google Scholar, adhering to defined inclusion criteria. These criteria include articles written in English, peer-reviewed, anxiety conditions documented, and manual medicine delivered by a respectfully qualified professional. Manual medicine modalities include massage therapy, aromatherapy massage, Osteopathic Manipulative Therapy (OMT), foot reflexology, Swedish massage, acupressure, manual therapy, mixed light touch manual therapy, and therapeutic touch. After initial data collection, two experienced researchers independently screened the articles using two metrics: Level of Evidence (LOE) table from Ebell et al.¹ and a screening criterion incorporating unique elements from the search process. The quality of the included articles was assessed using Strength of Recommendation Taxonomy (SORT)¹. The review incorporates 38 articles, all of which received an LOE rating of 2 or better and aligned with our specific screening criterion. The Strength of Recommendation based on SORT and our body of evidence was assigned a “B” rating. Among the included articles, n=36 demonstrated statistical significance in favor of using manual medicine therapy as an anxiety treatment. Thus, a pattern emerged, wherein individuals receiving manual medicine interventions displayed a statistically significant reduction in anxiety intensity. The positive results for the aforementioned manual therapies on anxiety symptom improvement are shown here: 14/18 (78%) massage therapy, 2/2 (100%) aromatherapy massage, 5/6 (83%) OMT, 4/5 (80%) foot reflexology, 2/2 (100%) Swedish massage, 1/1 (100%) acupressure, 1/1 (100%) manual therapy, 1/1 (100%) mixed light touch manual therapy, 2/2 (100%) therapeutic touch. Considering the accumulation of positive results, manual medicine should be considered an effective strategy for anxiety management.

POSTER PRESENTATION

Abstract #39

Intraocular Pressure Measurements post Ultraviolet Corneal Crosslinking: Handheld tonometer vs Rebound tonometer

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In ophthalmology, intraocular pressure (IOP) measurements rely on devices using the surface of the cornea to measure a patient's IOP. Specifically, handheld tonometer and newly developed rebound tonometry are two different devices primarily used in ophthalmology clinics today. Previous studies have shown them to be equally reliable in non-pathological eyes. However, there are limited studies on how these devices compare to one another in pathological eyes, such as those that have keratoconus and have undergone ultraviolet corneal crosslinking (UV-CXL) with riboflavin. Keratoconus, an anterior ocular condition characterized by progressive pathological coning of the corneal tissue, can be treated with UV-CXL to prevent further progression of the cornea. With this procedure altering the composition of cornea, our study sought to determine which IOP measurement device is more reliable in post-UV-CXL eyes. The process of this retrospective study involved compiling 34 patient data sets including demographic information, preoperative and postoperative corneal thickness and IOP measurements. Data analysis showed the handheld tonometer when compared to the rebound tonometry device is equally reliable in post-UV-CXL eyes. These results were from patients who had the traditional epi off UV-CXL. Based on these results, the handheld tonometer which has been the stable modality of measurement in ophthalmology does not need to be replaced by the new rebound tonometer in clinics performing epi off UV-CXL. Future studies can examine whether the method of epi on versus epi off UV-CXL impact the reliability of tonometers in the measurement of IOP.

POSTER PRESENTATION

Abstract #40

Use of Contextual Design to Assess Workflows and Redesign Opportunities After EHR Conversion

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Introduction

Contextual Design (CD) is a process that aggregates user data into a comprehensive understanding of workflow that directly informs the design of software.¹ Given its capabilities in systematically evaluating processes, participants, and environments, CD is uniquely suited to evaluate complex workflows.¹

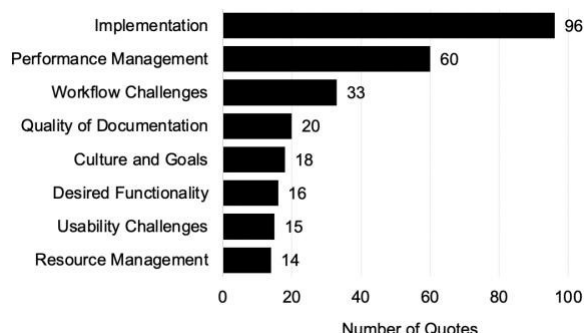
The Mayo Clinic system recently completed the Plummer Project which standardized clinical workflow and converted to a single-enterprise electronic health record (EHR) system, Epic.² In this study, methods from CD (contextual inquiry, affinity diagramming, work modeling, and consolidation) were applied to assess clinical workflow after a major multi- site EHR conversion.

Methods

Data was obtained from a series of 46 semi-structured interviews of operational and clinical leaders in Surgical and Emergency Departments across four regional sites. Interview questions were designed to gather post-conversion data on the use of the new EHR, its relationship to other information systems and clinical workflow, and opportunities for workflow and system improvement. These findings were shared with clinical and operational leaders at Mayo Clinic.

Results

The application of CD methods to assess workflow post EHR implementation resulted in the identification of eight themes derived from a total of 272 quotes gathered from post-implementation interviews. Themes and corresponding quotes are represented in a consolidated



affinity diagram (Figure 1). Figure 2 displays the frequency of themes.

Figure 1: Affinity diagram consolidating quotes into representative themes

Figure 2: Themes revealed from applications of Content within each theme reflected patterns found in individual stories, which revealed representations of the population of EHR users. Some gaps in user understanding of the EHR software's underlying frameworks and strategies or practices for effective integration of the EHR into their personal workflows were indicated. The notion of using the multi-site convergence to a single-enterprise EHR as an opportunity to standardize workflows and processes across multiple sites was salient across several themes.

Discussion

This study provides a proof-of-concept for CD as an approach for evaluating clinical workflows post software implementation. The presentation of user data in an affinity diagram provides a representative summary of clinical workflow without sacrificing the specificity provided by each quote. These findings can be used to address workflow and suggest potential redesigns, which ultimately improve health system performance.

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POSTER PRESENTATION

Abstract #41

Efficacy of Prostate Cancer Screening Guidelines in Early Detection

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Second to skin cancer, prostate cancer is the most prevalent cancer found in men within the United States population and it is a leading cause of cancer-related death. However, overdiagnosis of prostate cancer can lead to unnecessary invasive procedures, which may result in physical and psychological harm to a patient. Conversely, if screening is avoided early on, this can lead to undetected progression of cancer and a worse prognosis. The purpose of this research was to explore how the rate of more severe stages of prostate cancer at time of diagnosis has changed given current screening guidelines and their foundational research used to develop these recommendations. The current research focuses on the reduction in number of incidences of prostate cancer and death secondary to prostate cancer. Screening guidelines for prostate cancer were reviewed and obtained from PubMed (i.e., U.S. Preventative Services Task Force, American Cancer Society, and American Urological Association), while the Centers for Disease Control and Prevention and National Cancer Institute Surveillance, Epidemiology, and End Results Program were utilized for collection of data on prostate cancer rates, prostate cancer stage at diagnosis, and prostate cancer deaths. The data was publicly available and deidentified; data from 2004 to 2020 was analyzed. Statistical analysis was conducted in Microsoft Excel to calculate and graph rate-of-change and percentage-of-change results. A limitation of this research was age groups were limited to 25-year increments. The rates of metastatic prostate cancer at time of diagnosis were explored from 2004 to 2020, which revealed that the rate of the most severe (i.e., distant stage) prostate cancer diagnoses has increased in males >40 years old. More specifically, the number of diagnoses in ages 40-64 has increased by 52.9% from 2004 to 2020. Based on this finding, an initial screening age of 55 is not early enough for providers to effectively screen for prostate cancer in the 40-54 age group of men. Providers may consider adhering to the guidelines established by either ACS or AUA, which are more compatible with earlier screening, reduced stage at time of diagnosis, and more favorable outcomes with men afflicted by prostate cancer.

POSTER PRESENTATION

Abstract #42

Short Video Training for Delivery Injury Diagnoses

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Identification and repair of obstetric anal sphincter injuries (OASIs) can reduce the risk of chronic complications. Studies suggest that delivery attendants in the USA have gaps in obstetric delivery laceration identification. Therefore, we tested a brief video training module to improve classification and diagnosis of delivery injuries in a diverse cohort of labor and delivery providers. We aimed to measure participant accuracy and confidence in identifying perineal and non-perineal lacerations and to test the effectiveness of a short training video. We hypothesized that video education would be efficient and effective for improving knowledge of postpartum

care. In a multi-center electronic survey study, we obtained baseline and post-video data on learners' classification and identification of delivery injuries using previously validated text and image questions. The video was designed and reviewed by a multidisciplinary panel. We included participants whose practice includes vaginal deliveries and who completed both the pre- and post-education survey. We compared the respondent accuracy before and after viewing the video to assess its effect and changes in participant confidence. From 19 sites, we received 555 baseline responses. Of those, 191 (34%) watched the video training and completed the post-education reassessment. Most participants (70%) reported no formal education on vaginal delivery injury diagnoses; many (41%) did not use the third-degree subcategory system. After watching the video, 53% of participants improved their accuracy by 16% +/- 1.3 SEM. For participants with the lowest baseline scores (less than 1 SD below the mean), 89% improved OASI and non-perineal laceration identification after training. Rectal buttonhole laceration identification was the least accurate, with only 30-40% correct responses. Overall, 40% of participants reported enhanced confidence after video education. Video instruction has not been studied extensively in obstetric quality improvement, but these findings suggest that brief online education can improve provider knowledge and confidence in accurate obstetric laceration identification and diagnosis. This has important diagnostic, quality, and research implications for postpartum obstetric care.

POSTER PRESENTATION

Abstract #43

How a delivery method of surgical skills workshop impacts tactile and NBME subject examination performance

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The COVID-19 pandemic necessitated significant adaptations across various sectors of society, including educational institutions, which introduced online remote learning into their curricula. This study aims to examine the disparities between remote and in-person teaching concerning perceived learning, perceived independence, and graded performance among medical students participating in Surgical Skills Week. This course is completed prior to surgical rotations at Rocky Vista University College of Osteopathic Medicine (RVUCOM). A survey was administered to two successive cohorts from the institution: the first cohort engaged in Surgical Skills Week remotely in 2020-21, while the second cohort participated in person in 2021-22. The survey further aimed to ascertain students' levels of interest in surgical specialties, evaluate their learning experiences, and collect individual scores in Surgical Skills Week and the National Board of Medical Examiners (NBME) Surgery Subject Examination (Shelf). Survey data was collected through Qualtrics and analyzed using MedCalc v.20.216. Results showed that students reported higher levels of perceived personal confidence (3.55 ± 0.93 vs. 2.98 ± 0.94 ; $P < 0.001$) and operating room competency (3.45 ± 0.76 vs. 2.96 ± 0.70 ; $P < 0.001$) in the in-person setting compared to the online setting. However, there was no significant difference ($P = 0.400$) in Shelf exam performance. One of the limitations of this study is the subjective nature of many survey questions, which rely on memory and personal experiences. These findings can enhance the pre-surgical curriculum by either maintaining in-person instruction or considering a hybrid model that combines in-person workshops with virtual lectures. The latter approach offers potential benefits, including reduced financial and travel burdens, particularly for students rotating at satellite sites, without compromising the quality of education.

POSTER PRESENTATION

Abstract #44

Life Flight Medical Professional's Comfort Level with Pediatric Medical Treatment

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Background/Objective: The pediatric population constitutes around 27 percent of ED visits (Diggs, et al., 2015, *Prehosp. Emerg. Care*). Of these, even less require life flight transport as this is reserved for significant traumas or essential transports making the treatment onboard crucial for survival. Many life flight medical professionals have had some degree of exposure to pediatric-based training, but little to no research has been done to assess their comfort level with this training and if they desire more. This research evaluated just this issue in order to inform life flight companies where there are deficits and if employees want increased pediatric training.

Methods: A 12-question survey was developed in Qualtrics and administered to life flight medical professionals during training sessions at Air Methods Colorado office in Centennial. Survey responses from flight medics and nurses (n=102) ages 18 years and older were collected and analyzed by Excel. An ordinal-by-ordinal association addressed with a gamma statistic was used to assess data for associations related to the proposed hypothesis.

Results: After analysis of the datum, a significant correlation (p-value= 0.0052, ordinal-by-ordinal association) between comfort level with pediatric treatment and desire for additional pediatric training was found. Additionally, there is an inverse relationship (gamma=-0.3298, gamma statistic) between the current level of pediatric training and desire for increased training indicating that those with less pediatric training are the ones with the strongest desire for more pediatric based training.

Conclusions: Results from this research can inform life flight companies that increased pediatric training is something of interest for their medical professionals. This will allow companies to provide a more well-rounded training experience by including more pediatric training practices. This research prompts others to build upon these findings to reveal any additional deficits that might exist in life flight medical professional's training.

POSTER PRESENTATION

Abstract #45

Anesthetic challenges in the management of splenic hydatid cyst excision

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Visceral hydatid cyst caused by *Echinococcus granulosus* is still endemic in many parts of the world. Almost any organs can be involved, but those most commonly affected include the liver (55%–70%), lungs (18%–35%), and less commonly, the spleen (5-8%). Because the rupture of hydatid cyst can potentially lead to hemodynamic instability, anaphylactic shock, and/or death during surgical removal, special considerations must be made by the anesthesia provider when approaching these procedures.

We present a case report of a previously healthy 24-year old female whom presented to the ED for epigastric pain. She was later found to have a cystic, trabeculated fluid accumulation in her spleen, with particular involvement of the superior pole. Following pertinent evaluation and diagnosis, and inability for percutaneous drainage, the young female was scheduled for total splenectomy.

During the procedure, inadvertent rupture of the splenic cyst during EndoRetrieval bag placement caused significant spillage of cystic content in the peritoneal cavity. Although the patient remained hemodynamically stable intraoperatively and for several hours following surgery, she later experienced an overnight, delayed and severe angioedema of the hands, face, and neck resembling an anaphylactic reaction. Success mitigation with adrenaline, antihistamines, steroids, and crystalloid fluids prevent severe and potentially fatal sequelae.

This present review will describe the successful pre-, intra-, and postoperative management of ruptured splenic hydatid cyst from the perspective of the anesthesia provider. We hope to further bolster the already present body of literature on therapeutic modalities, especially in the context of the more rarely seen splenic hydatidosis.

POSTER PRESENTATION

Abstract #46

Vitamin D for Fall and Fracture Prevention in the Elderly: A Guideline Comparison

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Vitamin D (VD) is essential to achieve optimal bone metabolism, bone mineral density, and bone integrity. Bone density declines with age, putting the elderly population at an elevated risk for fractures. Elderly individuals have a greater incidence of VD deficiency, which is a risk factor for both falls and fractures. An agreed upon daily VD intake amount for elderly individuals has yet to be determined. Therefore, this paper compares VD guidelines to determine the optimal daily VD intake for elderly individuals for the prevention of falls and fractures. The vitamin D guidelines from the Institute of Medicine, U.S. Preventative Services Task Force (USPSTF), American Geriatrics Society (AGS), and Endocrine Society were compared. Then, a review of the current data regarding VD supplementation in the elderly was performed. Risk ratios and 95 percent confidence intervals for both fall and fracture risks from selected randomized control trials and meta-analyses were displayed in forest plots to compare results for various VD dosages. USPSTF recommends the lowest daily VD intake of 400 international units (IU) per day, while AGS recommends the greatest, at least 1,000 IU per day. Studies incorporated in this analysis showed that daily VD supplementation between 700 IU and 1,000 IU significantly reduced falls. Similarly, fracture risk was only reduced when daily VD supplementation exceeded 400 IU. Despite the upper limit set at 4,000 IU, 10,000 IU per day does not appear to induce toxicity and is considered safe for most individuals. This paper supports the AGS recommendation that elderly men and women should supplement with at least 1,000 IU of VD per day. Additionally, one should choose a vitamin D3 over a D2 supplement as D3 has been shown to be more effective at raising serum VD levels. Supplementation can be safely initiated in older adults without a prior serum VD level, given the absence of underlying conditions that increase the risk of hypercalcemia.

POSTER PRESENTATION

Abstract #47

Pre-participation Cardiac Screening for Young Competitive Athletes: Comparing United States (AHA) and European (ESC and EFSMA) Guidelines

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Sudden cardiac death (SCD) is an umbrella term that includes a wide variety of cardiac pathologies, most notably hypertrophic cardiomyopathy (HCM), congenital coronary artery anomalies, valvopathies and more. To date, SCD is the most common cause of non-traumatic death in young athletes and yet there is no global consensus for heart screening in this population. The aim of this research is to evaluate the current pre-participation guidelines in place in the United States and Europe to determine what aspects offer the greatest reduction in rates of SCD. The methods used in that evaluation were a thorough review of the research that led to the creation of the guidelines themselves, as well as the research that has been conducted in the meantime. Terms such as SCD, HCM, preparticipation and heart screening were used on platforms including google scholar and PubMed which returned many articles, seven of which were deemed most relevant and utilized in this research. They were chosen based on their direct association with the guidelines being compared as well as the matching participant demographics in the studies conducted. The major difference between US and European guidelines was the US exclusion of electrocardiogram (ECG) in initial screening. The American Heart Association (AHA) advises screening with personal history, family history and physical exam while the European Society of Cardiology (ESC) and the European Federation of Sports Medicine Association (EFSMA) include those aspects as well as ECG. A 2019 study by Williams, et al, found that abnormal cardiac conditions found during pre-participation screening were caught by ECG at a rate more than double that of history and physical alone (15 with ECG vs seven with H&P out of 3620 participants) The AHA model for excluding the use of ECG as part of initial screening is explicitly based on the financial implications of its inclusion as well as the burden on the healthcare system requiring qualified professionals to interpret the results of the ECGs. The inclusion of ECG as part of initial pre-participation screening has shown to be a valuable tool in the revelation of conditions that may lead to SCD, but a more thorough cost benefit analysis may be required to detail which approach to guidelines is more appropriate.

POSTER PRESENTATION

Abstract #48

Medial Ulnar Collateral Ligament Injury Risk Factors in The Overhead Throwing Athlete

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Repetitive valgus stress experienced at the medial ulnar collateral ligament (UCL) by the overhead throwing athlete can lead to tears and eventual ligament rupture, affecting roughly 10 percent of professional baseball pitchers. Surgical correction sees a 63 percent return to previous throwing level; however, the average post operative athlete will return to play 10 months after surgery with significant rehabilitation. This study was created to identify potential risk factors associated with UCL injury that could be targeted in future studies. The specific aims of this study were to identify if, in college level male baseball players, the age the athlete began throwing competitively, the year the athlete started throwing curve balls, athlete compliance with following structured stretching programs before throwing, and the quality of education they received on arm health maintenance are associated with risk for UCL injury. A 19-question survey was developed with Qualtrics to investigate these risk factors. The survey was distributed via Facebook and Instagram. Descriptive statistics and Student T-Tests were performed to analyze average responses and correlation of risk factors to injury. A total of 15 respondents completed the survey and were included in the data analysis. The average respondents began competitive play before the age of eight, threw curveballs starting at age 11.6, and threw between 20 and 29 percent curveballs when pitching. Overall, stretching compliance was variable and education was rated “poor”. There were no significant differences when comparing arm injury to the age a player started throwing curveballs ($p=0.84$, Student t-test), arm injury and the percent of curveballs thrown ($p=0.78$, Student t-test), arm injury and arm health education received from coaches ($p=0.19$, Student t-test), and arm injury and arm health education received from external resources ($p=0.31$, Student t-test). This data suggests that early introduction of valgus stress to the UCL and early curveball use may play a role in arm injury. Stretching routines may need to be adapted to prevent future injury and it would be beneficial to investigate and standardize the education coaches receive regarding arm injury prevention. Limitations to this study include sample size, distribution methods, and participation bias.

POSTER PRESENTATION

Abstract #49

Airway management in maxillofacial trauma: Further defining the role of submental intubation

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The complex nature of facial fractures requires that efficient airway measures be utilized in order to maintain a patent airway throughout initial inspection as well as treatment. Currently, the gold standard airway utilized in repairing fractures of the midface is endotracheal intubation. However, due to the limited area that surgeons and anesthesiologists have to work in, other methods of airway management have been considered. Notably, submental intubation has been proposed as a promising alternative method. This review seeks to summarize the current body of literature surrounding airway management in the setting of facial fracture with focus on the risk/benefits of submental intubation and how frequently it is utilized in clinical practice. To investigate this relationship, SCOPUS, PubMed, and Google Scholar databases were searched in the date range of 1986 to present. The cutoff of 1986 was established because submental intubation was first introduced to the literature as a new procedure that year. A review of 63 articles pertaining to airway management of facial fracture repair showed many positive outcomes for patients who had received submental intubation. Furthermore, studies on the safety of submental intubation have reported complication rates as low as 3.5%, which can be contrasted against a 40% rate as has been reported with regard to the elective tracheostomy. Despite this resume, further investigation into the literature regarding the occurrence and utilization of submental intubation revealed that it was only used a fraction of the time that it was indicated. A review of several studies reported an average of 10% occurrence of submental intubation when all indications were met. This is indicative of a major discrepancy between the literature and clinical practice, so this review then seeks to identify potential explanations for this phenomenon, while proposing further exploration of submental intubation as a viable option.

POSTER PRESENTATION

Abstract #50

Addressing the Challenge of Period Poverty in Kenya: An Examination of Strategies Used Between 2022 and 2023 Global Health Trips

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Introduction: Period poverty refers to the lack of access to menstrual products, education about menstruation, waste management, and adequate sanitation facilities. Period poverty can lead to consequences including social isolation, harassment, missed school/work, and significant health issues. An estimated 65% of Kenyan women and girls cannot afford basic sanitary products, which leaves the women of Kenya profoundly vulnerable to period poverty.

Objective: To evaluate the utilization of funding to reduce period poverty during two RVU global health outreach trips. Secondly, to identify areas for improvement that can inform future efforts. **Methodology/Approach:** In 2022 and 2023 Rocky Vista students fundraised money for feminine hygiene products and education for the annual global health trip to Oloitokitok, Kenya. A retrospective cost analysis evaluated fundraising utilization and distribution between the 2022 and 2023 RVU Kenya Trips.

Results: In 2022, \$4,587 was raised of which \$3,394.38 was utilized. Makini kits consisted of 8 reusable pads. The cost per kit equated to \$5.47 and 621 women were given kits. In 2023, \$2210 was raised, of which \$1,243 was utilized. Two packs of 8 disposable pads were distributed. The cost per person was \$0.97, 1,276 women were given pads, and 2,553 packs of pads were distributed. Additionally, reproductive education was included in the 2023 trip. 1,705 women and 126 school-aged girls were educated on menstrual hygiene and sexual reproductive health information.

Conclusion: By strategically allocating resources solely towards the provision of packs of disposable pads, we achieved a reduction in the cost per person from \$5.47 to a mere \$0.97. This financial optimization allowed us to provide pads to a larger number of women, which also allowed us to educate a larger number of women and children. Our endeavor sought to alleviate period poverty and empower women and children through comprehensive sexual and reproductive health education.

POSTER PRESENTATION

Abstract #51

Comparing Umbilical Cord Blood pH and Lactate Levels to Determine Neonatal Outcomes

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Fetal acidosis can lead to complications, including organ dysfunction, cerebral palsy, respiratory distress, or neurological impairments¹. The current guidelines recommend umbilical cord acid-base analysis when signs of fetal metabolic abnormality are present². Given a blood gas analyzer's manufacturing complexity and cost-prohibitive nature, such a gold standard is not a valid solution for neonatal patients in developing countries. They ultimately necessitate new studies exploring the novel use of hand-held lactate devices in determining neonatal outcomes. In this review of the literature, studies that compared a blood gas analyzer and hand-held lactate devices to explore the short-term neonatal outcomes for deliveries of at least 35 weeks of gestation when comparing the umbilical cord blood pH and lactate levels were analyzed³. The PubMed database was used with the search terms "umbilical cord blood pH AND umbilical cord blood lactate" with inclusion criteria based on peer-reviewed resources, measured variables, and readily available publications. From the 72 results, approximately 30 studies were included. The studies showed a positive correlation with adverse neonatal outcomes, with average lactate levels of 6.8 mmol/L and a pH <7.20³. Despite devices from multiple manufacturers and a lack of studies taking place in the intended settings, the results of this review suggest that hand-held lactate devices can have a high predictive value for neonatal outcomes. This is accomplished when used with a blood gas analyzer to create reference values per manufacturer. By verifying the efficacy of this methodology, greater access can occur attributed to its portability, affordability, and low blood requirement.

POSTER PRESENTATION

Abstract #52

Exploring Communication Interventions For Incidental Potentially Oncologic Masses Detected On Radiological Imaging: A Literature Review

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In the realm of advancing technology, the escalation in the identification of incidental masses during radiologic imaging has drawn increasing attention. This systematic review is dedicated to delineating the nuances of communicating suspicious incidental masses, suggestive of malignancy, to patients, specifically focusing on AI vs human-based communication (intervention). The primary aim is to explore the strategies that influence patient adherence to follow-up protocols concerning malignancy. Original articles were identified through a systematic search of the MEDLINE database using the search terms: “Incidental findings,” “follow-up,” “cancer,” and “resources or support or programs or services.” The initial search yielded 198 results, each of which underwent individual assessment by one reviewer, further validated by a panel of two additional reviewers. Inclusion criteria included patients between the ages of 18 to 65, English language, and oncological findings. Exclusion criteria include pediatric population, outside of the United States. This selection process culminated in the inclusion of 32 articles that met the inclusion criteria. Through this review, two prominent themes emerge- the development of guidelines and communication strategies- this review focuses on communication strategies. Finally, 15 articles were identified that specifically focused on the technological or human approaches to communication of these incidental findings.

Results reveal that human-reliant communication pathways have drawbacks, necessitating enhanced patient-centered care, particularly in radiology report-based follow-ups. In contrast, a combined human-AI approach demonstrates optimal follow-up communication, bridging gaps and enhancing adherence through standardized forms and email notifications.

Various computerized systems, notably computer-assisted reporting and decision support programs, enhance follow-up adherence after identifying incidental findings. A structured discrete field element and supervised machine learning models also positively influence follow-up rates. Automated software systems display the potential for further reducing barriers to effective follow-up care.

Limitations include limited available research and a lack of consensus on the best program. Further research should aim for improved communication strategies and comprehensive guidelines. The study underscores the significance of appropriate follow-up in mitigating psychological distress and promoting patient-centered care.

POSTER PRESENTATION

Abstract #53

Attitudes of healthcare providers to early ambulation in post-operative care

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Decreased mobility after a surgical procedure is associated with a variety of complications and generally reduced outcomes, especially if the procedure requires an inpatient stay in the hospital (Hoyer et al., 2015, *Am JPhys Med Rehabil.*). There are several barriers to ambulation of patients that have been studied previously, including time restraints, inadequate staffing, or inexperience of staff members (Hoyer et al., 2015, *Am JPhys Med Rehabil.*). However, negative attitudes of medical professionals towards early ambulation is one potential barrier that has been less explored. This study set out to investigate this as a potential barrier to ambulation and subsequently a barrier to best practices and outcomes in the inpatient surgical setting. An eleven-question survey utilizing a modified likert scale was distributed online via Qualtrics to healthcare professionals that care for post-operative surgical patients. Collected data were analyzed with specific metrics to score questions in a manner consistent with the sentiment of the response, whether it expressed an attitude positive or negative towards ambulation. These data were then analyzed with a Pearson correlation coefficient to determine whether there was any correlation between attitudes towards ambulation and the perceived level of ambulation of patients. There was a very significant correlation ($p=0.0013$; Pearson's R) between individuals that expressed attitudes in favor of early ambulation and increased perceived ambulation of patients. These data suggest that individuals with more positive attitudes towards early ambulation could be more likely to ambulate their patients, making negative attitudes towards ambulation of increasing interest as a potential barrier to best practices. Professionals can incorporate the results of this study in their practice by working to educate and improve attitudes of peers regarding early ambulation, as this could potentially increase peers' ambulation of patients and improve patient outcomes. This study is limited by the fact that it was a self-report survey, and it is unknown if respondents perceived ambulation of patients is representative of their actual ambulation of patients.

POSTER PRESENTATION

Abstract #54

CAR-NK Immunotherapies for the Treatment of Human Immunodeficiency Virus (HIV-1) and Production of an HIV Vaccine: A Review

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Immunity involves a complexity of occurring events that ultimately keeps us safe from harmful invaders. Although our immune system is strong and durable, there are cases where it can become compromised and ineffective. Such a case occurs with *People Living With Human Immunodeficiency Virus-1 (HIV-1)* (PLWH). HIV-1 is the viral infection that leads to Acquired Immunodeficiency Syndrome (AIDS), which is a chronic-immunosuppressing disorder and interferes with proper immune function. While antiretroviral treatments (ARTs) are currently used for PLWH, recent research has focused heavily on natural killer (NK) cells for their viral elimination and resistance to HIV-1. NK cell receptors, such as NKG2A/CD16 receptors, has been of great interest in immunotherapy research. Specifically, immunotherapies involving the production of chimeric-antigen-receptor (CAR)-NK cells are becoming increasingly accepted as HIV-1 eliminators. Moreover, utilizing the NK-92 lineage, a subset of NK cells, has shown to be advantageous. The concept involves engineering a CAR on NK-92 that binds to broad neutralizing antibodies (bnABs) and targets glycoprotein-160 (gp-160) present on HIV-infected cells. NK cell therapies may help propel us to a potential HIV vaccine as previous studies have shown with a vaccine made against SIV. Consequently, the purpose for this literature review is to discuss current treatments involving NK cells and their robust ability at eradicating HIV-1. Thereafter, a proposed theory on how an HIV vaccine can be produced to work in concert with NK cells to abolish HIV infections will be explored, ultimately leading to a cure. To construct this paper, PubMed was used, a total of fifty-two articles were utilized, focusing on peer-reviewed journals and keywords, such as “NK cells”, “HIV”, “HIV vaccine”, and “CAR-NK immunotherapies”. Furthermore, research information published within five years and pertaining to HIV-1, ART, and NK cell therapies was included. NK immunotherapies are crucial for future advancement of HIV-1 research and vaccine development, paving the way for an HIV treatment for PLWH.

POSTER PRESENTATION

Abstract #55

Effects of PEA and Omega-3 Fatty Acids on Immune Markers in First and Second Year Medical Students

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Stress and anxiety play significant roles in neuroinflammation and have long-term effects on brain health. The presence of pro-inflammatory signals attributed to stress has been shown to increase risks of neurotoxicity and disrupt signaling patterns in the brain. Therefore, we believe prolonged activation of these inflammatory processes from stress should be attenuated, especially in populations prone to periods of psychological stress such as medical students. This prospective study aims to investigate changes in cytokine, cortisol, and neurodegenerative marker levels present in the saliva of medical students supplementing their diet with Palmitoylethanolamide (PEA) and Omega-3. Omega-3 is a precursor to natural endocannabinoids, which directly stimulate cannabinoid receptors 1 and 2. Endocannabinoids also affects other pathways like the peroxisome proliferator-activated receptor alpha and gamma (PPAR- α and PPAR- γ) pathways. Meanwhile, PEA, an endocannabinoid-like lipid mediator, interacts similarly with PPAR- α and PPAR- γ . Upon stimulation, these pathways bring anti-inflammatory effects which could potentially be observed via decreased levels of pro-inflammatory biomarkers in saliva.

A total of 40 participants (1st and 2nd-year students) will be subdivided into 4 experimental groups (10 participants each) as follows: Group 1 takes nothing, Group 2 takes 1200mg PEA once daily in the morning, Group 3 takes 4000mg Omega-3 once daily in the morning, and Group 4 takes combined PEA and Omega-3 at the same doses, intervals, and time as Group 1 and Group 3, respectively. The study period will last for 8 weeks, and salivary samples will be taken at 3 intervals to assess biomarker levels. Obtained results will then be analyzed to note whether anti-inflammatory effects have occurred or not.

The expected results from this study are decreases in proinflammatory and neurodegenerative markers with supplementation. The proposed mechanism by which this would occur is through modulated release of inflammatory cytokines via signaling cascades linked to immune cells both in brain and the periphery. Additionally, decreased amyloid levels are expected through changes to glial cell activation. As a result, these therapeutic effects could be used as means of mitigating chronic inflammation in the brain from stress in at risk populations to increase overall brain health and prevent neurotoxicity.

POSTER PRESENTATION

Abstract #56

Current Reproductive Health Status in Females Who Experienced Secondary Amenorrhea as a Component of Red-s While Participating in Collegiate Athletics

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Relative Energy Deficiency in Sport (RED-S) is a syndrome of low energy availability due to an imbalance of fueling or intake and the energy output or exercise. The syndrome affects many systems including endocrine, immunologic, GI, hematologic and psychological. A hallmark of the syndrome is menstrual dysfunction, which includes variation of irregular bleeding, anovulatory cycles, and secondary amenorrhea, defined by an individual who has achieved menarche missing three menstrual cycles. Menstrual dysfunction in RED-S occurs through disruption of the hypothalamic-pituitary-axis (HPA) due to low energy availability. Subsequent hypoestrogenism in premenopausal women can result in decreased vaginal lubrication, thinned endometrial tissue, and increased vaginal pH, which can increase the incidence of genitourinary tract infections and complications associated with gestation. Current studies demonstrate rates of secondary amenorrhea are three times as high in collegiate athletes (Yeager). This retrospective cohort study aims to examine correlation between collegiate female athletes who experienced secondary amenorrhea as part of RED-S and current reproductive health, quantified by ability to conceive, pregnancy complications, and age/severity of menopausal symptoms. . An anonymous Qualtrics survey was created and parameters include past gynecologic history, past medical history, and current reproductive health assessed by ability to conceive, complications associated with gestation or delivery, and variations in menopausal symptoms. The survey is being distributed through various social media outlets with a target population of 200 survey responses. There is well established information on the impact of low estrogen on bone mineral density, but there is currently a gap in the literature demonstrating the long term sequelae of estrogen deficiency secondary to RED-S on reproductive health in premenopausal female collegiate athletes. This ongoing study is currently obtaining more survey responses for statistically significant evaluation of data. It is expected that females who experienced secondary amenorrhea will demonstrate long term sequelae of hypoestrogenism, which may include infertility, difficulty with gestation, earlier or more severe menopausal symptoms, or development of co-existing disorders of the reproductive tract. It is

critical to have this information to share with young females. It can serve as a reference guide for collegiate athletes to pursue healthier habits around nutrition and training.

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POSTER PRESENTATION

Abstract #57

Link Between Stress Induced Inflammation and GERD Pathology

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According to a recent study, medical students were found to have higher prevalence of GERD than their non-medical student counterparts but had there has been no proposed mechanism of this finding. Medical students are commonly stressed due to demanding curriculums, and mental stress has been shown to increase inflammatory cytokine levels. The purpose of this study is to investigate how the chronic inflammatory state due to the stressful environment of medical education can manifest in specific pathologies such as GERD. As of today, there has been a minimal investigation into the study of pro-inflammatory markers leading to GERD in first-year medical students. Two surveys aimed at measuring perceived stress and GERD presence along with a salivary cytokine sample to measure inflammatory cytokines will be collected two times over the course of the first academic year of medical school. Anticipated results will be increased perceived stress scores along with higher inflammatory salivary cytokines. With the increased salivary cytokines, we expect a higher prevalence of GERD pathologies. Should these be positive it would provide evidence for a possible mechanism for the increased GERD prevalence in medical students. Overall, this research will aim to understand how stress affects the immune system. This research would provide further evidence as to how stress can impact mental health and induce pathologies in otherwise healthy populations. This project could lead to future investigation as a longitudinal study in practicing physicians to assess the effects of a high stress profession on the overall health and well-being of this population.

POSTER PRESENTATION

Abstract #58

***De novo* Familial Adenomatous Polyposis with undiagnosed von Willebrand's Disease: A Case Report**

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This case details the presentation of a young 29-year-old male that was found to have *de novo* familial adenomatous polyposis (FAP) in which treatment was complicated by undiagnosed von Willebrand's disease (VWD). The patient presented to his primary care physician for routine labs and the results were consistent with anemia. The patient was urgently referred to gastroenterology (GI) for further evaluation and diagnosed with FAP with no evidence of cancer. The patient had no known family history of GI cancer. FAP is a rare autosomal dominant disorder in which hundreds of adenomatous polyps develop in the colon with a nearly 100 percent chance of developing colon cancer by age 40 if untreated. *De novo* mutations with no family history account for only 10-30 percent of FAP cases (1-3 in 100,000 individuals). Additionally, *de novo* cases are usually not diagnosed until cancer has developed. This case is unique in that the patient was diagnosed at a young age (29-year-old) and had not yet developed cancer. The patient was diagnosed based on abnormalities from routine labs. This reinforces recommendations for routine lab work and the importance of completing full investigations into abnormalities. To treat his FAP, the patient underwent a total colectomy with mucosal proctectomy and ileoanal pull through. Pre-surgical labs revealed a minimally prolonged clotting time. However, since it was barely longer than the normal range, the surgeon decided to proceed without further investigation. Post-operative bleeding occurred, leading to the patient undergoing three additional unplanned surgeries and further evaluation for a bleeding disorder, after which, the patient was diagnosed with VWD. Von Willebrand's disease, which affects about one percent of the population, is the deficiency of a protein, leading to decreased ability to form a blood clot. A literature review revealed no reported case studies or known associations between FAP and VWD. After the delay for hematology work up, the patient returned three months later for surgical ileostomy reversal as planned, which proceeded without complication. This case report highlights the importance of routine screenings and presurgical labs and full investigation of abnormalities even if they are slight.

POSTER PRESENTATION

Abstract #59

Analysis of Factors Influencing Glenohumeral Osteoarthritis Incidence

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Osteoarthritis (OA) is a degenerative joint disease that is commonly diagnosed in the aging population; the average age of diagnosis is around 65 years old. Although much is known about the disease process of OA, it remains unclear why some joints are more affected by this form of arthritis. Lower extremities, such as the hip and knee joints, have a higher published incidence of OA than the upper extremities, especially the shoulder. This may be reflective of the fact that there is no one standard criterion for diagnosis of glenohumeral OA (GHOA). Currently, there are 6 classification systems that are used to diagnose and guide treatment of GHOA; there has yet to be a consensus from governing agencies as to which classification ought to be utilized. Bony and soft tissue anatomy, prior injuries, and weight bearing status are a few factors that complicate diagnosis and may also play into a joint's susceptibility. This study aims to investigate what factors, such as which diagnostic criteria was used, could contribute to the decreased incidence of GHOA compared to OA in other joints. The National Inpatient Sample (NIS) Database (2020) is comprised of 7 million hospital inpatient records from 48 states and the District of Columbia. This database will be mined to determine incidence of GHOA. We expect to see differences in the diagnosis of GHOA based on what diagnostic criteria was adhered to. Incidence will then be correlated with a variety of demographic factors (age, sex, race, socioeconomics) in an effort to tease apart underlying factors that may impact incidence. A better understanding of what factors interact with the complex anatomy and biomechanics of the GH joint is necessary to begin to identify a single best criterion for the diagnosis of GHOA. This project is a first step in that direction.

POSTER PRESENTATION

Abstract #60

Promoting equity in healthcare: strategies to overcome language barriers

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Linguistic diversity has surged in the US since 1980, often leading to communication barriers and adverse health outcomes for non-primary English speakers. This research reviews literature on the healthcare discrepancy between Limited English Proficient (LEP) and non-LEP patients. Reputable and peer-reviewed databases such as PubMed, Google Scholar, NIH, and Medline were searched using keywords relevant to our research. Patient outcome and treatment compliance data reveal a significant healthcare gap between these two subgroups. Key challenges and barriers contributing to this gap are identified, with a focus on implementing strategies and policy changes to address this issue. Numerous potential solutions exist to ensure equal healthcare access regardless of language barriers, encompassing the utilization of interpreter services, incorporation of technology-driven tools, use of patient navigation programs, and active advocacy for policy reforms. While acknowledging the complexity of the issue, this research demonstrates the potential to narrow this healthcare gap and enhance patient outcomes through comprehensive efforts and achievable steps at both individual and systemic levels.

POSTER PRESENTATION

Abstract #61

Resiliency and Cortisol Awakening Response in High Stress Scenarios

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Stress is a pervasive element among many professions including first responders and medical professionals. Understanding the determinants of stress is essential for effective management. The Cortisol Awakening Response (CAR), characterized by a sharp increase in cortisol levels upon waking followed by a gradual decline, is closely associated with individual stress. Concurrently, the Hardiness Resilience Gauge (HRG) is a psychometric questionnaire that evaluates individual resiliency through measurement of commitment, control, and challenge, and has been linked to adaptive coping. We hypothesize that HRG scores will correlate with CAR, reflecting increased resilience.

To investigate this, we conducted a study during a four-day training session at Strategic Operations (STOPS) in San Diego California. In this hyper realistic training, 40 participants engaged in active combat scenarios utilizing cut suits, which accurately replicate life-threatening injuries. Prior to the simulations, participants provided demographic data and completed the HRG questionnaire. Over the four-day event, salivary samples were then collected at two time points. One immediately upon waking, and one 30 minutes after waking to reflect the CAR. Samples were subsequently analyzed for cortisol and a panel of 42 immune cytokines utilizing multiplex ELISA assays from Eve Technologies.

We anticipate our results will shed light on how high-resilience individuals potentially exhibit better stress management and unique CAR profiles. This research contributes to our understanding of stress adaptation in high-stress professions, offering insights that could be used to develop strategies to enhance resiliency and stress adaptation. However, considering the limitations of our sample population, these results are unlikely to be generalizable, but provide a starting point for investigating applications of CAR. Future studies could investigate resiliency in relation to individual perceived stress versus quantified cortisol response.

POSTER PRESENTATION

Abstract #62

Unknown Case: Enlarging Intramammary Lymph Node

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Intramammary lymph nodes are common benign findings on imaging and 48% of mastectomy specimens show IMLNs. Normal IMLNs are typically smaller than 1-cm with a reniform shape, discernable fatty hilum, an adjacent artery and vein, and 76% are found in the upper outer quadrant.

Distinguishing malignant from reactive or normal IMLNs can sometimes be challenging. In the absence of known ipsilateral breast cancer, Dialani et al found a low breast malignancy rate on biopsy of suspicious IMLNs of only 5/77. All 5 malignant IMLNs in that setting had a cortical thickness greater than 5-mm and loss of the fatty hilum. However, in women with known ipsilateral malignancy, IMLNs with a cortical thickness greater than 3-mm and loss of the fatty hilum were suspicious, with 60/94 of such nodes found to be malignant. Features such as round shape, non-circumscribed margins, size greater than 1-cm, calcifications, absent or eccentric hilar fat, and enlargement when compared with prior imaging, should prompt further investigation, although in one series, 15/19 of metastatic IMLNs were under 1-cm in size.

Sentinel node injections are typically performed by injecting 99mTc-sulfur colloid in the subcutaneous space within the periareolar region because the retroareolar Sappey plexus of lymphatics drains to the axillary nodes. While the sentinel node is often the most inferior level I axillary node, IMLNs are identified as sentinel nodes in 0.7% to 14% of patients. In a review of 20 case series, Abdullgaffar et al found 313/30784 of breast cancers had metastatic IMLNs. For the subset of cases with sufficient data, 162/274 of patients with IMLN metastases also had axillary nodal disease. Isolated IMLN metastasis is considered N1, node-positive disease and IMLN metastasis should be excised.

In this case, the primary breast malignancy was occult on tomosynthesis. The retroareolar breast and inframammary fold are common locations for mammographically occult cancer. In the retroareolar region, mammographic challenges include reduced anterior compression and often suboptimal positioning with the nipple not in profile. The astute radiologist evaluating this patient identified the primary malignancy by performing US of the retroareolar region, and the finding was also demonstrated on subsequent MRI.

POSTER PRESENTATION

Abstract #63

Average UV Irradiance Comparison Amongst United States to Further Skin Cancer Screening Guidelines

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It is estimated that one in five Americans will be diagnosed with skin cancer at least once in their lifetime. The guidelines that exist for skin cancer prevention remain vague and have limited research supporting their recommendations. The United States Preventative Services Task Force and American Academy of Dermatology both conclude that there is not enough scientific-based evidence to make a recommendation for patients being screened for skin cancer by their primary care provider. Nonetheless, the Skin Cancer Foundation recommends that patients get a skin cancer screening once yearly.

This research aims to add supporting evidence to the field for guidelines regarding skin cancer screenings. Ultraviolet Radiation (UV) has long been known to contribute to increased risk of skin cancer. This is because of the immunosuppressive effects of UV, which is a cause of carcinogenic activity.

Here we compared average UV indexes and irradiance (from publicly available databases) among individual states in the U.S. from 2005, 2010, and 2015 to determine if significant increases in UV indexes and irradiance exist. We chose these markers as Moan and colleagues (2014) showed that total UV exposure and increased exposure patterns correlates with an increased rate of skin cancer. Microsoft Excel was utilized to calculate t-tests with significance set at p-value <0.05.

When comparing average irradiance levels from 2005 to 2015 against all grouped UV indexes, all four groups demonstrated a significant increase (p-value <0.05, t-test). This suggest that climate change has affected the ozone, allowing higher average UV irradiance to hit the earth rather than be absorbed by the ozone layer.

A UV index of three or greater can damage skin and increase the risk for skin cancer. All the United States have an average UV index of six or greater, except for Alaska whose average UV index is one. States with an average UV index from six to ten showed a significant increase in UV irradiance from 2005 to 2015, hence increasing one's risk for skin cancer. From these findings, we propose a skin cancer screening for everyone in the U.S. once yearly to prevent, detect, and/or treat skin cancer.

POSTER PRESENTATION

Abstract #64

West Nile Virus Meningoencephalitis– A Consideration for Earlier Investigation

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West Nile Virus (WNV) is an arbovirus endemic to many countries causing nearly 57,000 cases in the U.S. and 2,773 deaths. The highest incidence is in states such as Colorado and Arizona, typically during Fall in the elderly. We present a case of WNV meningoencephalitis in a 79-year-old female from Colorado in the Fall who experienced a delay in supportive-care, the only current management for WNV, due to an atypical clinical presentation. This shows the importance of early inclusion of WNV into the differential for AMS, expediting initiation of management and potentially reducing antibiotic duration and hospital costs.

The patient was brought to the emergency department (ED) with altered mental status (AMS) and subjective fever. After normal basic workup, she was discharged. Overnight, she became increasingly altered, incontinent, febrile, and severely septic and was brought by ambulance to another ED. Many physical exam findings were unobtainable due to agitation, but she was alert and oriented only to self with “twitching” legs. The differential included etiologies such as meningitis, stroke, toxic-metabolic encephalopathy, electrolyte derangement, and urinary tract infection. After normal CT and MRA, empiric antibiotics for meningitis and supportive care were started, and two separate lumbar punctures (LP) revealed aseptic meningitis. PCR for WNV was negative, but antibody testing was positive. The patient’s mentation improved progressively, and she was discharged in stable condition on day eight of her hospitalization.

Although case reports involving neuroinvasive WNV in the U.S. are limited, Manusov et. al. presented two cases involving AMS, ocular findings, meningeal signs with sepsis and vague symptomatology confounded by chronic conditions like cord compression and opioid use. Similarly to our case, WNV was not an early consideration due to nonspecific symptoms, leading to a delayed LP and diagnosis. However, our patient was incontinent, did not initially meet sepsis criteria with no ocular or meningeal signs to indicate CNS involvement. Our purpose is to better inform providers of the variable presentations of WNV and risk factors that should prompt early investigation in patients with AMS, leading to earlier diagnosis and more precise management.

POSTER PRESENTATION

Abstract #65

Isolating a Distinct Immune Cytokine Profile that is Associated with Emotional Intelligence Improvement and the Cortisol Awakening Response in Repeated Stress

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Cortisol production upon awakening has shown strong links to psychosocial functioning and individual responses to stress. The cortisol awakening response (CAR), 30-45 minutes after waking may play a role in priming the brain for the demands of the day. We wish to show a distinct cytokine pattern that correlates with changes in the cortisol awakening response and Emotional Intelligence following repeated stress exposures.

Thirty-seven military medical students participated in data at a 5-day training session for military trauma. Cortisol and 48 cytokine salivary samples were collected upon wakening at 5 AM. These sample measured concentrations were averaged and plotted on a scatter plot, then points were fit to a second order polynomial trendline of best fit to measure. This R-squared value was calculated to analyze the accuracy of the polynomial regression. Emotional Intelligence was performed before and after.

Cortisol, along with four cytokines (EGF, GROalpha, IL-1alpha, and PDGF-AA), were identified as having an early peak in concentration with decreasing concentration levels (R-squared value of 0.9657). Four other cytokines (IL-27, G-CSF, IL-10, and IL-13) were identified to have a late peak followed by a lower trend towards the end of the week with respective R-squared values of 0.8941, 0.8108, 0.8289, and 0.8874. Lastly, one cytokine (MCP-1) was identified to have a decline to a low point on Thursday with a return to a peak on Friday. Statistically significant increases occurred in Overall "EQ-I". The highest scoring EQ-i subscales were Self-Actualization and Social Responsibility. Notable increases occurred in all EQ-i domains except Decision-Making. Potential limitations of this study to be investigated further include gender differences and collection timing for true CAR readings.

Multiple cytokines were found to be associated with cortisol shifts following acute stress exposure. A second cytokine fluctuation was identified that may provide insight into how individuals habituate to stress. By determining specific changes in immune markers associated with cortisol levels fluctuation, we may determine underlying pathophysiological mechanisms of stress related disorders. Statistically significant increases occurred in Overall EQ-i, The Self-Perception domain saw the most significant increases in Self-Regard and Emotional Self-Awareness.

POSTER PRESENTATION

Abstract #66

The Tube over the Needle: Thoracic Trauma Interventions

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Thoracic trauma differential diagnoses typically include pneumothorax versus hemothorax. The current prehospital dogma is that the preferred intervention is a needle decompression (ND) to restore pleural pressures. However, there is growing evidence that tube thoracostomy is the preferred prehospital intervention for chest decompression due to high failure rates of ND, especially in hemothorax. This case demonstrates the shortcomings of ND and provides evidence for the use of tube thoracostomy in hemothorax.

A 21 y/o male presented post-tree strike while skiing with chest wall trauma, hemoptysis, dyspnea, and back pain. The patient was alert and oriented, writhing in pain, mildly combative, and complaining of back pain and not being able to breathe. Rapid trauma physical exam revealed a large hematoma on the right lateral chest wall, diffuse midline spinal tenderness to palpation, bloody sputum but intact dentition, and tenderness on compression of the pelvis without instability. Absent breath sounds were noted on the right side so two chest decompression needles were placed anteriorly, but were unsuccessful. The decision was made for an emergent thoracostomy and a chest tube was placed which returned approximately 350mL of blood. The patient was flown to undergo emergent surgery and receive blood transfusions. Six months later, the patient is recovering and doing well.

ND is regularly touted by prehospital providers and the military as the algorithmic intervention for acute pneumothorax; however, literature shows that this procedure is not as successful as believed. One such study showed that due to the increased thickness of an injured chest wall, needle catheters were rarely long enough to reach the pleural space. Another study looking at the necessity for tube thoracostomy after ND found 85% of the cases included required a tube thoracostomy after the ND. This case clearly illustrates the reality of the ND not being as successful as perceived and highlights the success rates of the tube thoracostomy over the ND. By increasing the prevalence of in-field tube thoracostomies, prehospital providers can see improved outcomes and survival rates in decompression of pneumo- and hemothorax.

POSTER PRESENTATION

Abstract #67

Best practices for iliosacral screw placement in sacral fracture repair and avoidance of L5 radiculopathies

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There is a unique challenge presented to orthopedic surgeons when operating on sacral fractures. This challenge is confronting the unique surgical anatomy found at the L5-S1 junction. The current standard procedure for operating on sacral fractures is to place percutaneous Iliosacral screws under fluoroscopic guidance. When Iliosacral screws are utilized at this location, it is of the utmost importance that the surgeon pay close attention to the surrounding anatomical real estate so as to prevent L5 nerve root injury. This is primarily due to the proximity of the nerve root to the ala of the sacrum. Navigating this issue becomes even more cumbersome in the patient with sacral dysmorphism. A preliminary review of the literature shows that those affected by sacral dysmorphism are at a heightened risk for L5 radiculopathy when an iliosacral screw is placed at the S1 level. Unfortunately, sacral dysmorphism affects up to one third of the population, so this anatomical variant is of clinical concern and should be highly accounted for prior to beginning surgery. This review seeks to identify contributing factors that may affect the rate of L5 nerve root injury as well as subsequent iatrogenic radiculopathy symptoms following the procedure. Additionally, this review will provide suggestions found in the literature for ways to reduce the risk of these complications and provide considerations for improving future surgical management in this region.

POSTER PRESENTATION

Abstract #68

Surgical Simulation Training in Medical Education

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ABSTRACT:

The current medical education model involves 2 years of primarily didactic coursework as well as 2 years of clinical integration and rotations before applying to residency programs. Medicine is an extremely hands-on career. Surgeons will need to master technical skills in their residency years of training as they have little exposure to hands-on surgical training in the current medical education model. For medical students that are interested in the surgical specialties, this calls into question whether or not there are modalities available to begin this training earlier on in their medical training. The ACOS (American College of Osteopathic Surgeons) Spring Conference held on April 29- April 30th, 2023 offered a state of the art surgical simulation experience that gave medical students interested in surgery the ability to explore these passions. In order to assess the benefits of such surgical simulations, the opinions of the medical students were assessed via survey. Respondents provided insight as to whether or not surgical simulations may be a useful addition to the didactic years of medical education, as well as continued training afterward. Resulting data suggests that medical students may benefit greatly from simulation experiences alongside attending physicians, whereupon they can ask questions as well as perform new skills under the guidance of an expert. Practicing in front of fellow students and attending physicians before encountering these same situations on rotations and in hospital may prove to be greatly beneficial to students seeking surgical careers. Medical students that engaged in the simulation training and answered the survey expressed opinions that highlighted benefits both in technical aspects as well as communication (non- technical) aspects of surgery. This study highlights simulation training as a potential solution to bridge the gap between the didactic and clinical years of medicine for aspiring surgeons.

POSTER PRESENTATION

Abstract #69

Back Pain Reveals Rare Case of Multiple Myeloma in 23-year-old

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Background: Multiple myeloma is a rare malignancy characterized by the abnormal proliferation of clonal plasma cells often accompanied by an overproduction of monoclonal immunoglobulins. Multiple myeloma primarily affects those of advanced age and the incidence of multiple myeloma below the age of 30 is exceptionally rare. This case presents a rare exception to the norm with a 23 year old patient diagnosed with multiple myeloma.

Case Description: A 23 year old male presented to the emergency department with complaints of back pain, lower extremity weakness, and reduced sensation of the lower extremities. On magnetic resonance imaging, the patient was found to have widespread osseous lesions involving the spine and ribs, pathologic compression fracture at T6, with extraosseous extension of tumor causing cord compression at the level of T6. During admission, the patient underwent T6 corpectomy, laminectomy, and rod placement, with intraoperative biopsies obtained consistent with lambda restricted multiple myeloma. Outpatient follow-up with oncology confirmed the diagnosis of IgA lambda multiple myeloma stage 1 and the patient began treatment with Dara-RVd therapy per the GRIFFIN trial with plans for stem cell transplantation at a future date. The patient responded well to Dara-RVd therapy and further treatment response remains pending at this time.

Discussion: Multiple myeloma presenting at the age of 23 is very unusual. In the absence of lab abnormalities (ie. elevated calcium levels, renal insufficiency, anemia, elevated gamma gap) or with lack of acute abnormalities visualized on plain film imaging (as was the case with our patient) the diagnosis of multiple myeloma may be easily missed, especially in younger patients. This case report highlights an atypical presentation of multiple myeloma with the goal that multiple myeloma remain on the list of differential diagnoses despite non-traditional presentations.

Abstract #70

Investigating Neuropsychiatric Considerations When Treating Anorexia Nervosa Patients With Osteopathic Manipulative Medicine

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Osteopathic manipulative medicine (OMM) has a growing recognition in serving as an effective treatment to promote adaptation and homeostasis of the body by addressing musculoskeletal, neural, vascular, and lymphatic structures to promote self-healing and regulation. OMM can treat the musculoskeletal tension and sympathetic hyperactivity resulting from the increased cortisol response and hypersensitivity found in varying psychiatric illnesses, including anorexia nervosa (AN). This paper addresses the need to further investigate the utilization of OMM in treating patients with AN because body image disturbances in AN patients can be linked to abnormal high-level neuronal processing of sensory information, including differences in perception of touch compared to the general population.

Methods to conduct the literature review included searching PubMed using a combination of the following keywords: anorexia nervosa, body dysmorphic disorder, perception of touch, and osteopathic manipulative therapy. No literature was found addressing OMM's effects on perception of touch for AN patients, however six studies were found that addressed the change in perception of touch found in AN patients. Results of the literature review reveal that the perceptions of touch in AN patients are distorted and can lead to reduced perceived pleasantness encountered in social interactions and touch. Specific changes have been found in tactile C afferents responsible for the positive effects of touch, thus influencing emotional regulation.

The significance of addressing this topic is to provide insight into the pathophysiological processes of AN and inform physicians of unconventional stimuli that may exacerbate AN symptoms and behaviors. Further study is required to elucidate the role and mechanism of OMM in patients with AN and if manual therapy could worsen pathological behavior and thinking patterns seen in AN patients. Such studies could include but are not limited to, examining biological factors such as cortisol levels in AN patients receiving OMM and collecting data about AN patients' thinking patterns and behavior during OMM treatment.

POSTER PRESENTATION

Abstract #71

How chronic stress of medical school can manifest in sleep disturbances in first and second-year medical students.

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Inadequate sleep can result in tremendous effects on one's physical and mental health. Unfortunately, medical students are among the most susceptible groups to sleep disturbances (1). Though multiple studies have been done to investigate stress and sleep disturbances correlations, none of those studies evaluated salivary biomarkers. This study hypothesizes a correlation between chronic stress and sleep disturbances. To test this hypothesis, 20 first-year and 20 second-year medical students will be recruited. Each of these recruits will complete stress and sleep disturbances surveys and will provide a saliva sample (total of two times). First, at the beginning of the spring semester, and second before the spring break. The first sample will be considered as a baseline for stress and the second sample will be considered as under chronic stress evaluation. Stress and sleep disturbances surveys will be scored. Saliva samples will be sent to Eve Technologies (Calgary, Canada). Eve technologies will analyze the concentration of stress salivary biomarkers (C-reactive protein and Immunoglobulin A) and sleep biomarkers (Melatonin and Cortisol). The scores for the sleep disturbance survey will be compared to obtained values of sleep biomarkers to assess if there is any correlation between the two. The scores for the stress survey will be compared to obtained values of stress biomarkers to evaluate if there is any correlation between the two. Obtained values of sleep biomarkers will be compared to obtained values of stress biomarkers to evaluate the relationship between chronic stress and sleep disturbances.

Expected findings: higher stress scores will correlate with higher sleep disturbance scores, where low c-reactive protein and IgA levels will correlate with low levels of melatonin and cortisol.

Finding a correlation between stress and sleep salivatory biomarkers can help to design a fast, non-invasive testing tool to predict/evaluate sleep disturbances in chronic stress conditions.

POSTER PRESENTATION

Abstract #72

Review of Post-Traumatic Stress Disorder and Incidence of Autoimmune Disease

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Post-traumatic stress disorder (PTSD) is a psychiatric disorder diagnosed in the United States using the DSM-5 criteria. The diagnosis criteria are extensive and stem from direct exposure to death, violence, or injury. PTSD is associated with many adverse outcomes, including, but not limited to, poor quality of life and altered physiology. Traumatic stress produces remarkable changes in both the innate and adaptive immune systems as well as the neuroendocrine and autonomic nervous systems that regulate them. This is a proposed mechanism of the link between PTSD and the subsequent development of autoimmune diseases. The link between PTSD and autoimmune disease in the past was not self-evident. However, there is now a body of evidence suggesting a potential connection between the two. Due to this increased evidence showing higher rates of autoimmune disease in patients with diagnosed PTSD, a literature review is appropriate to analyze this link on a larger scale and include multiple populations. In this study, we will complete a systematic review and meta-analysis of the available literature discussing the connection between PTSD diagnosis and the development of autoimmune diseases. We systematically reviewed articles using DistillerSR software to screen and categorize publications from PubMed, EBSCO, and Cochrane Review. Publications had to meet the inclusion criteria of physician diagnosed PTSD and autoimmune conditions in individuals aged 18 and older and of cohort study design. Publications were excluded if they were directly related to 9/11, included self-report data, or were not a cohort study. This project is still underway, but we expect to see a statistically and clinically significant risk for the future development of autoimmune disease in individuals diagnosed with PTSD. The relative risk for conditions based on varying populations allows for the generalizability of our data and study validity. This systematic review and meta-analysis make an important contribution to this field, as no recent and comprehensive publication discusses this topic. The meta-analysis will help understand this crucial connection better and allow for proper screening and intervention to limit the adverse health outcomes of PTSD.

POSTER PRESENTATION

Abstract #73

Comprehensive Geriatric Assessment for Oncologic Treatment Saves Long-Term Hospital Follow-Up Costs

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Introduction

The American Society of Clinical Oncology (ASCO) and the National Comprehensive Cancer Network (NCCN) provide guidelines for providers on how to screen patients based on physiological status for chemotherapy treatment using the Comprehensive Geriatric Assessment (CGA). However it remains unclear whether or not the ASCO and NCCN CGA guidelines are a cost effective way to screen patients for chemotherapy treatment complications.

Purpose

The purpose of this guideline comparison was to determine if CGA analysis for elderly patients prior to oncologic treatment helps reduce follow-up hospital costs. Currently there is no formal analysis on whether the ASCO and NCCN CGA guideline tools significantly reduce US inpatient hospital stay costs in patients >65 years old who undergo a CGA screening. This paper used a guideline analysis comparing follow-up US hospital costs in individuals >65 who had a CGA screening prior to oncologic treatment versus the control.

Methods

Eight different studies from 1990 to 2002 which were extracted from an Ellis et al. study (2011) referenced by both NCCN and ASCO guidelines.²⁻¹⁰. A non-parametric Wilcoxon signed-rank test to compare the US-only inpatient hospital costs of the control compared to those who had a CGA analysis with a p-value of <0.05 determined to be statistically significant.

Results

These data show that for each study, there was a significant cost savings when a CGA was performed prior to treatment compared to not utilizing a CGA (range: \$114 – \$21,283; Table 1, p-value=0.01, Wilcoxon signed-rank test).

Conclusions

The results demonstrate that CGA screening for elderly patients can significantly reduce institutional follow-up care and hospital costs and thereby may be an efficient way to lower the cost of unnecessary oncologic treatment in the elderly.

POSTER PRESENTATION

Abstract #74

Variable Heart Rate Target Recommendations for Atrial Fibrillation Management: A Guideline Comparison

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Atrial fibrillation (AF), the most common heart arrhythmia, correlates with diminished quality of life, heightened medical expenses, and increased morbidity and mortality rates¹. Irregular, rapid electrical impulses in the heart's atria can disrupt synchronized contractions essential for effective pumping and allow clot formation. Despite research indicating comparable efficacy between lenient (<110 bpm) and strict (<80 bpm) rate-control in mitigating AF-related effects, the optimal target heart rate (HR) for AF remains uncertain^{2,3}. The 2019 American Heart Association/American College of Cardiology/Heart Rhythm Society (AHA/ACC/HRS)⁴, 2020 Canadian Cardiovascular Society/Canadian Heart Rhythm Society (CCS/CHRS)⁵, and 2020 European Society of Cardiology (ESC)⁶ guidelines differ in HR target recommendations. The AHA/ACC/HRS recommends a resting HR <80 bpm for symptomatic AF, and <110 bpm may be considered for asymptomatic AF with preserved left ventricular systolic function⁴. CCS/CHRS strongly recommends a resting HR target of <100 bpm for patients with typical AF⁵ and the ESC suggests an initial resting HR target of <110 bpm for rate-control therapy⁶. To determine guideline suitability, we compare AHA/ACC/HRS, CCS/CHRS, and ESC recommendations for HR targets in AF, evaluate the underpinning evidence, and assess novel research. The most recent AF Management Guidelines from AHA/ACC/HRS, CCS/CHRS, and ESC were retrieved and thoroughly reviewed. Citations were gathered from recommendations and respective discussion sections. A record search was performed on PubMed and Scopus to identify novel literature. Records gathered from databases and citations were selected for review according to the PRISMA 2020 Flow Diagram⁷. Record gathering was limited to 20 per database due to the capacity constraints of a single reviewer. Seventeen reports were reviewed and summaries of reports that addressed HR targets were synthesized while summaries of those that did not were excluded. Reports that address HR targets were categorized based on the HR target endorsed (<80, <100, and <110 bpm). All three guidelines rely on the RACE study for lenient rate-control justification, but limitations of the study and other evidence supporting strict-rate control complicate determining the optimal HR target. In conclusion, existing evidence for rate-control strategies in AF patients is conflicting and inadequate, and further research is needed to optimize AF treatment.

POSTER PRESENTATION

Abstract #75

How Comfortable are Medical Students with Interpreting Dermatologic Conditions During Didactic Training

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The importance of understanding the healthcare needs of individuals with skin of color (SoC) in dermatology has gained increasing awareness. Though research suggests dermatologic literature is one of the key sources providers reference for patient care, the focus is primarily on lighter skin tones, which can be detrimental in providing care for patients with SoC. While there has been recent emphasis on incorporating SoC-focused lectures in residency training, we believe there remains a deficit of this knowledge throughout medical school curricula. This study analyzes medical students' comfort with diagnosing dermatologic conditions among different presentations based on their didactic training.

We recruited first and second year medical students at Rocky Vista University to participate in a SoC dermatologic seminar. Students (n=22) attended an educational workshop where they were presented with seven dermatologic conditions and asked to diagnose each beginning with a SoC patient, followed by an identical condition in a Caucasian patient, and finally a medical vignette with common descriptors of the condition. Students completed an anonymous survey before and after the seminar to evaluate changes in their comfort level in identifying dermatologic lesions.

Prior to the workshop, participants had a mean comfort level of 6.04 ± 1.84 for Caucasian presentations and 4.09 ± 1.54 for SoC presentations. This increased to 7.04 ± 1.79 for Caucasian presentations and 6.18 ± 2.01 for SoC presentations after the educational seminar. The average percentage of correct answers were 23.26% for SoC presentations, 34.58% for Caucasian presentations, and 68.42% for clinical vignettes.

Based on our educational workshop, medical students exhibited higher comfort levels in diagnosing dermatologic conditions in Caucasian skin tones. However, following the seminar, the greatest increase in comfort level was within SoC presentations, indicating the effectiveness of this instruction in didactic training. These findings emphasize the need for diversity of visual dermatological presentations in early medical education. By addressing curricular gaps in medical training, we hope to enhance the quality of care for patients with SoC.

Abstract #76

***Mycoplasma pneumoniae* and *Ureaplasma* Infection in Children Requiring Mechanical Ventilation: a Multicentre Study Investigating Clinical Outcome.**

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Mycoplasma pneumoniae accounts for up to 40% of the total number of community-acquired pneumonias (CAP) in children and up to 20% of the pediatric CAP requiring hospitalization. *M. pneumoniae* infection has a wide range of clinical manifestations from asymptomatic to severe pneumonia requiring ICU admission. Despite the high prevalence of *M. pneumoniae* infections in children, reports on severe life-threatening pneumonia caused by *M. pneumoniae* in children are limited in the U.S. We identified 8 children with diverse microbiome by 16S rRNA gene based PCR test and RNA-sequencing to evaluate the clinical outcome of severely ill children with *M. pneumoniae* infection.

We hypothesize that children with *M. pneumoniae* infection and other co-infections like *Ureaplasma* will show poor clinical outcomes compared to children with *M. pneumoniae* infection only.

We conducted a case-control study of severely ill children aged 31 days to 17 years with respiratory failure requiring mechanical ventilation (>72h) on a multicenter study in the USA. The study includes mechanically ventilated children admitted to the 8 pediatric intensive care units (PICU) in the National Institute of Child Health and Human Development's Collaborative Pediatric Critical Care Research Network (CPCCRN) from February 2015 to December 2017. 8 patient cases were matched to 17 controls with age (+/- 1 yr) and most abundant pathogens at the genus level. Length of PICU stay, Vent free days at 23 days, Pediatric Logistic Organ Dysfunction (PELOD-2) score, Pediatric Risk of Mortality (PRISM) score and change in The Functional Status Score (FSS) were defined as the primary measures of outcome.

Currently we are running an antimicrobial resistance (AMR) pipeline that implements the Resistance Gene Identifier (RGI) tool for AMR sequence detection. The pipeline compares our mNGS reads against the Comprehensive Antibiotic Resistance Database (CARD). We will use

the AMR data along with our primary measures of outcome to compare clinical outcomes of children with *M. pneumoniae* infection vs other infections.

While we still have to the run analysis on our data, we predict significant difference in clinical outcome of children with *M. pneumoniae* compared to children with other co-infections. Our brief report will further support the need to consider atypical respiratory pathogens in future diagnostic investigations.

Abstract #77

A Comparative Analysis of Evidence-Based and Consensus-Based Guidelines for First-Line Maintenance Therapy of Atopic Dermatitis: The Efficacy of Topical Calcineurin Inhibitors vs. Topical Steroids

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Atopic dermatitis (AD) is a common chronic, inflammatory skin condition characterized by dry, itchy skin that can significantly impact the quality-of-life for patients and families with AD. Long-term maintenance is crucial in managing the disease and prolonging time between flares, with topical corticosteroids (TCS) historically being an efficacious first-line treatment. However, prolonged steroid use can cause skin atrophy, corticophobia, and other side effects, leading to the discussion for alternative therapies for AD maintenance, including topical calcineurin inhibitors (TCI). TCIs have similar anti-inflammatory effects as TCS, without the associated adverse effects, and may be advantageous compared to TCS overall. By comparing guidelines and most recent literature, this study aims to demonstrate the equal efficacy of TCIs compared to TCS with a lower side-effect profile and should be considered first-line for AD maintenance. A comprehensive analysis was performed comparing an evidence-based guideline with a consensus-based guideline for AD maintenance therapy. PubMed was utilized to identify accredited clinical trials that investigated the efficacy of TCIs compared to TCS for AD maintenance therapy in adults. A total of 4 clinical trials were selected using certain inclusion/exclusion criteria. The selected trials encompassed adequate sample sizes, adult populations only, and comparisons involving mild-moderate potency topical corticosteroids and 0.1% tacrolimus, with exclusion of trials based on poor sample sizes, combination therapies, and treatment durations of 2 weeks or less. A meta-analysis was performed to generate a forest plot using the data from these studies, presenting the odds ratios and corresponding confidence intervals. The comparative analysis of both guidelines revealed that both TCS and TCIs were considered effective in AD management, but the guidelines differed in TCI's role in maintenance therapy recommendations. The forest plot supported our hypothesis, with all trials showing significant TCI improvement compared to TCS or vehicle, with associated p-values < 0.05. Hanifin 2010 demonstrated the largest odds-ratio of 8.25, Reitamo 2005 demonstrated the smallest odds-ratio of 1.84. Recent literature supported the use of TCI as a suitable alternative with comparable efficacy and lower side effects. Limitations to the study included the variable types of corticosteroids used in clinical trials and possible selection bias in data collection. TCIs have been proven to be equally efficacious as TCS in controlling AD flares, while posing a lower risk of adverse events with prolonged use. Corticophobia is a significant limiting factor in AD management, posing TCIs as a suitable alternative to facilitate treatment adherence and improved patient outcomes. As clinicians continue to refine treatment approaches, the incorporation of TCIs as the preferred first-line maintenance therapy can enhance patient satisfaction and quality of life.

POSTER PRESENTATION

Abstract #78

Examining Medical Student and Physician Attitudes Towards Suicidal Patients

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Patients who attempt suicide are more likely to have had contact with their primary care provider than a mental health provider within one month of their suicide attempt. This statistic shines light on the vital role that physicians have in suicide prevention. The purpose of this literature review is to investigate attitudes medical students and physicians have towards suicide and how these attitudes influence care for suicidal patients. This review also investigates the effectiveness of suicide intervention training in changing attitudes and confidence in caring for suicidal patients.

Methods to conduct the literature review included searching Pubmed and Google Scholar using a combination of the following key words: medical students' attitudes towards suicide, physician attitudes towards suicide, suicidal patients in primary care, and effectiveness of suicide intervention training. Studies involving other primary care providers such as physician assistants and nurse practitioners, and mental health providers were excluded. Results of this search revealed medical students and physicians report predominantly negative attitudes toward suicide and a lack of confidence in addressing suicidality. Results further revealed that negative attitudes and lack of confidence can be due to lack of experience of working with suicidal patients, but that it is more likely due to a lack of intervention training.

Research reveals that brief interventional trainings lead to improvement in attitudes towards suicide while also increasing the confidence to assess suicidal ideation. However, there is a significant lack of training for suicide intervention for medical students and physicians. This deficit could be playing a significant role in the negative attitudes present and the lack of care suicidal patients receive. The significance in addressing this topic is to shine light on the need for proper interventional training for medical students and physicians to improve the quality of care for suicidal patients in primary care settings. The installation of brief interventional training could play a significant role in early recognition and implementation of resources for patients contemplating suicide.

POSTER PRESENTATION

Abstract #79

Intent to Administer Nitroglycerin for Inferior Wall Acute Myocardial Infarction

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Nitroglycerin (GTN) is often administered in the incidence and treatment of acute myocardial infarction (MI), but is often withheld as treatment in cases of inferior wall MI/right ventricular involvement. Withholding GTN in inferior wall MI cases is a protocol which is relatively new and is based on limited clinical evidence. Without sufficient evidence it is possible that GTN is being wrongfully withheld in patients with this particular type of MI. This study looks to evaluate the intent of emergency and cardiac medicine practitioners and pre-hospital emergency employees to evaluate practice regarding Nitroglycerin administration to patients experiencing inferior wall MI. The evaluation of this belief aims to study whether appropriate care is being withheld from patients where they may benefit from Nitroglycerin. Additionally, this study aims to identify the trends that occur when standard of care is changed or unclear, mainly regarding the length of time it takes for uniform treatment protocols to be used after they have become the recommended standard of care. To evaluate GTN usage in clinical practices with patients experiencing inferior wall MI/right ventricular involvement, a survey was sent out to physicians, prehospital emergency medical staff, and advanced practice providers which displayed an electrocardiogram (ECG) demonstrating ST-segment elevation in inferior leads II, III, and Avf as well as reciprocal changes in leads I, and Avl all of which indicate a classic inferior wall ST elevation Myocardial infarction (STEMI) ECG presentation. After displaying the ECG, survey respondents were asked if they would or would not treat the patient to whom the ECG belonged with GTN. The survey also included questions to help identify respondent demographic information. Preliminary data exhibits split practices, and no clear preference of administration or withholding of GTN for Inferior wall MI. This was the case for providers of all levels, across several different clinical settings, and across all national/state/local/clinical guidelines used in each setting. Data acquisition is still ongoing, Our study has the potential to demonstrate several trends including wrongful or rightful withholding of nitroglycerin in inferior wall MI as well as incongruence in clinical practice when protocols are changed for a medication, commonly used or otherwise.

POSTER PRESENTATION

Abstract #80

Postural Orthostatic Tachycardia Syndrome (POTS) and Primary Ovarian Insufficiency (POI) as an Adverse Event to HPV Vaccinations

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Gardasil 9, the most administered Human Papilloma Virus (HPV) vaccination, was first approved in December 2014. The vaccine has been shown to protect against various cancers, including cervical cancer. Common side effects of the vaccine include pain where the vaccine was administered, fever, headaches, and muscle aches. However, the vaccine has been known to cause severe side-effects to some individuals. Serious adverse effects, such as postural orthostatic tachycardia syndrome (POTS) and primary ovarian insufficiency (POI), have been reported. Providers need to use these reports to better understand the increasing incidence of side effects due to the HPV vaccine, and to better characterize POTS and POI.

Gardasil 9 is a relatively new vaccine, and there is still much we do not know. The vaccine has been out for seven years, and we are starting to see some chronic and long-term effects. Leading to the question, what are the common and severe adverse events from receiving the Gardasil 9 vaccine?

A survey designed to identify adverse events from the HPV vaccine was administered via four HPV vaccine resistant/hesitant Facebook groups. Eight responses were obtained. Additionally, an HPV vaccine adverse event reporting system (VAERS) was gathered, and a pivot table was created to identify common adverse effects of the HPV vaccine.

From those eight responses, four patients had reported being diagnosed with POTS. POTS is characterized by an abnormal response to being in an upright posture. Patients can experience lightheadedness, blurry vision, and dizziness while in an upright posture (1). A majority of survey respondents also reported symptoms associated with POI. These symptoms include polycystic ovarian syndrome (PCOS), endometriosis, and amenorrhea. POI is characterized as primary hypogonadism in woman under the age of 40 and has been reported as an adverse event of receiving an HPV vaccination (2).

While receiving the HPV vaccine is strongly recommended for patients eleven years old and older, there are some serious adverse events such as POTS and POI that do occur and providers need to be aware of to properly help their patients.

1. Cheshire, W. P. (2023, February 14). *Postural Tachycardia Syndrome*. UptoDate.
2. Welt, C. K. (2022, October 25). *Primary Ovarian Insufficiency*. UptoDate.

Abstract #81

Are we missing sleep apnea in patients with subglottic stenosis?

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Introduction:

Subglottic stenosis (SGS) is a narrowing of the subglottic airway with an impact on daytime dyspnea and reduced peak expiratory flow (PEF). The aim of this study is to characterize the prevalence of obstructive sleep apnea (OSA). We hypothesize a reduced airflow at night with a greater predisposition to OSA and hypoxemia in this population.

Methods:

A prospective cohort study was conducted on adult subjects at a tertiary academic medical center from 2022-2023. Subjects with a recent airway dilation (< 3 months), tracheostomy, prior diagnosis of OSA, posterior glottic stenosis, and/or vocal fold paralysis were excluded from enrollment. Demographic data was collected. All subjects completed a PEF measurement and one-night home sleep test (HST). HSTs were scored by a board-certified sleep medicine physician and total recording time (TRT), obstructive apnea-hypopnea index (OAHI), central apnea index (CAI) Oxygen (O₂) nadir, and time O₂ < 89% were collected. OSA severity was categorized into none (OAHI < 5), mild (OAHI ≥ 5 & < 15), moderate (OAHI ≥ 15 & < 30), and severe (OAHI ≥ 30). Descriptive statistics with 25% and 75% quartiles and correlation between AHI and PEF controlling for BMI were performed.

Results:

Twenty subjects participated in the study; all were Caucasian females with a median age of 49 (41, 55) years and a BMI of 24.6 (21.8, 26.6). The majority (N=18, 80%) presented with idiopathic SGS, and a median PEF of 290 (236, 346). All studies had more than 6 hours of recording time with OSA present in 43% of subjects. Severity in subjects with OSA was categorized into 67% mild, 33% severe, and none with severe OSA. Central apneas were minimal with a median CAI of 0.05 (0, 0.3). Median O₂ nadir was 84.5% (80, 87) with median hypoxemia (time O₂ < 89%) of 2% (0,13). PEF did not correlate to AHI, adjusting for BMI (p>0.05).

Conclusion:

Reduced nighttime airflow is present within a small cohort of patients with SGS demonstrating an elevated prevalence of OSA. Further study of airway dilation's impact on airflow and associated threshold to prevent OSA is necessary to prevent the long-term consequences of untreated OSA.

POSTER PRESENTATION

Abstract #82

Postoperative Opioid Use Following Elective Endonasal Skull Base Surgery: A Retrospective Analysis

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Background: Following Endonasal Skull Base Surgery (ESBS), clear postoperative analgesic protocols do not exist. We sought to define opioid prescription patterns at our tertiary institution and identify demographic factors, comorbidities, and surgical complications associated with increased opioid prescribing patterns following ESBS.

Methods: A retrospective review of 500 patients who underwent ESBS between October 2015 and November 2020 was conducted. Demographics, comorbidities, and intraoperative complications were analyzed. Oral Morphine Milligram Equivalents (MMEs) and postoperative opioid refill rates were calculated from Electronic Medical Record data. Odds Ratio and Chi-Squared analyses were performed to identify patient characteristics associated with increased postoperative opioid prescription rates.

Results: Data from 500 patients was analyzed. Current smoking status demonstrated the greatest risk for refilling an opioid prescription (OR 2.18, 95% CI 1.08-4.42). Mood disorders (OR 1.99, 95% CI 1.01-3.89), chronic headache or migraine (OR 1.67, 95% CI 1.05-2.69), and intraoperative CSF leak (OR 1.93, 95% 1.22-3.05) were also associated with increased risk for opioid prescription refill, while age was inversely correlated. No significant association was found with sex, surgical approach, pathology, history of chronic pain, or Cushing' disease.

Conclusion: Smoking status, intraoperative CSF leak, age less than 50, history of mood disorders, and chronic headache or migraine were all associated with increased rates of opioid prescription refills in patients undergoing ESBS. Understanding these patient factors may help inform patient counseling on postoperative pain expectations and improve analgesic protocols to reduce opioid diversion and misuse.

POSTER PRESENTATION

Abstract #83

Synchronized Dynamics of Salivary Neuropeptides in Response to Acute Stress

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Stress is an inherent part of life and can have a significant impact on an individual's psychological and physiological well-being. Neuropeptides including oxytocin (OT), beta-endorphin (β -endorphin), alpha-melanocyte stimulating hormone (α -MSH), neurotensin, and substance P have been shown to play crucial roles in the regulation of the stress response when measured on their own. By evaluating the fluctuations of these neuropeptides during the acute stress response, in association with an evaluation of past-life trauma experiences, we hope to gain insight to the involvement of the cooperation between the neuropeptides. We hypothesize that salivary neuropeptides may follow a pattern throughout the acute stress response, specifically in people with similar resilience and trauma backgrounds.

To test our hypothesis, 24 firefighters enrolled in the fire academy training program at South Metro Fire and Rescue Department were recruited prior to an acute stress simulation. Participants were screened and evaluated for past life trauma and self-perceived hardiness. Salivary samples were collected at three timepoints throughout the acute stress simulation: pre-stress, post-stress, and recovery (1hr post-stress). Salivary analysis was performed using human neuropeptide 5-Plex ELISA custom assay from Eve Technologies. Statistical analysis was then performed on the salivary samples including pairwise Pearson correlation coefficient studies and exploratory factor analysis.

Exploratory factor analysis identified one factor for pre-stress, one factor for post-stress, and two factors for recovery. Pearson correlation coefficient studies resulted in positive correlations greater than 0.9 for almost all neuropeptide pairs before the acute stress simulation. Throughout the acute stress simulation and recovery, correlation coefficients range from 0.6084 and 0.9823. Hardiness scores mildly correlated with baseline levels with a correlation of 0.351.

These findings support our hypothesis that these neuropeptides fluctuate together, opening the door for future studies to explore long-term predisposition towards mental health diagnosis for those in high stress professions. These findings could have significant implications for the development of stress resilience and mental health interventions.

POSTER PRESENTATION

Abstract #84

Yoga as an educational aid for osteopathic medical students studying musculoskeletal anatomy

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Previous studies have suggested a link between yoga practice and increased anatomy exam performance, increased confidence in anatomy knowledge, and decreased stress in allopathic medical students. A study was conducted with osteopathic medical students at Rocky Vista University College of Osteopathic Medicine - Utah in 2022 and is being continued with RVUCOM - Colorado students this year. No such studies have previously been conducted with osteopathic medical students.

To address this gap, a small study was conducted that placed osteopathic student volunteers into either a yoga intervention group (n=13) or a survey-only control group (n=8). The yoga intervention group participated in three yoga classes during their MSK block, and average anatomy practical scores were compared between groups. All study participants also completed pre- & post-MSK surveys, which evaluated their stress levels using the Perceived Stress Scale (PSS-10). The yoga intervention group scored significantly higher when compared to the average of all MSK practical exams. PSS-10 scores showed a modest decrease but were not significant. The same study protocol has been implemented in CO this year again with a yoga intervention group (n=15) and a survey-only control group (n=13). We hope to build upon the data that was collected last year. Our study suggests that continuing to incorporate a yoga component into the anatomy curriculum could have a positive impact on students' well-being and could improve student exam scores by diversifying learning experiences.

POSTER PRESENTATION

Abstract #85

Bisphosphonate Use in Pediatric Bone Disorders

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The advent of bisphosphonate therapy in pediatric patients with bone disorders is a topic of great potential. Although there have been several decades of clinical experience and research on bisphosphonates, the evidence for their use in pediatric conditions is still emerging. Since bone in children changes size and shape with the growing skeleton, it has been challenging to extend adult bisphosphate regimen recommendations to pediatric patients. However, in recent years, there have been several studies evaluating the efficacy and expanding the indications of bisphosphonate treatment in conditions such as Osteogenesis imperfecta, fibrous dysplasia, Legg-Calvé-Perthes disease, cerebral palsy, and Langerhans cell histiocytosis among others. Bisphosphonate use in severe cases of pediatric osteoporosis is widely accepted, but there is still uncertainty about using these drugs in other conditions due to a lack of significant data on their long-term safety and efficacy. This review aims to highlight current research areas surrounding bisphosphonate use in pediatric orthopedics and emphasize the need for continued research and trials to strengthen treatment recommendations. Key terms search for this review was performed in PubMed, ClinicalKey, UpToDate, and Google Scholar to identify research related to bisphosphonate use in pediatric patients with various bone disorders. Keywords used when researching included “bisphosphonates AND pediatrics,” as well as “Osteogenesis imperfecta,” “fibrous dysplasia,” “Legg-Calvé-Perthes disease,” “cerebral palsy,” and “Langerhans cell histiocytosis.” Clinical trials and case reports that were more than twenty years old were excluded. The results of this review are limited by both lack of significant data on bisphosphonate use in pediatric patients and the decision to include only a select number of disorders. Although there is not yet sufficient data on long-term efficacy and safety of bisphosphonate therapy in pediatric patients, short-term use has demonstrated improved bone density and pain relief in several conditions with few adverse effects. It is clear that there is a need for future clinical research and studies of bisphosphonate therapy in pediatric patients to support better evidence-based guidelines and recommendations.

POSTER PRESENTATION

Abstract #86

A Patient With Foot Pain Found to Have Leriche Syndrome: A Case Report and Brief Review of the Literature

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Leriche syndrome, a rare and critical complication of peripheral arterial disease (PAD), affects the distal abdominal aorta (infrarenal) and, similar to PAD, is a result of plaque buildup in the arterial lumen. The Leriche syndrome triad includes claudication in the proximal lower extremity, decreased or absent femoral pulses, and, in some cases, impotence. This article presents a patient with an atypical presentation of foot pain who was subsequently found to have Leriche syndrome. The patient was a 59-year-old female, a former smoker, who presented to the emergency department (ED) with atraumatic, acute right foot pain. All right lower extremity pulses were faintly audible on bedside Doppler. Computed tomography with angiography of the abdominal aorta revealed a Leriche-type occlusion of the infrarenal abdominal aorta and left common iliac artery and a 10 cm right popliteal arterial occlusion. Pharmacological anticoagulation was initiated by the ED. Definitive treatment in this patient included catheter-directed tissue plasminogen activator lysis to the thrombus on the right and placement of kissing stents in the distal aorta without complication. The patient made an excellent recovery and had a complete resolution of her symptoms. PAD is an omnipresent condition and, when untreated, can result in a myriad of high mortality and morbidity conditions such as Leriche syndrome. Collateral vessel formation can make the symptoms of Leriche syndrome vague and inconsistent, often making early recognition difficult. Optimal outcomes hinge on the clinician's ability to efficiently recognize, diagnose, stabilize, and coordinate multidisciplinary involvement of vascular and interventional radiology specialties. Case reports such as this one help to illuminate some of the more infrequent presentations of Leriche syndrome.

POSTER PRESENTATION

Abstract #87

An Unusual Case of Hangman's Fracture

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The term "hangman's fracture" was first introduced in 1965, and described the biomechanics and other similarities of cervical fractures seen following judicial hangings. The injury classically results from hyperextension and distraction of the upper cervical spine, causing the axis (C2) to break symmetrically across its pedicles or lateral masses, sometimes involving the body of the vertebrae. Hangman's fractures are one of the most frequent types of high cervical spine injury. The following report describes a case of atypical hangman's fracture, with an asymmetrical break and unique mechanism of injury, a low speed motor vehicle collision (MVC). A 73 year old female presented to the emergency department (ED) via ambulance with chief complaint of neck pain. She was the restrained driver and was struck on the front passenger side while at a stoplight. Her car sustained minimal front-right damage without airbag deployment, nor did she require lengthy extrication. In the field, emergency services achieved complete spine immobilization as well as intravenous access. Medical history included type two diabetes, hypertension, and obesity. On physical exam she was neurologically intact, without focal deficits or any signs of obvious trauma. No midline tenderness of the cervical spine or step-off sign were appreciated. She was not intoxicated, nor did she have distracting injuries. The cervical collar was continued and basic labs including coagulation profile were ordered. Imaging included portable chest and pelvis X-rays and a computed topography (CT) scan of the cervical spine without contrast. X-rays and blood work were non-contributory. CT of cervical spine surprisingly revealed an acute fracture of the axis involving the lateral arch, mass, body, and foramen transversarium on the left along with a right lateral mass fracture. Immediate neurosurgical consultation was obtained. The patient was admitted to the hospital for observation and discharged home after two days. She made an uneventful, non-surgical recovery after wearing a rigid cervical collar for three months. This case illustrates the importance of high suspicion of injury secondary to clinical gestalt, mechanism of injury, and early specialty consultation. Regarding NEXUS criteria, this case would have clinically excluded c-spine injury, supporting the call for age limitations on this decision making aid. Lastly, it demonstrates the vitality of appropriate radiographic imaging, in this case of CT vs. X-ray for an obese, elderly female where plain films could have missed osseous injury.

POSTER PRESENTATION

Abstract #88

Septic Shock, Subacute Endocarditis and HOCM: An Anesthetic Management Case Report

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Introduction – Infective endocarditis (IE) is a potential rare complication of hypertrophic obstructive cardiomyopathy (HOCM), with the risk higher in those patients with left ventricular outlet obstruction^{1,2}. Patients with IE and HOCM provide unique challenges to anesthesiologist³. Classically, the hemodynamic goals of patients with severe sepsis, regurgitant valvular pathologies, and HOCM all differ, making anesthetic management of the three simultaneously difficult^{3,4}. This case highlights the anesthetic management of our patient's double valve replacement and emphasizes the hemodynamic management required for patients with multiple cardiovascular pathologies with differing management techniques.

Case description – A 53-year-old male with a past medical history of hypertrophic obstructive cardiomyopathy presented with altered mental status, hypotension and fever was found to have subacute multivalve endocarditis with compounding septic shock. Transesophageal echocardiogram was significant for severe aortic insufficiency, moderate mitral regurgitation, systolic anterior motion of the mitral valve and a left ventricular outflow tract (LVOT) gradient of 51mmHg. The patient was scheduled to undergo emergency native valve IE surgical correction. The patient required multiple vasopressors for hemodynamic support preoperatively. Pre-induction arterial line was placed along with bilateral erector spinae plane blocks. The patient was induced with etomidate and rocuronium and was an easy intubation. Intraoperatively, the patient's hemodynamic status remained labile, requiring infusions of epinephrine, milrinone and dobutamine and boluses of ephedrine and phenylephrine however these agents were used judiciously as increases in systemic vascular resistance lead to worsening valvular regurgitation and cardiac contractility. The patient tolerated the remainder of the surgery without incidence, was transferred to the ICU where vasopressor support was weaned and was extubated seven hours post operatively. The patient was discharged on post operative day three without deficit.

Discussion – While numerous case reports exist of infective endocarditis in patients with HOCM³, few exist in patients with multiple regurgitant pathologies, overwhelming sepsis and through an anesthesiologist's perspective. This case emphasizes the hemodynamic goals of competing and challenging pathologies and provides perspective on the anesthetic management of pathologies with differing anesthetic goals.

POSTER PRESENTATION

Abstract #89

Xylazine usage and awareness among people who use drugs in the Denver Metro Area

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Xylazine, also known as “Tranq”, is a non-opioid veterinary sedative that is becoming more prevalent in the illicit drug supply, especially on the east coast of the United States. Since xylazine is not an opioid, its effects are not reversible using Naloxone (a common method of treating opioid-related overdoses). This is leading to an increased number of overdose deaths. This study aims to better understand xylazine usage and awareness among people who use drugs in the Denver Metro Area with the hope of developing future targeted harm reduction initiatives. This project was done in collaboration with the Harm Reduction Action Center in Denver, a public health agency, that works specifically with people who use drugs. An anonymous 16-question survey was conducted among its participants (n=148; 119 Male), evaluating their usage and awareness of xylazine from July to August 2023. Fifty-three percent of participants had heard of xylazine, 16.3% of participants said yes to using xylazine with knowledge and 17.7% said unsure. None (0%) selected xylazine as their primary drug of choice. Those who selected fentanyl and heroin as their primary drug of choice were significantly more likely to have used xylazine ($p=0.0002$ and $p=0.0125$ respectively). Out of the participants that said that they had used or were unsure if they had used xylazine (n= 37), 75.7% said that it was unintentional use. Responses that were contradictory or blank were excluded from analysis. Additionally, since 83% (n=122) of participants said they had never used xylazine testing strips and since responses were self-reported, the study was limited in its ability to confirm the presence of xylazine in the drug supply. This study concludes that among people who use drugs in Denver, awareness of xylazine is still limited despite its presence in the community. Additionally, among those who have used xylazine, its use has been mostly unintentional. Future research should be done to better assess the adverse effects of xylazine and to accurately determine the presence in the drug supply. Additionally, further education on xylazine and testing strips is warranted.

POSTER PRESENTATION

Abstract #90

Preferences in screening for cancer by resident physicians

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Cancer screening in essence, is a life saving tool that has been in existence for decades; however, it is seemingly overlooked and under-utilized. This study aims to present the disparities in cancer screening recommendations, which exist among the different fields of medicine. With the common knowledge of earlier detection leading to a better prognosis, it would not only benefit the patient but the physician to follow strict guidelines in order to catch cancers earlier, and ensure the patient lives a full life. It is a shocking discovery that regulations of cancer screening do not coincide depending on where a provider decides to refer their patient to, or where they research for themselves. There are varying screening guidelines for specific cancers, which can lead to confusion among patients and physicians, decrease trust in the medical system, and unfortunately lead to late diagnoses and early morbidity. This study aims to understand which organizational bodies physicians use for guidelines in treating their patients. A survey was dispersed to a multitude of family medicine, internal medicine, and general surgery residents in the state of Colorado. The survey asked physician preferences on screening for breast, cervical, and colorectal cancers. We hypothesize that there will be a discrepancy between residents of different specialties and even within a single specialty – emphasizing the need for standardized guidelines to decrease confusion and uncertainty. By providing data to expose the disparities among different specialties, we hope this becomes a springboard for review and change in cancer screening guidelines. It would be beneficial for both providers and patients to eventually rely on a single set of clear guidelines to not miss important screenings that could save many lives each year.

POSTER PRESENTATION

Abstract #91

Recurrent staged reminders improve attendance rates to virtual pediatric weight management visits: a quality improvement initiative.

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Pediatric obesity remains a global and national public health issue, with a projection that more than half of American youth will suffer from obesity by 2050. A commonly implemented strategy to address this is the use of virtual multidisciplinary pediatric weight management (PWM) programs, but patient retention is a bar to success. There is a paucity of literature regarding the effectiveness of orientation measures on increasing retention within PWM programs. The aim of this quality improvement study was to understand the effects of orientation measures and appointment reminders on no-show rates within pediatric PWMs. This study implemented the use of four Plan-Do-Study-Act (PDSA) cycles using orientation methods and appointment reminders with the aim of decreasing no-show rates by 10% over three months. The PDSA cycles consisted of the following: A) Calling families upon receiving their referral, B) Texting families upon receiving their referral, C) Calling families 1 week prior to first visit, and D) Texting families 1 week prior to first visit. Control charts, linear regression and chi squared analysis were used to examine the differences in the incidence of no-show rates between youth who were cared for in the weight management program before and after each implementation. The implementation of this study in a single urban clinical setting decreases the generalizability of the study's results. The results of the study showed that youth in the Implementation groups C and D had increased odds of attending their first visit compared to the pre-implementation group (Protocol C: OR: 2.07 CI: 0.012-0.35, $p = .04$, Protocol D: OR: 2.66, CI: 0.50 - 0.34, $p = .02$). Protocols A and B showed no significant change in attendance compared to the pre-intervention group. Taking into account both financial and labor requirements of each protocol, implementation D was the most cost-effective with a \$12/week cost compared to \$18/week in protocol C. A clinician driven quality improvement project can decrease patient no-show rates to first-time visits with the use of pre-visit reminders delivered via both text and phone calls to optimize the delivery of virtual PWM in a post-COVID era.

POSTER PRESENTATION

Abstract #92

Understanding the Prevalence of Advance Directives Among Current Physician Assistant Students and Recent Graduates

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Advance care planning is an important decision among individuals regardless of age or disease¹. Despite it being well known that accidents and emergencies are largely unplanned and can happen to anyone, very few individuals under the age of 54 years old have an advance directive in place². Considering this information, a goal of this research is to see if future healthcare providers would be more comfortable discussing advance directives with future patients if they have gone through this process themselves. For that reason and in absence of other research conducted on this matter, this study aims to assess how many physician assistant (PA) students or recent PA graduates have filled out an advanced directive, evaluate if they have faced any barriers themselves, and determine whether they plan on discussing advance directives with their future patients regardless of the patient's age or disease status. To answer this question, a survey was sent out to current PA students and recent PA graduates. This study's survey was created via Qualtrics and administered to PA students in Colorado through email, Facebook, GroupMe, and Slack from February 2023 to August 2023. A total of 38 surveys were analyzed and included in the results. Data analysis was performed through excel primarily using descriptive statistics, gamma statistics and thematic analysis. Only 76 percent of respondents had advance directives filled out themselves, but 82 percent noted they would feel more comfortable discussing this with future patients regardless of age or disease status if they had one filled out themselves. Barriers included not knowing how to access an advance directive, lack of time, young age, and unnecessary. Limitations of this study include population size, answers left blank on the survey and potential biases of participants. Based on this study, very few PA students have advance directives filled out and very few were approached about the topic by a healthcare professional. This study suggests that having first-hand knowledge of the process of filling out an advanced directive is important in building the confidence needed to have difficult conversations with patients' regardless of their age or disease status.

POSTER PRESENTATION

Abstract #93

Factors influencing the reliability of palpatory diagnosis – a literature review

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The practice of palpatory diagnosis and treatment has been a staple in the field of osteopathic medicine since its inception. Training osteopathic physicians in these modalities is critical not only to the best patient outcomes but also to advancing the credibility of osteopathic medicine as a field. However, the evaluation of these skills in the educational setting is inherently subjective and subject to the vagaries of human error. Cognitive errors such as confirmation bias (CB) account for a substantial fraction of medical errors, up to 75 percent in some estimates (O’Sullivan and Schofield, 2018, *JRCPE*). The authors hypothesized that this phenomenon may also affect hands-on assessment and diagnosis of the human body, as conducted in osteopathic and other areas of palpatory medicine. This literature review investigated the relationship between confirmation bias and the degree of agreement between separate examiners (termed interrater reliability, IRR), in palpatory diagnosis. Using the databases PubMed, Cochrane, and Google Scholar, a keyword search was conducted for articles relating to “palpatory medicine,” “confirmation bias,” and “medical education.” Twenty-seven articles were identified, and twenty were included in the final review due to restrictions placed on articles regarding their age, sample size, and relevance. Generally, it was found that studies of palpatory diagnosis had poorer IRR, as measured by kappa statistics, than similar studies conducted via non-palpatory diagnostic methods. It was also noted that confirmation bias appears to affect physicians of all experience levels and that both CB and IRR in the context of student evaluation vary widely. No articles were identified that specifically address the presence of CB in the context of palpatory diagnosis. Based on these findings, the authors propose an empirical research study to investigate the impact of CB on IRR in osteopathic palpatory diagnosis.

O’Sullivan E, Schofield S. Cognitive Bias in Clinical Medicine. *Journal of the Royal College of Physicians of Edinburgh*. 2018;48(3):225-232. doi:10.4997/jrcpe.2018.306

POSTER PRESENTATION

Abstract #94

Stress markers and resilience in trauma surgeons

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Resilience refers to an individual's ability to adapt to challenging or stressful situations. Having increased resilience could be essential for individuals employed in high-stress careers such as first-responders, military personnel, and healthcare workers where high rates of burnout and post-traumatic stress disorder (PTSD) are commonly observed. The acute response to stress is a multifactorial process involving the psychoneuroimmunological axis which connects the brain and behavior to the immune system. There is evidence to suggest utilization of a "buddy system" where individuals are paired up to assume responsibility for one another's safety and productivity is associated with decreased perceptions of stress and anxiety. Many professions, including healthcare, are beginning to adopt this practice of peer support to promote well-being amongst employees. This study aims to characterize the acute response to stress by analyzing salivary cytokines, hormones, and neuropeptides in attending trauma surgeons before and after they complete an in-hospital trauma call at a level-one trauma center and correlate these findings with demographic data and survey-based assessments of stress, anxiety, depression, and resilience. Data will also be collected regarding utilization of the buddy system and potential protective effects this may have on the acute stress response through expression of neuropeptides associated with social bonding such as oxytocin and vasopressin. We expect to identify a high resiliency phenotype characterized by a unique biomarker profile of salivary cytokines, hormones, and neuropeptides associated with decreased perceptions of stress and increased perceptions of resilience. Additionally, we expect utilization of the buddy system to result in higher salivary oxytocin and vasopressin levels as well as subjective perceptions and biomarker profiles similar to the high resiliency phenotype. This will be one of the first studies to characterize the acute stress response in a real-world, high stress environment and correlate it with markers of social bonding. The results of this study will lead to a better understanding of the acute stress response and provide insight on how to manage stress and improve resilience for those employed or considering employment in high-stress careers.

POSTER PRESENTATION

Abstract #95

From Pandemic to Pump: Unraveling the Tale of Post-COVID Cardiomyopathy

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Introduction: Since the onset of the COVID-19 pandemic, there has been a rising incidence of post-COVID-19 cardiomyopathies, particularly heart failure with reduced ejection fraction (HFrEF). The development of post-COVID-19 cardiomyopathy is likely multifactorial, stemming from the direct impact of the virus on the heart, the body's immune response, and the overall physiological stress associated with the illness. This condition poses significant concern as it elevates the risk of severe complications and mortality. However, with appropriate and goal-directed medical management, patients with post-COVID-19 cardiomyopathy-induced HFrEF can experience substantial improvements in heart function and lead healthy lives.

Case Presentation: A 42-year-old female with a medical history of Hashimoto's thyroiditis and insomnia presented to the emergency department with complaints of fatigue, dyspnea, and orthopnea a few days after an upper respiratory tract infection (URI) with SARS-CoV-2. The patient denied experiencing any other pulmonary or cardiac symptoms. Initial investigations, including electrocardiography, blood tests, chest X-ray, chest CT, and echocardiography performed in the ED, revealed severe HFrEF with a left ventricular ejection fraction (LVEF) of 23%. Physical examination showed signs of volume overload with bilateral basal crackles and lower extremity edema. Vital signs were stable, with blood pressure on the lower side and sinus tachycardia. The patient was admitted to the hospital with a diagnosis of viral cardiomyopathy, and an ischemic workup, including coronary angiography, yielded negative results. During her hospital stay, the patient received heart failure goal-directed therapy, including diuretics, leading to an improvement in symptoms and an increase in LVEF to 32% at the time of discharge. After discharge, the patient continued to optimize her treatment, wore a Life Vest, diligently adhered to medication, underwent close follow-up, embraced healthy lifestyle changes, and demonstrated significant improvement in LVEF, reaching 48% at 4 months and 63% at one year.

Discussion: This case underscores the significance of prompt diagnosis and optimal management in post-COVID-19 cardiomyopathy-induced HFrEF, with meticulous follow-up after discharge, personalized lifestyle modifications, and cardiac rehabilitation programs. Cardiomyopathy entails myocardial structural and functional abnormalities and can be triggered by various factors related to COVID-19, such as acute disease processes, hemodynamic demands, or exacerbation of preexisting heart conditions. The virus's systemic inflammation or direct infection can lead to heart dysfunction, with COVID-19 patients facing an increased cardiovascular risk due to myocardial

stress and hypercoagulable states. Studies have revealed that a quarter of hospitalized patients and one third of ICU-admitted patients develop new-onset heart failure during COVID-19 infection. Factors like systemic inflammation, prothrombotic states, and increased metabolic demands may contribute to cardiac dysfunction, with some patients experiencing symptoms long after the initial viral infection.

Conclusion: Physicians should remain vigilant about post-COVID-19 cardiomyopathy, given its increasing prevalence and potential long-term consequences. Further research is warranted to investigate long-term outcomes and risk factors associated with post-COVID-19 cardiomyopathy-induced HFrEF. Vaccination continues to be a pivotal factor in preventing and reducing the severity of COVID-19 symptoms, thereby potentially mitigating the risk of post-COVID-19 cardiomyopathy.

POSTER PRESENTATION

Abstract #96

A Comparison of Colorectal Screening Techniques: Colonoscopy and Cologuard

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Introduction: Despite the usage of colonoscopy in prevention and treatment of colorectal cancers, compliance remains low and search for alternative methods gave birth to non-invasive multi-target stool DNA screening methods such as Cologuard.

Methods: A literature review was conducted using published papers within PubMed. Twenty studies were reviewed and analyzed including identifying mutations, assessing for socioeconomic factors, and outcomes from 2008 to 2021. The studies were carefully examined and selected based upon relevant and up to date information within the literature.

Discussion: Cologuard uses multiple biomarkers to create a test that has a high sensitivity and specificity. Although it is shown that colonoscopy for CRC screening is much more sensitive, the 10-year interval may be too long and not accommodate for the variable metastasizing rates CRC can have. Cologuard preference is noted when patients are educated and given a choice between treatment plans. Uninsured and poorly educated patients have shown decreased CRC adherence.

Conclusions: Cologuard can serve as a potential screening option for the time period in-between colonoscopies. Patients are more likely to opt into this screening increasing the likelihood that if polyp formation occurs in this time period, that it will be detected before it metastasizes.

Abstract #97

Blood pressure control in patients presenting with acute intracerebral hemorrhage

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Background: A primary focus in treatment of intracerebral hemorrhage (ICH) is lowering blood pressure (BP) through intravenous administration of antihypertensive medication. However, the method and timing of BP reduction has been debated due to conflicting studies, leading to differing guidelines. The combined American Heart Association (AHA) and American Stroke Association (ASA) guidelines recommend intensive BP reduction to a target systolic BP (SBP) of <140 mmHg. The European Society Organization (ESO) guideline only recommends intensive BP reduction in patients presenting <6 hours since symptom onset; reduction to <180 mm Hg is the standard treatment. **Objective:** The goal of this research was to compare the AHA/ASA and ESO guidelines and supporting data on BP lowering in ICH to assess the efficacy of intensive BP reduction on clinical outcomes in patients presenting with ICH. **Methods:** The supporting articles cited by each guideline were reviewed. Intensive BP reduction (defined as target SBP of <140 mmHg) was compared to standard reduction (defined as target SBP of <180 mmHg). The primary outcomes assessed were mortality, functional status based on modified Rankin Scale (mRS), and hematoma size. **Results:** A total of twelve randomized, controlled trials were analyzed. Data from 5,954 participants were included: 2,979 receiving intensive BP reduction group and 2,975 receiving standard BP reduction group. There was no significant difference in mortality, functional outcome, or hematoma expansion between intensive and standard BP reduction (p-value=0.90, p-value= 0.20, and p-value=0.11, respectively; *Estimate of effect*). **Conclusion:** Results from this study suggest that intensive BP management in ICH should not be generalized to all patients. Given that both guidelines recommend BP reduction, it is important to consider factors that impact outcome, such as time to treatment and BP variability. The ESO guidelines focus on the importance in lowering BP only in a hyperacute window, defined as <6 hours from symptoms onset, while the AHA/ASA guidelines highlight reducing variability in BP when lowering BP to improve outcomes. We suggest an approach to BP reduction that combines the ESO and AHA/ASA guidelines to address both the timing (i.e., number of hours since onset) and approach to BP reduction (i.e., short-acting antihypertensives).

POSTER PRESENTATION

Abstract #98

Discrepancies in Skin Cancer Detection and Outcomes in People of Color: A Scoping Review

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Skin cancer detection and outcomes among people of color (POC) have shown pronounced disparities compared to white individuals in the United States. While there is a higher incidence of skin cancers in white populations, there is a much worse survival rate for minority populations. This scoping review aims to explore the causes of such discrepancies and provide recommendations for improved health outcomes in POC.

We utilized PubMed to identify publications with keywords “Social barriers to care AND people of color AND skin cancer,” “dermatologic AND discrepancies OR inequities AND minorities OR Black Americans.” The review systematically analyzes forty-three articles spanning from 1973 to 2023. Fourteen studies met inclusion criteria and encompassed a variety of data sources.

The review's findings highlight three key themes underlying the disparities in skin cancer outcomes for POC. Firstly, a lack of diverse education on skin of color leads to late stage diagnoses due to missed presentations. For example, the 5-year survival rate of melanoma was 66 percent compared to 90 percent for black v. white patients. Additionally, black patients are more commonly diagnosed with acral lentiginous melanoma compared to “classically described” superficial spreading melanoma more common in white patients. Secondly, the dermatology field itself exhibits a scarcity of diversity. Thirdly, limited public education efforts further undermine preventive measures and early detection in POC.

Recommendations center on augmenting diversity in dermatology training and personnel and launching targeted public awareness campaigns. Implementing these recommendations could help rectify late-stage diagnoses and foster more equitable health outcomes.

While acknowledging limitations stemming from the thematic nature of the study, the review underscores the urgent need to bridge the gap in skin cancer detection and outcomes among POC. By addressing systemic deficiencies in education, personnel, and public awareness, the healthcare system can work towards ensuring improved health outcomes for all populations.

POSTER PRESENTATION

Abstract #99

Unusual long-term survival of a metastatic uveal melanoma, a case study

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Uveal melanoma (UM) is a potentially fatal disease of the pigmented cells of the eye that primarily affects adults and has a significant risk of metastatic spread throughout the body, particularly to the liver. This case highlights a patient who was diagnosed with a medium sized uveal (choroidal) melanoma at age 31. At that time, she underwent standard I-125 brachytherapy. Despite having a low-risk class 1A gene expression profile (GEP; Castle Biosciences), after a year of surveillance, she developed liver and subsequent brain metastases. Currently, there is no uniformly efficacious treatment for metastatic UM. Mortality rate is high and average survival for metastatic UM is less than a year. Due to the progression of her disease, her prognosis at the time was poor, and the patient participated in multiple clinical trials including a combined trametinib (MEK inhibitor) and Soltrastavrin (AKT inhibitor) trial in 2015, Ipilimumab and Nivolumab (immune checkpoint inhibitors) in 2015, Glembatuminab in 2016 (monoclonal antibody conjugated to an antimetabolic agent), and a tumor infiltrating lymphocytes (TIL) trial in 2020. She had to discontinue most of them due to either experiencing adverse side effects or inadequate response to the medications, however, has seen good response with TIL. The patient also underwent multiple local procedures including radioembolization of tumors of both lobes of her liver and gamma knife radiotherapy to her brain metastases. Survival statistics suggest that her chance of survival for 9 years would be less than 1%. Currently, she is free of measurable disease progression ten years after initial diagnosis of UM. This case discusses the mixed prognostic factors, and various immunologic and directed treatments, in light of her remarkable long-term survival with metastatic UM.

POSTER PRESENTATION

Abstract #100

Neurodegenerative Disorders and Evidence for Gut Associated Pathogenesis Factors

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The prevalence of neurodegenerative diseases such as Parkinson's Disease (PD) and Alzheimer's Disease (AD) in the U.S. is expected to increase as the population ages. Despite significant progress and research in the field of neurodegenerative conditions, scientists have yet to fully elucidate the initiating event or develop treatments to stop or reverse disease pathogenesis. Given the recent research surrounding the importance of the gut microbiome and gut-brain-axis in the pathogenesis of many human diseases, this review aims to analyze the alterations in gut microbiome in patients with Parkinson's and Alzheimer's Disease in attempts to find similarities and investigate the potential functional role of those changes on disease pathogenesis.

A rigorous literature review was performed on available data published for microbial alterations in PD and AD patients compared to healthy controls using PubMed, Google Scholar, and Cochrane Database of Systematic Reviews. Data was compiled into a spreadsheet to analyze overlaps and differences which was then discussed in a literature review format.

The compiled data revealed that both conditions share an overall decrease in anti-inflammatory short-chain fatty-acid (SCFA) producing bacteria and an increase in pro-inflammatory bacteria. Further, both conditions have increased levels of bacteria that are known to contain lipopolysaccharide (LPS), which can potentiate misfolding of both alpha-synuclein and beta-amyloid proteins. Additionally, both conditions appear to have an increase in Lactobacillus and Bifidobacterium genera which are generally viewed as protective bacterial genera. It is unclear whether this increase is due to a compensatory response in an attempt to decrease intestinal and systemic inflammation that characterizes both conditions, or potentially playing a role in disease progression in pathogenesis via an uncharacterized mechanism.

The results of this review provide potential insights into intestinal gut microbiota levels that may serve as biomarkers for disease progression or initiation associated with neurodegenerative disease. Further research is needed to determine the effects of altered bacterial levels in these patient populations to understand if the bacteria are beneficial or detrimental in PD/AD. Understanding the mechanistic roles of these bacteria in AD or PD pathogenesis could allow for personalized targeted therapies to either slow or potentially reverse the disease process.

POSTER PRESENTATION

Abstract #101

Transgenerational trauma: can we stop the cycle?

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Although the physical and psychological effects of physical trauma are well known, there is minimal research investigating the risk of transgenerational inheritance of psychiatric disorders as a result of experienced trauma. In this review, we not only aim to bridge this gap by assessing the risk of developing psychiatric disorders post-trauma, but determine the inheritance incidence across multiple generations. Databases utilized include PubMed, Google Scholar, and Clinical Key with search terms transgenerational trauma, transgenerational epigenetics, PTSD risk, epigenetic transmission, CpG island and trauma. The primary mechanism responsible for this inheritance is through epigenetic modifications. Epigenetic changes such as DNA methylation, histone acetylation, and changes in miRNA regulation are among the most well understood consequences following both physical and psychological trauma. Fortunately, these changes may all be potential targets for pharmacologic intervention. Additionally, we investigate the literature suggesting the potential reversal of epigenetic changes through lifestyle remedies such as exercise and nutrition. Following hospitalization from physical trauma, there is a strong association between PTSD risk and factors such as trauma recidivism, PTSD symptoms, and gender. Although identified with the individual who experienced the trauma, evidence in animal models suggests that the epigenetic modifications associated with trauma exposure can be passed down as far as the 4th generation. However, we found that lifestyle and pharmacologic changes such as incorporating a mediterranean diet, immersion training for healthcare workers, and HDAC inhibitors can result in DNA hypomethylation, reduce stress biomarkers and increase emotional intelligence, and reduce markers of atherosclerosis, respectively. Ultimately, through risk assessment and intervention, the undesirable consequences of acquired epigenetic alterations through transgenerational trauma may be reversed.

POSTER PRESENTATION

Abstract #102

Diversity Trends in the Field of Orthopedic Surgery

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Over recent years, the importance of diversity has become more evident in the medical society. Diversity fuels innovation and collaborative critical thinking. Orthopedic surgery is a specialty that has yet to progress in diversity. This became evident from a study in 2019 by Molly Day et al., *A Brief Overview of Diversity in Orthopedic Surgery*. This study looked at gender, racial, and ethnic profiles of residents in orthopedic surgery positions up to 2010, concluding that efforts to diversify orthopedic residency are in place. However, disparities still exist. Hence, this study will look at the progress of diversifying the field of orthopedic surgery from 2011 to 2021 to continue this investigation. This will use ACGME self-reported ethnicity data to compare percentages of each ethnic group in orthopedic surgery to all GME residents. The study shows orthopedic surgery residents are consistently 20-30% higher in White ethnicity than GME averages. Furthermore, orthopedic residents are consistently lower than GME averages in percentages of other races, including Asian, Hispanic, African American, and Native American. This study shows that there is still a need for more diversity in orthopedic surgery residency programs.

POSTER PRESENTATION

Abstract #103

Depression as Primary Symptom Presentation of Glioblastoma Multiforme: A Case Series

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Glioblastoma multiforme (GBM), is an aggressive form of an astrocytic brain tumor. Due to the accelerated development of this tumor, early diagnosis and intervention drastically improves the patient's prognosis. Current clinical practice correlates the presence of a brain tumor with patient symptom presentation involving headaches, seizures, vision abnormalities, and acquired apraxia. Recent studies have shown that depression and general changes of personality are symptoms that correlate with the presence of a brain tumor, but few studies reflect the importance of how providers should be recognizing this form of presentation. For our study we compiled three separate and previously published case studies of individuals aged from 46-64 years old experiencing depression as their primary presenting symptom of their GBM. Case reports of patients with a history of mental health disorders, anxiety as their primary presenting symptom of their GBM, or previous cancer diagnoses were excluded from the series. We analyzed the similarities between patient presentations including misdiagnosis of depression, delayed oncologic care, and subsequent diagnosis of GBM through magnetic resonance imaging. Further analysis of the studies include location of GBM and its association with symptom presentation. Analysis of homogenous findings within the cases provides further evidence of depression as primary symptom of GBM and reflects a need to reform how physicians analyze this semblance of symptom presentation. Educating clinicians about studies reflecting the common occurrence of misdiagnosed depression when a brain tumor is present may elicit this change in the clinic.

POSTER PRESENTATION

Abstract #104

Barriers to cervical cancer screening in newly resettled refugee women in the united states and a potential solution

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Refugee women migrating to the United States (US) often lack access to essential reproductive healthcare in their home countries. Cervical cancer is a significant health threat, especially in low-income countries with limited prevention measures including vaccinations and cervical screenings. Refugee women exhibit low cervical cancer screening rates in the US, prompting the need for early screening upon resettlement. Recent initiatives show mixed outcomes, suggesting the need for tailored interventions to identify and address barriers hindering screening rates. This research aimed to identify barriers to cervical cancer screening in refugee women and propose a new screening method that can address these barriers and increase screening rates among this vulnerable population.

A comprehensive review of relevant literature was conducted using PubMed, MEDLINE, JAMA, the Cochrane Database of Systematic Reviews, and Google Scholar to identify barriers to cervical cancer screening among refugee women in the US and assess the viability of self-collected Human papillomavirus (HPV) testing within this population. Inclusion criteria encompassed studies focusing on US refugee women's barriers, discussing nationwide cervical cancer screening obstacles, exploring self-collected HPV testing in office or mail-in settings, conducted from 2008 to 2023, and published in English. Studies were retained if they addressed barriers within a refugee minority group context but excluded if focused solely on the general population or non-refugee groups.

The results show that the common barriers among refugee women encompass general challenges of accessing healthcare and specific obstacles to traditional cervical cancer screening, including language limitations, transportation, and competing demands that hinder healthcare access. Emotional, cultural, and educational factors further impede screening due to unfamiliarity with screening practices, fear of invasive procedures, and distrust of Western medicine. Self-collected HPV testing offers a potential solution. Studies suggest its effectiveness is comparable to provider-collected samples. Logistical and emotional barriers can be addressed by allowing home-based or in-clinic self-testing. Promising results have been observed among specific refugee minority groups suggesting broader implementation could elevate screening rates for the entire US refugee population. We show that tailoring self-testing strategies to this population's unique needs holds the potential for improved cervical cancer prevention and management.

POSTER PRESENTATION

Abstract #105

Impact of Social Determinants of Health on Hemoglobin A1c Management in Type II Diabetics: A Systematic Review

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As the prevalence of Type II diabetes mellitus (T2DM) continues to increase in the United States, further evaluation has shown the correlation between this chronic condition and social determinants of health (SDHs). SDHs are circumstances in life that affect the risks and maintenance of chronic conditions. SDHs play a significant role in the management, development, and outcomes of T2DM due to their complex impact on patient outcomes and health disparities. This review is focused on learning more about the disparities that exacerbate the development and complications of T2DM, so that the importance of considering SDH in treatment and management of T2DM is addressed. T2DM management is typically followed by a patient's hemoglobin A1c levels (HbA1c), which indicates an average percentage of glycosylated erythrocytes.

A comprehensive literature review was done to analyze the relationship between SDHs and the prevalence of T2DM A1c management in the United States of America based on the ideal A1c level for type II diabetics is 7-8 mg/dL. Articles were aggregated aligning with the study population who had been diagnosed with T2DM as adults and had elevated HbA1c results in the United States, which were the inclusion criteria used in this study. Using a reproducible strategy on PubMed, 36 articles were identified, and 21 were reviewed. The articles resulted in identifying that socioeconomic status, education, food security, and access to care and transportation were some of the most prevalent SDHs affecting Type II diabetics' average glycemic control. Results indicated that these SDHs progressively exacerbate the metabolic disease process of those who are disproportionately affected, which can result in a higher incidence of HbA1c elevation for Type 2 Diabetics. Future directions would include further evaluation of various confounding variables that include but are not limited to the duration of the disease, sex influences, race, and immigration status as this review analyzed only the most prevalent from literature. This review provides evidence for the importance of addressing and finding sustainable solutions to combating the SDHs that impact T2DM HbA1c management,

prompting further analysis on how to implement this knowledge in curricula for health professional students.

Keywords: Hemoglobin A1c, Type II Diabetes Mellitus, United States, Social Determinants of Health

POSTER PRESENTATION

Abstract #106

Consideration for including peripheral nerve blocks before epidural blood patch in the treatment algorithm for post-dural puncture headaches with respect to anesthesia guidelines

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BACKGROUND: Assessing spaces between meningeal layers of the spinal cord is a frequent procedure for anesthetic/diagnostic purposes however any intervention that disrupts meningeal integrity has potential to result in a common and possibly serious complication called a post-dural puncture headache (PDPH). PDPH is defined as a headache occurring within five days of accidental dural puncture, that is worse in the upright position. Incidence of this complication depends on numerous factors including needle size/type and bevel orientation. Epidural blood patch (EBP) is considered the gold standard for treating PDPH; however, there is a lack of consistent guidelines in place, as different facilities/providers implement varying algorithms. One such intervention is peripheral nerve blocks (PNB), which have long been utilized for treating other types of headaches.

OBJECTIVE: The goal of this research is to determine if there is a role for PNB in the management of PDPH before the more invasive EBP. To answer this question, the parameters investigated in this research included onset/degree of pain relief, need for additional interventions, and incidence of complications. This is an important area of study for the contribution to a consistent treatment algorithm that is rooted in evidence-based medicine.

METHODS: Google Scholar was used to identify studies with search terms: “post-dural puncture headache”, “epidural blood patch”, and “peripheral nerve blocks”. Studies examining EBP, PNB, and conservative measures to treat PDPH were included. Microsoft Excel was used to compile, analyze, and generate graphs of the data. Statistical analyses included odds ratios and 95% confidence intervals as well as P-values of <0.05.

RESULTS: After reviewing 11 papers with 663 patients, EBP was determined to have a higher degree of efficacy, but with higher incidence of complications. Additionally, PNBs were shown to be effective with less complications (P-value: 0.03) and even provider faster relief of PDPH symptoms (P-value: 0.004).

CONCLUSION: This research highlights the benefits of a less-invasive alternative to EBP in treating PDPH. A limitation of this research is the number of papers/subjects comparing PNB vs EBP. Further research is required to replicate these results and determine evidence-based guidelines for providing optimal care of a common iatrogenic complication.

POSTER PRESENTATION

Abstract #107

A Retrospective Analysis of OMT Techniques Used by Rocky Vista University 3rd and 4th Year Medical Students on Rotations.

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Context:

There is little literature evaluating medical students' use of osteopathic techniques during third- and fourth-year rotations. Rocky Vista University College of Osteopathic Medicine (RVUCOM) students log at least ten osteopathic manipulative treatment (OMT) encounters per semester in their third- and fourth-year rotations and evaluating these logs can give insight into the factors students consider most when performing osteopathic techniques.

Objective:

To investigate if the frequency with which techniques are taught in RVUCOM's preclinical didactics and labs are correlated to the prevalence of student use of those techniques in third- and fourth-year rotations.

Methods:

Third- and fourth-year OMT logs for the classes of 2020-2022 were retrospectively reviewed for the techniques that the students performed most often during rotations. The logs were then compared to how frequently the technique was taught in the preclinical curriculum. Survey data were collected from RVUCOM Class of 2025 third-year students upon completion of their family medicine rotation to evaluate factors that influence students' use of certain OMT techniques while on third- and fourth-year rotations.

Results:

OMT logs were submitted from July 2018 through April 2022 and 20,149 logs were reviewed. These logs showed that Muscle Energy (ME) was the most used technique among the classes. Muscle energy is the technique most frequently taught in the RVUCOM preclinical curriculum. Ninety-six out of 214 survey responses were evaluated from the Class of 2025. Analyzing the logs and survey results, the data show ease of use and confidence were significantly correlated to students' use of osteopathic techniques while on third- and fourth-year rotations. There was a strong correlation of consistency (.72-.98) among the different classes and all pairwise correlations were statistically significant.

Conclusion:

Medical students' use of osteopathic techniques during third- and fourth-year rotations is directly related to their confidence and ease of performing the technique. Correlations exist between curricular frequency and students' confidence, indicating the importance of preclinical curriculum and hands-on lab time. RVUCOM and other COMs can apply this information to help tailor the preclinical curriculum to improve student use of osteopathic techniques while on clinical rotations and in their future practice.

POSTER PRESENTATION

Abstract #108

Virtual Reality (VR) and Cardiac Pathophysiology: Analyzing the Effects of Implementing VR as a Supplementary Education Modality on Knowledge Retention in Pre-Clinical Students at RVU

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Virtual reality (VR) offers a transformative approach to medical education by providing an immersive, realistic, and safe environment for students and clinicians to learn and practice clinical skills. The benefits of VR simulators encompass simulating rare or atypical cases, pausing and rewinding scenarios, and learning from mistakes without harming patients. VR can also be utilized for training and assessing individual and team-based skills, as well as facilitating patient education and decision-making. Despite challenges like haptic feedback development and preventing vertigo-like symptoms, integrating VR into medical education models could yield significant benefits for clinical and technical skill training. Our proposed study aims to investigate the effectiveness of VR as a supplementary educational modality for teaching cardiac pathophysiology to pre-clinical students attending Rocky Vista University in Colorado. To test this hypothesis, we plan to recruit first and second-year pre-clinical students after completing their required cardiac block. Participants will receive a faculty-recorded video lecture followed by a practical session, where they will engage with either a traditional physical heart model or a 3-D interactive VR model. The teaching sessions will focus on cardiac anatomy, identifying ST Elevated Myocardial Infarctions (STEMIs) on Electrocardiogram (ECG), and determining the affected coronary arteries based on specific ECG findings. Knowledge levels will be assessed using pre- and post-assessment quizzes, and participant feedback will be collected through surveys. We expect our study to reveal that VR technology can significantly improve knowledge retention and critical thinking skills among pre-clinical students compared to traditional video lectures. These expected findings could potentially bridge the gap in understanding the role of VR in medical education, thereby improving medical skill quality, teaching methodology, training modalities, and decision-making in the field of medical education.

POSTER PRESENTATION

Abstract #109

Cervical Cancer Screening: When Should We Start?

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The American Cancer Society (ACS), American College of Obstetricians and Gynecologists (ACOG), and United States Preventive Screening Task Force (USPSTF) have different recommendations as to when average risk individuals should begin cervical cancer screening. ACS recommends beginning screening at age 25, while ACOG and USPSTF recommend beginning screening at 21. ACS' recommendation is partly based on screening patients who received the human papilloma virus (HPV) vaccine, protecting against high-risk HPV (hrHPV) strains such as 16 and 18 which are the leading cause of cervical cancer. This study assesses hrHPV prevalence based on age in average risk females throughout the world to determine if hrHPV prevalence is low enough to delay the initiation age of cervical cancer screening. Cervical cancer screening guidelines from ACS, ACOG, and USPSTF were reviewed from 2020 and 2018, and 2016, respectively. A publication search using keywords; "age associated cervical cytology" and "hpv prevalence by age" was conducted on the RVU library database, PubMed, and Google Scholar. A meta-analysis was conducted to assess the odds ratio of hrHPV based on age. Selected studies were conducted in the past 5 years. Results from three studies reflected higher odds ratio of hrHPV prevalence, between 0.5-0.8, in females ≤ 35 years when compared to females ≥ 35 years. This is an unexpected finding. It was anticipated that younger females would have a lower hrHPV prevalence as HPV vaccines are part of childhood immunizations. This meta-analysis is limited as studies were only conducted in specific parts of the US and Ghana, where access to healthcare may be limited. The findings may not be an accurate representation of global hrHPV prevalence. Although younger populations have a higher hrHPV prevalence, the rate of cervical cancer in patients aged 21-29 is $< 5\%$. With strong immune systems, they can clear hrHPV quicker. The findings of this study indicate that initiating cervical cancer screening at age 25 will not cause an increase in the rate of cervical cancer in a younger population. It is very likely other organizations will follow ACS and recommend beginning screening for cervical cancer at age 25.

POSTER PRESENTATION

Abstract #110

Dendritic cell vaccine efficacy in grade IV glioblastoma patients post standard of care

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Glioblastoma multiforme (GBM), or Grade IV astrocytoma, is the most common type of malignant brain tumor with an incidence rate of 3.21 per 100,000 people. Glioblastomas are aggressive and have been described to invade nearby areas in the brain by infiltration of neural connection fibers as well as ventricular circulation. Since standard of care (SOC) guidance was established in 2005, which consists of maximal surgical resection of the tumor, followed by radiation therapy, chemotherapy with temozolomide (TMZ), and adjuvant TMZ thereafter, the overall survival (OS) and progression free survival (PFS) rates are 15-17 months and 5 months, respectively. Although the SOC increases OS and PFS there is a need for new alternative therapies to extend longevity and quality of life. A new active immunotherapy drug, known as dendritic cell (DC) vaccine, is currently pending Food and Drug Administration approval for treatment in GBM. Our objective analyzed the OS and PFS of individuals with GBM who received standard of care therapy and DC vaccine. We conducted a systematic literature review on registered clinical trials utilizing dendritic cell vaccines as treatment for GBM. Four databases (PubMed, Cochrane, Clinical Trials.gov, Scopus) and a standardized search criteria were used to identify eligible articles. This search yielded a total of 783 results. Each article was screened and our inclusion (≥ 18 years, Karnofsky Performance Scale >60 , histologically confirmed GBM, received SOC, underwent surgical tumor resection, males & females, newly diagnosed or recurrent GBM) and exclusion criteria (<18 years, systemic disease, autoimmune disease, pregnancy, viral/bacterial infection, allergies to vaccine) were applied. Twelve registered clinical trials were used in this systematic review. Increases in OS and PFS were observed in all studies and side effects ranged from no adverse events to mild fatigue, fever, or nausea. With this new personalized vaccination therapy, patients are benefitting from a longer life expectancy. With further improvements in DC vaccine efficacy, a once terminal diagnosis could become a more manageable disease without devastating effects on quality of life and life expectancy.

POSTER PRESENTATION

Abstract #111

Factors contributing to increased opioid overdoses in the COVID-19 pandemic: A scoping review

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INTRO

The opioid epidemic was one of the most discussed and divisive issues within healthcare in the United States before the beginning of the COVID-19 pandemic. In early 2020, as the COVID-19 pandemic began sweeping through our nation's communities, the United States faced its worst year on record for opioid overdose deaths. Subsequent data releases revealed an alarming acceleration in opioid-related fatalities, surpassing the already exponential pre-pandemic trend. This scoping review aims to conduct a qualitative thematic analysis to uncover the underlying reasons and contributing factors behind the surge in opioid overdose deaths during the COVID-19 pandemic.

METHODS

Utilizing the PRISMA ScR checklist and the five-step protocol for scoping reviews outlined by Arksey and O'Malley, we developed the following question: Compared to before the COVID-19 pandemic, what factors led to the number of opioid overdoses increasing in the United States? We retrieved original peer-reviewed articles through systematic searches of PubMed, Cochrane Reviews, JSTOR, and Google Scholar databases. Inclusion criteria required articles to be conducted and published within the United States between March 2020 and July 2021, and to include the terms 'COVID-19' along with 'opioid overdose,' 'opioid overdose response,' or 'opioid use disorder'. Out of 883 screened articles, 44 met these criteria and were included in the scoping review. These studies were then categorized by region, study design, and the specific issues they addressed.

RESULTS AND DISCUSSION

The unpredictable nature of the COVID-19 pandemic has tested individuals' coping mechanisms and resilience. Isolation and reduced socialization can be powerful triggers for drug relapse, especially when combined with heightened negative emotions. Yet, this alone does not fully answer our question.

Our research identified the following factors as the most-cited contributors to the increase in opioid overdoses:

1. **Stigma, Social Isolation, Mental Health**
2. **Disruption in Drug Supply and the Rise of Fentanyl**

3. **Lack of Access to Medical Care**
4. **Lack of Access to Opioid Agonist Therapy**

As social distancing protocols were set and harm reduction action centers, group recovery homes, and peer support groups were forced to close their doors, individuals were forced into isolation both physically and mentally. As a result of these circumstances, we saw elevated rates of not only all drug use, but specifically opioid drug use alone, thereby delaying timely access to life-saving naloxone administration in the event of an overdose, dramatically increasing one's risk for death.

We saw a disruption in the drug supply along with subsequent a rise in fentanyl additives, which resulted in a more dangerous supply. Not only were individuals using opioids cut off from their access to fentanyl test strips at local harm reduction action centers, but this deadly additive was also found to be added to non-opioid bases, such as cocaine and methamphetamines. People who overdosed and were saved with naloxone often hesitated to seek further medical attention due to stigma and fear of COVID-19 infection. The globally reduced access to OAT programs during the COVID-19 pandemic, despite SAMHSA's attempt to counteract this fault by allowing buprenorphine to be prescribed in the ED, compounded to only further push away access to medical care in this population. Increasing opioid agonist prescription access but subsequently closing the dynamic supporting programs proven to be effective has darkly illustrated a "one step forward, two steps back" outcome.

All together this paints a grim picture for the opioid epidemic.

CONCLUSION

This review illustrates that opioid overdoses rose during the pandemic because of both new issues created by the pandemic and the exacerbation of existing issues. Dr. Utsha G. Khatri cautioned our nation of this future at the very start of the COVID-19 pandemic, in May 2020, asserting "epidemics don't smolder during pandemics - they ignite".⁴ We need systemic change and more resources devoted to this issue, otherwise the number of overdoses will only continue to rise at unprecedented rates.

Due to the rapidly evolving nature of the pandemic and the limited data available in this field, we set a cutoff date for article inclusion in July 2021, which coincided with the start of this review. While this decision may have excluded some potentially valuable new data, we maintain that the results presented here offer valuable insights into the fundamental issues underlying our nation's opioid overdose epidemic. These findings provide a strong foundation for initiating a critical conversation on the necessary next steps.

This review has identified potential targets for future programs aimed at addressing our nation's exponentially growing opioid epidemic. It is imperative that we prioritize further research to develop effective strategies for combating this public health emergency in the coming months. While we continue to grapple with the challenges posed by the pandemic, we also have an opportunity to reevaluate and adjust our nation's approach to opioid abuse and access to treatment.

POSTER PRESENTATION

Abstract #112

Comparison of Paramedic Point-of-Care Lung Ultrasound to Chest X-ray and Computerized Tomography Findings on Patients Presenting with COVID-19 Symptoms

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Background: Point-of-Care Ultrasound (POCUS), has a variety of clinical uses due to its accuracy, low cost, and portability. POCUS has been used as a sensitive alternative to chest X-ray (CXR) and computerized tomography (CT) imaging specifically for chest radiography in the diagnosis of COVID-19. Although, the gold standard of COVID-19 diagnostic is reverse transcription polymerase chain reaction (RT-PCR), lung ultrasound has shown to be a reliable diagnosis tool due to the consistent sonographic pathological findings in symptomatic patients who show thickening of the pleural line, pleural line irregularity, intermittent B lines, and sub-pleural consolidations. Studies have demonstrated paramedics are able to obtain and interpret lung ultrasound images in the prehospital environment.

Objectives: The objective of this study was to compare paramedic-performed POCUS lung findings to CXR and chest CT findings of COVID-19 positive versus COVID-19 negative patients.

Methods: A prospective cohort analysis was performed to compare pulmonary radiological lung findings of patients with COVID-19 symptoms from April 2020 to September 2021. Paramedics performed lung POCUS on patients presenting with COVID-19 symptoms in the prehospital setting. On patients who were transported to the hospital, the state-wide electronic health record (Corhio) was queried to obtain information about COVID-19 testing, CXR and chest CT results.

POCUS images were reviewed for quality by a POCUS fellowship-trained physician and chest CXR and CT results were categorized by a board-certified radiologist.

Results: Paramedics obtained POCUS images on 150 patients, 45 were COVID-19 positive while 105 were COVID-19 negative. Of the 129 patients transported to the hospital, 77% received a CXR and 40% received a chest CT. After analysis, COVID-19 positive patients were more likely to have an abnormal POCUS and CXR finding, with $P=.005$. There were no statistical differences between specific POCUS, CXR and chest CT findings when comparing the COVID-19 positive versus the COVID-19 negative groups.

Conclusions: When comparing the COVID-19 positive versus COVID-19 negative group, there were no significant associated radiology findings. Our data suggests that radiology findings alone are insufficient to diagnosis COVID-19 and further evaluation is needed. Further studies to assess the ability of POCUS to diagnose COVID-19 are warranted.

POSTER PRESENTATION

Abstract #113

Healthcare Providers' Knowledge and Attitudes About Overdose Prevention

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Overdose prevention sites (OPS) offer people who inject drugs a secure place with sterile supplies to inject pre-obtained drugs under the supervision of staff trained to recognize an overdose and intervene if it occurs. Previous research has shown OPS positively impact both individual participants and the surrounding community. In the current wake of the opioid epidemic, there remains a need for more harm reduction strategies, like OPS, and healthcare providers have a significant role in the implementation and promotion of these harm reduction resources. We hypothesized that the more knowledge a provider has about OPS the more positive their attitude is about OPS. We created an electronic survey to identify healthcare providers' knowledge base and associated attitudes about OPS to determine if there is a correlation between healthcare providers with more knowledge about OPS and having a more positive attitude about OPS. The survey was distributed to healthcare providers in Colorado. Responses were collected from January 18th, 2023 to March 23rd, 2023, and recorded on a 5-point Likert scale. Mean scores between 1 and 5 were calculated for each participant and variances were analyzed for correlating demographic factors. A Pearson correlation analysis revealed a strong positive relationship ($r = 0.76$, $P < 0.0001$) between provider knowledge and attitudes about OPS. A p-value of ≤ 0.05 was used to determine the statistical significance of all findings. Our findings concluded there is a positive correlation between providers with more knowledge about OPS and having a more positive attitude about OPS, indicating the need for education, exposure to harm reduction strategies, and interspecialty collaboration in shaping healthcare providers' knowledge and attitudes towards OPS. While our findings offer valuable insights, they are subject to limitations, including the potential for selection bias arising from non-random sampling. Additionally, the study's exclusive reliance on quantitative data may not capture the full complexity or nuances of healthcare providers' attitudes toward OPS.

POSTER PRESENTATION

Abstract #114

A Rare Case of Thrombosis Secondary to Myomatous Erythrocytosis Syndrome

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Background: Myomatous erythrocytosis syndrome is a rare phenomenon of secondary polycythemia evolving from uterine leiomyoma. Although the underlying pathology is still unknown, patients have an increased risk of venous thrombosis.

Case: A 44-year-old GO presented with an incidental finding of secondary polycythemia and a diagnosis of myomatous erythrocytosis syndrome was made due to her large uterine fibroids. She was placed on therapeutic anticoagulation after developing pulmonary embolisms and a dural sinus venous thrombosis. Subsequently, she underwent uterine artery embolization, which resulted in a substantial decrease in her EPO (8.1 mU/mL) along with hemoglobin (15.1 g/dL) and hematocrit (45 g/dL).

Conclusion: Myomatous erythrocytosis syndrome can cause venous thrombosis, leading to neurological complications. In patients with increased risk for surgery, uterine artery embolization is an effective option for treatment.

POSTER PRESENTATION

Abstract #115

Iron in Cirrhotic Liver

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Liver cirrhosis has a high mortality, and accounts for 80% of all liver transplants. Among several causes, alcohol use and Hereditary Hemochromatosis (HH) remain important acquired and inherited causes of liver cirrhosis respectively.

A 40-year-old female with a complex past medical history including alcohol use with recurrent pancreatitis, GERD, and VTE was admitted for a mechanical fall. Patient quit drinking for more than a month. On examination she had scleral icterus, distended abdomen, and +2 pitting edema in the lower extremities. Labs revealed macrocytic anemia, elevated liver function tests (LFT's), and raised ferritin (2000's). CT abdomen and pelvis showed no traumatic lesions, but evidence for liver cirrhosis, ascites and splenomegaly. Patient had multiple prior admissions where she was extensively worked up for persistently elevated LFT's and hepatitis. There was a concern for inherited form of iron overload with persistently raised ferritin and iron saturations (65%). She was tested for HFE gene mutations and was found to be heterozygous for H63D gene.

HH is an autosomal recessive disorder of iron metabolism with considerable phenotypic as well as genotypic diversity. Affected individuals absorb excessive iron from the small intestine. The liver is the most common organ involved as it stores most of the excessive iron. HH is generally classified into 6 groups. Hemochromatosis Type 1 is related to HFE gene mutations (C282Y homozygosity, and C282Y/H63D or C282Y/S65C compound heterozygosity). Non-HFE form of hemochromatosis are related to mutations of hemojuvelin (Type 2a), hepcidin (Type 2b), transferrin receptor 2 (type 3), ferroportin (type 4) and ferritin heavy chain 1 (Type 5).

In our patient there could be multiple explanations for her rapid progression to liver cirrhosis, including HH, especially in the setting of raised ferritin and iron saturations. She is still being worked up for compound heterozygous HFE form and non-HFE forms of HH in the outpatient setting. Hence, physicians should have a low threshold to diagnose and treat other non-obvious causes of liver cirrhosis to reduce mortality and morbidity associated with this disease.

POSTER PRESENTATION

Abstract #116

Interactive Module's Effectiveness on Empathy and Attitudes of Healthcare Students

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As the prevalence of social determinants of health continue to have an impact on the management of chronic conditions for individuals, it is imperative to expose health professional students to these encounters. This study investigates the role that interactive modules play on medical students (DO) and physician associate (PA) students' empathy and attitudes towards diabetes mellitus maintenance for individuals who are affected by social determinants of health. Students from both health professional programs were asked to complete a pre-survey that encompassed the Diabetes Attitude Scale, Jefferson Empathy Scale and Assessing Student Competence and Knowledge of Social Determinants of Health (ASCK-SDH) Instrument. Students were then asked to engage with interactive modules to follow the life of someone, Lula Mae, who lives in the Appalachian area with Type II diabetes. Once completed, students were asked to complete a post-survey that included all three scales. Scales were Likert-type scales with varying number of items. Results from 151 medical students concluded significant findings for the Diabetes Attitudes Scale ($p < 0.01$), Jefferson Empathy Scale ($p < 0.02$), and ASCK-SDH ($p = 0.02$), using paired t-tests for statistical analysis. While the matched data pairs for the PA students are too few to be significant, the data showed a positive trend pre to post module. This interactive module improved health professionals' awareness, empathy, and attitudes towards social determinants of health affecting those with chronic conditions. This implementation has proven itself to be a valuable and insightful medical educational tool that can be adapted for other scenarios to enhance the development of health professional students' cultural competency and health equity.

POSTER PRESENTATION

Abstract #117

Analysis of Guidelines Regarding Mental Health Hold Requirements and Duration of Adults from Mountain States

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Emergency commitments and involuntary holds are tools that medical providers possess to treat individuals with mental illness who may be a danger to themselves or others. State laws govern these holds in both requirement and length, and thus vary from state to state. We researched if the state laws of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming follow recommendations set forth by the American Psychiatric Association (APA) and United Nations (UN) regarding these holds. In this evaluation, we compared the requirements recommended by the APA and the UN and noted what differences they had. We then examined Mountain states and the specific length and requirements for each of these states to enact emergency holds and involuntary commitments in the respective state statutes. We found that APA guidelines incorporated the UN guidelines and added two recommendations: an individual must be likely to suffer physical hardship due to being unable to satisfy their basic needs and that the state must present 'clear and convincing' evidence to enact involuntary holds. In total the APA and UN present seven guidelines. Arizona is unique in that it is the only state that fulfills all guidelines by the APA while Wyoming and Colorado only lack one and the remaining states lack at least two. All Mountain states require that a patient suffers from a mental disorder, is likely to cause harm to self, cause harm to others, and require a judicial review to present evidence for continued care. Each state varies in who can provide evidence. Additionally, we find that all states vary in the length of their emergency holds and involuntary commitments. All states also allow the initiation of a hold by persons other than a medical professional. Moreover, neither the APA nor the UN recommend a minimum or maximum length of a hold. We theorize that this can allow the states flexibility in treating mental illness while simultaneously cause barriers to care due to lack of standardization. Further research regarding this variability is recommended. This analysis recommends further research-based guidelines from the APA to better standardize care across the United States.

Abstract #118

A Comparison of Polycystic Ovary Syndrome Guidelines and Biochemical Androgen Testing

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Polycystic ovary syndrome (PCOS) affects as many as 13 percent of reproductive-aged females and has significant metabolic, reproductive, and psychological features. The clinical heterogeneity of the ranging phenotypes of PCOS and lack of standardized and reliable laboratory testing leads to exacerbation of the devastation this condition can have on female physiology. The most widely accepted diagnostic criteria for PCOS is the Rotterdam criteria, which includes recommendations for evaluation of biochemical hyperandrogenism. However, accurate measurement of serum androgens in females is a challenge due to several considerations including varying serum concentrations of different androgens throughout the day, as well as inaccurate assays being the most accessible testing methods. Thus, the aim of this study is to compare the recommendations in evaluation of biochemical hyperandrogenism between two Rotterdam endorsing guidelines with additional emphasis on which specific androgens should be evaluated in PCOS as well as the testing methods. Two PCOS diagnostic criteria guidelines were reviewed: (1) American Academy of Family Physicians (AAFP), and (2) the Centre for Research Excellence in Polycystic Ovary Syndrome in partnership with European Society of Human Reproduction and Embryology/American Society of Reproductive Medicine (CREPCOS/ESHRE/ASRM). In addition, nine studies were gathered from primary literature and key term search articles to compare the prevalence of elevated androgens across various studies and which methods of analysis were used for biochemical evaluation of hyperandrogenism in PCOS. Despite endorsement of the Rotterdam criteria, the two reviewed guidelines from AAFP and CREPCOS/ESHRE/ASRM recommend evaluating different androgens. In 4,597 patients over nine studies, the percent of elevated total testosterone, free testosterone, and dehydroepiandrosterone sulfate compared to controls were 49.3 percent, 59.8 percent, and 24.1 percent, respectively. However, the significance of this data remains indeterminate given all nine studies reviewed used analysis methods such as radioimmunoassay or enzyme-linked immunoassays, which are considered unreliable compared to the established gold standard method of equilibrium dialysis. The inconsistencies and inaccuracies in PCOS testing as demonstrated above highlights the need for more research and education to move towards accurate diagnosis of hyperandrogenism and improving health outcomes in patients with PCOS.

POSTER PRESENTATION

Abstract #119

Considering aspirin for secondary VTE prevention after endothelial injury with respect to American Society of Hematology 2020 Guidelines and the European Society of Anaesthesiology VTE Guidelines Task Force 2018

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The American Society of Hematology (ASH) 2020 recommends anticoagulation over aspirin (antiplatelet) for secondary (lifelong) venous thromboembolism (VTE) prophylaxis. However, cost and compliance issues with anticoagulation options like apixaban and dabigatran (\$500/mo.) or warfarin (\$15/mo.; frequent testing and monitoring) are challenges. ASH Guidelines allows aspirin (\$4/mo., no monitoring) on a cases-by-case basis for *secondary* prophylaxis but does not give specific guidance. Histologically, arterial thrombi are platelet-rich and venous thrombi are fibrin-rich; thus antiplatelet is used for arterial thrombi and anticoagulation for VTE. Virchow's Triad explains VTE causes: venous stasis, hypercoagulability, and endothelial injury – the last with the greatest association with platelets. The European Society of Anaesthesiology VTE Guidelines 2018 concludes that aspirin may be as effective as anticoagulation after hip or knee arthroplasty or fracture – which have the highest orthopedic VTE risk. Here we investigate how does aspirin compare to anticoagulation for *secondary* VTE prophylaxis in whom endothelial injury is the suspected source. Using Google (search terms including “ncbi nlm nih aspirin for vte prophylaxis”), we examined peer-reviewed studies comparing aspirin to anticoagulation where endothelial injury is the likely cause of VTE (post-surgery; trauma) and completed after the ASH 2020 guidelines. Five random control trials (RCT) and four retrospective cohort studies (RCS) were identified using aspirin as *primary* prophylaxis (none investigated secondary). Microsoft 365 Excell was used for calculations. Pooled results for RCTs (n=21,853) indicate inferiority to anticoagulation (Odds Ratio = 1.40; CI: 1.20, 1.63) due mainly to one discrepant study ending early in which 15% of the anticoagulation group also received aspirin. Pooled RCSs (n=170,861) show aspirin superiority (OR=0.74; CI: 0.66, 0.82) for primary VTE prophylaxis. These studies examined worst-case orthopedic scenarios; therefore, we conclude aspirin can be confidently prescribed as secondary VTE prophylaxis where persistent endothelial injury is the source – benefiting patients struggling with anticoagulation's cost and compliance. Validity hinges on surgery VTE correlating to other endothelial injury cases; there are also no studies examining aspirin as *secondary* prophylaxis. Two upcoming largescale trials (Comparative Effectiveness of Pulmonary Embolism Prevention After Hip and Knee Replacement, and VTE Prevention Following Total Hip and Knee Arthroplasty) will explore this further.

POSTER PRESENTATION

Abstract #120

Innovation in Undergraduate Medical Education: A Novel Use Case for ACLM Board Review Course

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The ACLM Undergraduate Medical Education (UME) Task Force has prioritized the need for effective, standardized expansion of LM education into UME. This project showcases student demand for UME LM educational opportunities and how the current ACLM Board Review Course (BRC) can be integrated as a gap week elective in UME.

A survey was sent to all 3rd year osteopathic medical students across two campuses of Rocky Vista University. Students who indicated interest in participating in an LM gap-week elective were sent a follow-up survey containing financial details and requesting a formal commitment to sign up for the elective. A group discount agreement with the following tiers was obtained from ACLM: 10% for > 10 enrollees, 20% for > 25 enrollees, and 25% for > 50 enrollees. For individuals who elected to not further participate, a survey was provided to identify common barriers including cost, time, and interest in content.

Out of 303 students, 55 expressed interest in taking the Lifestyle Medicine Gap Week Elective at some point during their 4th year. Upon follow-up with those 55 interested, seven students signed up to take the course. For individuals who elected to not further pursue this opportunity, 100% of the students who responded, the cost was identified as the most common barrier to further pursuit. The current cost of the ACLM Board Review Course without CME credit is \$375 for ACLM members and \$499 for non-members. There are no explicit discounts for UME students, with the exception of volume-based group discounts.

There is significant interest among UME students to learn LM outside of core curricula. The ACLM BRC is a high-quality, pre-existing educational platform to deliver foundations of LM. Leveraging a pre-existing course would facilitate rapid, widespread implementation of standardized LM training without extensive time and resource allocation for UME institutions.

Abstract #121

Histological Analysis of Rare Gastric Bypass - A Cadaveric Case Study

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A 77-year old female cadaveric subject who underwent a one-anastomosis gastric bypass (OAGBP) was investigated for pathologic histologic changes to the gastrointestinal system. Unlike the gold standard Roux-en-Y gastric bypass procedure (RYGBP), the OAGBP is a newly approved weight loss surgery approved by the American Society for Metabolic and Bariatric surgery (ASMBS) with not much known about the long term pre-pathological or pathological implications.

Despite known increased malabsorption complications, the OAGBP has reported advantages such as a tension-free gastrojejunostomy, fewer herniations and a faster procedure time. These advantages have resulted in this technique being adopted more readily in countries other than the United States (US) and recent endorsement by the ASMBS. When compared to the standard RYGBP, the OAGBP resects a substantial portion of the proximal small intestine and retains a larger portion of viable stomach. It was hypothesized this results in greater adverse pathologic changes in the mucosa, leading to digestive and malabsorptive complications and possible long term health consequences. Risks related to the long-term outcomes of the RYGBP are more studied and understood, but not much is known about the changes seen in the less common OAGBP.

A histological analysis was conducted to compare the cellular structure from a cadaveric specimen with history of OAGBP to a similar cadaveric specimen with no history of a gastric bypass. The samples were collected from the proximal and distal stomach, duodenum, jejunum and the 3-way anastomosis junction. The samples were sent to HistoWiz Pathology where they were stained with Hematoxylin and Eosin and interpreted by a board-certified pathologist.

Samples were interpreted to assess the presence of epithelial necrosis, ulceration, inflammation, smooth muscle proliferation and other inflammatory and malignant changes. Results showed that the samples from the OAGBP underwent 60% more cellular changes when compared to the control. These differences represent pre-pathological changes that could lead to conditions such as ulcers, polyps, cancer, and other negative outcomes.

With an increase in medical tourism for bariatric surgery due to lower cost and less strict pre-procedure guidelines and new endorsement by the ASMBS, practitioners are more likely to see patients with a history of non-ASMBS-endorsed procedures such as the OAGBP . This study aims to show there are significant pathologic histologic changes that occur to the intestinal mucosa following an OAGBP, and that more research should be done to better understand postoperative impacts to patients in the long term.

POSTER PRESENTATION

Abstract #122

Male vs Female Reflex to Acetic Acid Induced Visceral Pain

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Often, only male mice are used in nociception studies due to the concern that the female estrous cycle will skew the results by adding another variable, and when females are used, they are generally checked daily to track which stage of the estrous cycle they are in [1]. Previous studies showed no sex differences in response to acute pain in mice [1]. Acute pain is generally associated with sympathetic or somatic nervous sensation [4]. Acetic acid injections, when administered intraperitoneally (IP) are used to induce visceral pain in mice, which will induce a “writhing reflex” [2,3]. Visceral pain is the result of organ irritation and associated with visceral nervous sensation [5]. This experiment was designed to test if male and female mice had significantly different responses to acetic acid induced visceral pain. Experiments were performed under the University of Colorado, Anschutz Medical Campus IACUC protocol number 157. All mice used were C57BL/6 mice. Equal number of male and female mice were used in this study (n=7). 300 µL of 0.6% acetic acid was injected bilaterally IP into the mice. They were monitored for 1 hour and the number of writhing reflexes were tallied and compared between males and females using unpaired t-tests. Comparisons of writhing reflexes in both the first 30 minutes and full 60 minutes showed no significant difference between sexes. This is consistent with experiments that showed no difference in response to acute pain [1]. Continued research studying sex differences and similarities in mice could provide insight on human responses to pain, as humans do exhibit sex differences when responding to pain [6].

POSTER PRESENTATION

Abstract #123

A comparison review of hypertension classification between the 2017 ACC/AHA and 2020 ISH guidelines.

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Hypertension (HTN) is a significant 'silent killer' due to its symptomless nature, carrying risks like stroke and heart disease if untreated. This literature review has two goals: (1) analyze variations in HTN classification between the 2017 American College of Cardiology / American Heart Association (ACC/AHA) and the 2020 International Society of Hypertension (ISH) guidelines, and (2) assess recent data against guideline references for clinical context application. Both HTN guidelines and their cited primary literature were reviewed. A PubMed and MEDLINE search was performed utilizing the key terms: “hypertension prevalence united states”, “global hypertension prevalence”, “hypertension mortality risk” and “RCT blood pressure treatment”. Freely accessible articles published between 2020 and 2023 were reviewed and critically analyzed by comparing them against the above guidelines to determine whether their results support the current recommendations. Four studies were selected and their relative hazard ratios (HR) of cardiovascular disease events (CVD) based on BP threshold were then utilized for a comprehensive pooled analysis. The ACC/AHA guideline defines HTN as blood pressure (BP) $\geq 130/80$ mmHg, while the ISH guideline sets it at BP $\geq 140/90$ mmHg. The ACC/AHA guidelines indicate a focus on risk reduction of major CVDs and mortality risk. The pooled analysis revealed an increased HR for stroke and CVDs as the BP threshold increased respectively. A 2015 randomized controlled study of 9361 patients over 3 years, targeting systolic BP <120 mmHg versus <140 mmHg resulted in fewer major CVD events and lower all-cause mortality in the lower BP group. However, there was a higher occurrence of serious adverse events in this group including syncope, hypotension, and acute kidney injury. Both guidelines are comprehensive and underwent rigorous peer review. Their main difference lies in BP cutoff thresholds. The guideline disparities have several implications for clinical practice including individualized treatment considering comorbidities, shared decision-making, and ongoing education. Evolving HTN guidelines prompt further research. Of note, ISH guidelines encompass diverse data from a variety of ethnic backgrounds globally, while ACC/AHA focuses on US and predominantly White populations. Rigorous investigation of optimal BP thresholds, considering diverse populations and access to pharmacotherapy, is pivotal for evidence-based recommendations.

POSTER PRESENTATION

Abstract #124

A Review and Comparison of the AAP's 2023 and 2007 Clinical Practice Guidelines for the Evaluation and Treatment of Pediatric Obesity

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The prevalence of childhood obesity has risen substantially in recent decades, along with its numerous and severe associated health risks. The new American Academy of Pediatrics (AAP)'s 2023 clinical practice guideline (CPG) marks a significant departure from the previous AAP's 2007 CPG recommendations by advocating a more proactive and intensive approach to pediatric obesity management. While its 2007 predecessor proposes a stepwise treatment plan, with progression toward increasingly invasive and expensive treatments based on patient response, the revised CPG advises immediate consideration of intensive health behavior and lifestyle treatment (IHBLT) programs, as well as weight-loss medications and surgery for adolescent patients. This research critically evaluates the two guidelines through a review of their primary literature and an independent examination of the existing research pertaining to their proposed treatment strategies. Twelve relevant studies were identified via a Google Scholar search of relevant key terms and included based on publication date (2013 and later), sample size ($n > 50$), and location (the United States). The 2007 CPG emphasizes the paucity of research on the long-term effects of weight-loss surgery and pharmacotherapy in adolescents, which remains a present concern as highlighted by a lack of evidentiary support for their use in the 2023 CPG. Independent research highlights additional concerns regarding the feasibility and accessibility of IHBLT programs due to their general scarcity and limited enrollment. The 2023 guideline advises that treatment via pharmacotherapy and surgery should be accompanied by IHBLT, though with such limited access to these programs, young and vulnerable patients are likely to end up utilizing risky and aggressive treatments without the necessary holistic guidance and monitoring intended by the CPG. The 2007 CPG exhibits a deeper respect for the seriousness of the risks posed by pharmacotherapy and surgery for weight loss in children, though it too falls short in proposing significantly efficacious recommendations. Before an adequate CPG can be devised, more research is needed to determine the efficacy and safety of weight-loss medications and surgery in pediatric patients, and more work must be done to address the many sources of health inequity that underlie the pervasive issue of pediatric obesity.

POSTER PRESENTATION

Abstract #125

Pregnant participation trends in industry-sponsored clinical phase IV trials from October 2012 to October 2022

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Over half of women in the United States use prescription medications for various indications, highlighting the need for a thorough evaluation of drug efficacy. Despite the consensus among national institutions such as the U.S. Food and Drug Administration and the U.S. Institute of Medicine regarding the importance of including pregnant individuals in clinical drug trials, the period from 1960 to 2013 saw only about 1% of pharmacokinetic trials focusing on this population. This scarcity of studies has resulted in limited clinical knowledge for managing medical conditions during pregnancy.

In a 2013 study conducted by Shields et al., an examination of the inclusion or exclusion of pregnant individuals in phase IV clinical trials revealed that among 558 qualified industry-sponsored studies, only five were explicitly designed for pregnant women. Moreover, out of 367 phase IV clinical trials, a staggering 95% excluded pregnant women. Given the significant changes to the FDA Pregnancy and Lactation Labeling Rules (FDA PLLR) in 2014 and the FDA's 2018 public statements in support of fair inclusion, it is crucial to investigate whether these changes have influenced the participation of pregnant individuals.

This study aims to determine whether there have been changes in the inclusion of pregnant individuals in industrial phase IV clinical trials since Shield et al.'s original study. Data extracted from ClinicalTrials.gov employed the terms "open studies," "interventional studies," "location in the United States," "studies with female participants," "adult age group (18-65)," "phase 4," and "funded by industry." Studies not meeting these criteria or commencing before our established October 1, 2012, timeframe were excluded.

The results are being categorized using DistillerSR Literature Review Software and will be analyzed using a chi-square test and descriptive statistics, such as central tendency measures. We anticipate discovering that industrial clinical research continued to restrict inclusion until recent years. By analyzing the inclusion of pregnant individuals in these trials before and after the changes in the FDA PLLR, our study provides valuable insights into the possible impact of these regulatory changes while addressing the inadequate understanding of the role evolving labeling rules have on the participation of pregnant individuals in critical clinical research trials.

POSTER PRESENTATION

Abstract #126

Investigation into management deficits in a patient with life-threatening gpa, and future management course

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A 49-year-old female presented to an Ear, Nose, and Throat (ENT) provider with progressive dyspnea. Pertinent past medical history includes childhood asthma, hemithyroidectomy, septoplasty for septal perforation, and nasal crusting. The patient reported her airway being narrowed to the point of requiring a pediatric endotracheal tube during surgeries. Additionally, subglottic stenosis was identified by ENT utilizing flexible tracheoscopy. Suspicion for granulomatosis polyangiitis (GPA) was high and antineutrophilic cytoplasmic antibody (ANCA) levels were obtained. Unexpectedly, perinuclear anti-neutrophil cytoplasmic antibody (P-ANCA) was positive and cytoplasmic anti-neutrophil cytoplasmic antibody (C-ANCA) negative. Typically, in GPA, C-ANCA is expected to be positive and P-ANCA is more associated with microscopic polyangiitis. Laryngeal biopsies obtained during an incision and dilation procedure to open the airway were negative. This case is unique as her clinical presentation correlated with GPA but was not serologically supported. Specifically, GPA is a rare autoimmune disease, and this case is an abnormal presentation of GPA. In general, GPA is not well understood, although etiologic/pathogenic theories exist with no clear definition at this time. The manner in which GPA manifests varies widely (e.g., subglottic/bronchial stenosis and glomerulonephritis), as it affects nearly any tissue of the body. This makes it difficult to recognize especially when clinical manifestations appear over years such as in this case. Furthermore, this case depicts seronegative GPA, bringing attention to the increased difficulty in diagnosis and treatment. Currently, there is no singular test for GPA; however, combination of clinical manifestations, serology, biopsies, and diagnostic imaging are utilized. Although, positive and negative serologic or biopsy results neither include nor exclude a diagnosis of GPA. Treatment is dependent on the patient's presenting symptoms, and often focuses on treating individual symptoms. Current studies have found success in utilizing immunologic suppression and steroid therapy, but guideline-directed management is limited.⁴ In this case, the treatments focused on the patient's individual symptoms and included one failed trial of immunosuppression utilizing methotrexate. This case is ongoing, and investigation into what treatment possibilities exist is underway between the patient and medical team. Discussion includes risk stratification for trialing cyclophosphamide and glucocorticoids in attempt to place the patient in remission.

POSTER PRESENTATION

Abstract #127

Comparison of percutaneous coronary interventions patient outcomes of rotational atherectomy vs balloon angioplasty with stent: a systematic review

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The percutaneous intervention corresponding to the best patient outcome for patients with coronary artery disease is a highly debated topic in the world of interventional cardiology. About 695,000 people died in the United States from heart disease in 2021, with the prevalence of heart disease reaching as high as 14.3% in adults aged 65-74 and 24.2% in adults aged 75 and over. In general, balloon angioplasty with stent is used for cases of mild stenosis while the rotational atherectomy procedure is used for cases of severe stenosis. We believe balloon angioplasty with stent leads to less repeat events occurring 6+ months from the date of the procedure than the rotational atherectomy procedure. Publicly available databases such as PubMed were searched for literature describing patient outcomes for both procedures independently. These studies ranged from randomized control trials to observational studies. Cross-referencing of the outcomes of each study was then done while also accounting for biases that may appear. The inclusion criterion used in deciding which papers to include in this study was based on recurrent events requiring another PCI 6+ months from the original procedure date. Papers with complications were also included in this study. Keywords such as “re-stenting”, “restenosis”, and “event-free survival” were used in the search. A comprehensive review and synthesis of the collected data was used to compile our results. Eight studies met our inclusion criteria and were used to create our bias graph and conclusion section. Data is currently still being compiled. Potential limitations of the study include differing thresholds for complications and success in between the studies. The work in this study advances the field of cardiology by allowing clinicians to know the efficacy of each PCI and what may give favorable results comparatively. However, clinicians may opt to use the less effective procedure due to factors not focused on in this study, such as the degree of stenosis in the artery. Our findings are predicted to show the BAWS procedure leads to less repeat events occurring 6+ months leading to it being the preferred procedure to be used for patients with CAD.

Acronyms:

- RA: rotational atherectomy
- BAWS: balloon angioplasty with stent
- PCI: Percutaneous intervention
- CAD: coronary artery disease

POSTER PRESENTATION

Abstract #128

Incremental EKG Lead Deviations: The Clinical Significance

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Electrocardiograms (EKGs) have been utilized in rapid diagnosis of electrical cardiac abnormalities since 1909 (1). Lead placement has been stressed as critical in determining the severity of arrhythmias (2). Limb and precordial lead reversal effects have been investigated extensively (3) due to the possibility of incorrect EKG interpretation. These errors typically focused on switching the leads with each other, i.e., swapping lead positions of left arm (LA) with right arm (RA) or V1 with V6. They do not address what occurs if the leads are raised or lowered from their initial intercostal space. We aimed to address if rhythm variability or incorrect interpretation could occur in certain patient populations, trauma, and rapid diagnostic situations with incrementally misplaced limb lead positions. We modified lead placement by shifting the limb and precordial leads up or down the chest wall. We utilized 10 different positions in total. EKGs were analyzed by a board-certified emergency medicine physician and a board-certified electrophysiologist for clinical significance and treatment recommendations. We found that incremental shifts in lead placement offered little to no interpretation variability and no treatment variation. This means that patients who are unable to have perfect lead placement will not be negatively affected by their EKG interpretation. Limitations include only utilizing healthy individuals with regular rhythms. Patients with arrhythmias could cause abnormalities to be accentuated. Future studies will assess the variability of abnormal rhythms with variable EKG placement.

POSTER PRESENTATION

Abstract #129

Transcatheter Aortic Valve Replacement (TAVR) Long Term Comparison

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Valvular heart disease has an abysmal prognosis when left untreated¹. Aortic stenosis is the most common form, encompassing 61% of cases and affecting 2.5% of the United States population². Attempts have been made to treat valvular disease conservatively but with poor efficacy³. High mortality rates through conservative therapies have led to the preferred treatment of complete valve replacement. Within the last decade, transcatheter aortic valve replacement (TAVR) has been introduced and become more highly utilized over surgical aortic valve replacement (SAVR) due to its minimally invasive nature and favorable, if not better, outcomes than SAVR⁴. Two devices are currently approved for valve replacement, Evolut Pro and Pro+ by Medtronic and Edwards Sapien System by Edwards Lifesciences Incorporation. Both valves have shown remarkable success at treating valvular heart disease, however, each valve is distinct in its shape, function, and surgical placement. Due to the variability in valve designs, we aim to assess long term prognosis and readmittance rates between the two valves by analyzing STS/ACC TVT registry data. This is a database designed to track outcomes for all valve replacements. Outcomes such as readmittance, deaths, and replacements needed are evaluated. If one valve has better outcomes, such as fewer early deaths or longer valve life, we believe that valve should be preferentially used over the other to improve patients' quality of life. Data is currently being collected with the intent to analyze, using a T-Score, before the end of 2023. We hypothesize that the Evolut Pro and Pro+ by Medtronic will have better long-term outcomes due to the preservation of anatomical features after valve replacement.

POSTER PRESENTATION

Abstract #130

Advances and limitations of high-intensity ultrasound ablation

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High-intensity focused ultrasound (HIFU) ablation is a promising non-invasive treatment modality with many clinical applications. HIFU ablation uses focused ultrasound waves to thermally ablate targets deep within the body. In recent decades, HIFU ablation has made significant advancements, especially in neurology, oncology, and reproductive health. However, there are challenges to be addressed before HIFU can be fully adopted into standard clinical settings. The goal of this literature review is to provide a comprehensive overview of the progress and constraints of using HIFU ablation treatment. A comprehensive literature search was performed on the PubMed, Scopus, Google Scholar, and Cochrane databases. The focus was peer-reviewed articles published between 2018-2023 that discuss HIFU clinical advancements and limitations through randomized controlled trials in humans. Limitations in our search methodology may result in underrepresenting available literature on the subject. Articles using our developed search criteria were retrieved. The literature presents HIFU ablation as a promising non-invasive, non-ionizing thermal ablation therapy that can be used in treatment of diverse conditions from CNS diseases to solid tumors and cancers. Despite the broad potential applicability, we expect conclusions on efficacy lack large enough sample sizes and long-term follow-up periods to support consensus benefit. Additionally, we anticipate several technical limitations in the literature such as lack of real-time viewing and tissue heterogeneity impacting ablation wave concentration. In conclusion, this review highlights the value of HIFU but underscores the need for additional investigations to provide more robust insights into the clinical potential of widespread HIFU therapy.

POSTER PRESENTATION

Abstract #131

Comparison of 34 cases of remote cerebellar hemorrhage after spinal procedures

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Background and Purpose

Remote cerebellar hemorrhage (RCH) is a rare complication following neurological surgery. It is generally benign, presenting asymptotically or with transient minor symptoms. In a minority of cases, it can lead to permanent neurological deficits and death. In 2016, a comprehensive review titled: “Remote cerebellar hemorrhage after spinal procedures (part 2): a systematic review,” was published comparing 57 cases from 1981-2013. In the last 10 years, additional cases of RCH have been described in literature. Here, we discuss 34 of these cases within the context of the systematic review.

Methods

We reviewed RCH cases associated with spinal procedures from 2013-2023 and compared details that could offer insight to the underlying cause of RCH. An update to the previous systematic review is included by comparing 34 cases from 2 databases – PubMed and BMC Journal of Medical Case Reports. We referred to variables from the previous systematic reviews to compare case data. These include demographics (age and sex), primary disease, spinal segment involved in surgery, surgical procedure, intentional dural opening versus accidental dural tearing, RCH characteristics (imaging pattern, clinical onset, side of procedure, timing of bleeding), management strategies, clinical status at discharge and follow-up, risk factors, and surgical maneuvers.

Results

Significant findings: age mean – 61.9, median – 60; 19 female, 15 male; most common primary disease – spinal stenosis (17 patients); most common risk factors – hypertension (10 patients); most common spinal segment – lumbar (22 patients); most common surgical procedures – laminectomy (18 patients), fusion (11 patients), fixation (7 patients), dural tear repair (7); most common RCH pattern on imaging – bilateral RCH (14 patients), hydrocephalus (7 patients); most common clinical onset – altered mental status (18 patients), headache (16 patients); most common management strategies – drain placement (9 patients), dural repair (8 patients); most common status at discharge and follow-up – recovery (21 patients), cerebellar symptoms (6 patients), death (3 patients).

Conclusions

We compare our results to those found in the 2016 systematic review. The review found disease and operations involving the lumbar segment to be the most common. We had similar findings. The review found a 12% mortality rate compared to our 8.8%. The review found hypertension and impaired coagulation in less than 1/3 of their cases and we found these in 38.2%. Overall, our findings agree with those found in the previous review.

POSTER PRESENTATION

Abstract #132

Novel Onset of Migraine with Visual Aura in College Age Female

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Migraines are a relatively common disorder that affect up to 17% of females and 6% of males annually. Only about 25% of these individuals experience a migraine with aura (MA) of varying types including visual aura. Visual auras typically manifest initially as a focal point of scintillations with varying geometric patterns in the peripheral vision and progress variably over 5 minutes - 1 hour into larger scotomas that impair vision temporarily. Genetic and Estrogen-age-based mechanism risk factors exist, but more research needs to be completed to arrive at reliable conclusions. Onset of episodic MA has occurred for a variety of reasons amongst males and females from childhood to elderly years. This patient's MA manifested for the first time in their life at age 18, which is two years younger than the published average age range according to recent hormonal-based mechanisms. Triggers in question include hormonal levels, smoke, stress, exercise, and lights.

Patient presented with visual aura of sparks and wavy lines in visual periphery that expanded to fill her field of view. Symptoms peaked after 30 minutes, the aura disappeared and was followed by intense headache pain, photophobia, phonophobia, and activity intolerance. This happened on two separate occasions over the course of one month and had never occurred prior. Upon presentation to an ophthalmologist, no symptoms were present and visual acuity was confirmed normal. Symptomology of prior episodes is commonly used to diagnose. Patient age & family history noted mother having similar migraines which suggest genetic & hormonal mechanisms of action.

Treatments include Triptan and pain medications that can help alleviate symptoms and the use of headache journaling to track patterns and triggers unique to the patient. These same recommendations for treatment were given to this patient and outcomes are yet to be determined. The patient suspects hormonal, bright light, and loud sound triggers to be related to her unique case and is self-managing avoidance of her triggers.

This case differs from others presented due to unique possibility of hormonal systems at play, age of onset, and timing of migraine episodes implicating a gap for further research.

POSTER PRESENTATION

Abstract #133

Disparities in health insurance literacy and possible solutions

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Since the enactment of the Affordable Care Act in 2010 and its subsequent expansion of health insurance to 20 million Americans, health insurance literacy (HIL) has become increasingly important. HIL is defined as a person's aptitude for finding, acquiring, and understanding health insurance plans. HIL disparities have been observed to affect an individual's ability to acquire and utilize health care coverage. To better understand how health insurance literacy impacts patients, the authors reviewed the literature on how age, race, income, and education impacted HIL, as well as the impact HIL had on an individual's ability to employ its coverage. To evaluate these disparities in HIL, the students utilized search engine functions that prioritized key terms such as healthcare literacy, while excluding information that did not pertain to U.S. HIL data. This was done across multiple electronic databases including PubMed, Scopus, and Google Scholar. We included articles concerning medicine and excluded articles concerning disciplines that did not serve our objective such as psychology, occupational therapy, legislation, and jurisprudence. Articles were selected if they were published in the last ten years with one exception of the 2003 National Assessment of Adult Literacy. Preliminary results have shown that disparities in HIL exist primarily among men, those of Hispanic and Black heritage, those who are either in their early twenties or early eighties, those of lower socioeconomic status, and those who have lower than a high school education. Results also indicate that these disparities promote healthcare avoidance and are associated with increased debt. These results were all shown using HIL scores. Identifying these inequities between demographics and the poor healthcare outcomes they induce is of crucial importance, as it identifies a need to further explore why these disparities in HIL exist. Likewise, it indicates a need to develop solutions to these inequalities through educational means, online and face-to-face outreach, and through the utilization of applications and other digital technologies.

POSTER PRESENTATION

Abstract #134

Utilizing Facial Expressions as a Biomarker for Empathy Measurement in Standardized Patient Scenarios: A Machine Learning Approach

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Empathy is a vital element in enhancing patient trust, optimizing communication, and elevating patient outcomes in medicine. However, standardized training is still evolving due to the lack of universally accepted quantifiable markers for empathy. This gives opportunities to refine the metrics of empathy evaluation by using advancement in machine learning and facial emotion recognition.

Machine learning algorithms have been used to analyze and identify patterns that are often too complex for human observation. Facial expressions, being spontaneous and often subconscious, can serve as potential biomarkers for empathy, offering a more objective measure of empathy during patient interactions. Facial recognition software can detect these patterns in video footage by comparing it to established facial expressions. Using machine learning opens a potential avenue for an objective measure of empathy in patient interactions.

This study at Rocky Vista University School of Osteopathic Medicine (Southern Utah Campus) will employ machine learning and facial recognition software during standardized patient (SP) interactions. The software will capture and analyze facial cues from both the medical professionals and the patients in real-time to determine levels of perceived empathy. Data will be processed using a supervised learning algorithm trained on previously established empathetic facial cues. Participants will include preclinical & clinical osteopathic medical students, and experienced clinicians (DO's and MDs) from Rocky Vista University.

Traditional empathy evaluations in medical education use subjective measures such as self-assessments, interviews, and feedback, which are susceptible to biases. Prior research indicates an escalation in perceived empathy with clinical experience, emphasizing the correlation between clinical exposure and empathetic care. We anticipate that our AI-approach will identify consistent facial markers of empathy across the different stages of clinical experience. Moreover, we expect seasoned clinicians to exhibit a higher frequency of these markers compared to newer medical students.

Limitations include the software's accuracy in differentiating genuine empathy from simulated expressions and does not account for the possibility of fatigue affecting facial cues in longer patient interactions. This methodology could help improve empathy evaluations in medical training, leading to AI-powered training modules that nurture authentic empathetic interactions in osteopathic medical students.

POSTER PRESENTATION

Abstract #135

Case report: peritoneal encapsulation in a cadaveric male

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During the abdominal dissection of a cadaveric male in his early 90s, a unique additional peritoneal encapsulation was discovered. Unlike other reports in literature which discuss a remnant of the dorsal mesentery, the encapsulation fully encompasses the abdominal organs, including the liver and stomach. Thus, this finding is completely unique compared to reports in literature and can best be described as a congenital persistent ventral mesentery.

Given the uniqueness of the anatomical anomaly and lack of documentation within the literature, it is important to provide a comprehensive description of our findings for any future comparisons. Its discovery can help increase awareness of a significant and rare persistent embryological remnant. There is potential that peritoneal encapsulation is associated with an underlying pathology or congenital anomaly. Further investigation and histological samples may provide further insight.

The patient was a white-collar worker with no reported abdominal surgeries and no external evidence of abdominal surgeries. The objective of this case report is to highlight the unusual positioning of this congenital anomaly, in an effort to expand upon potential pathophysiology. The donor's medical history is sparse, but notable for coronary artery disease and diabetes mellitus. The encapsulating peritoneum surrounds the stomach, liver, and intestines. It sits ventral to the greater omentum and dorsal to the parietal peritoneum. Per donor records, there is no indication the additional peritoneum contributed to comorbidities.

To our knowledge, there are no reports in existing literature of peritoneal anomalies superficial to the greater omentum in the abdominal cavity. A 2022 case report in Medico-Legal Journal describes an encapsulation of "all the abdominal organs," but does not specify if the peritoneal anomaly was superficial to the greater omentum. There are several reports of congenital anomalies that feature an encapsulation of portions of the digestive tract, especially the small intestines. The full peritoneal encapsulation that was discovered is distinct in comparison to similar reports in literature and there is no existing terminology for the finding.

POSTER PRESENTATION

Abstract #136

Merging PRK and Collagen Crosslinking: An Analysis of Literature and Guide to Prevalent Protocols

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Corneal ectasias are a serious pathology that may present following refractive surgeries or idiopathically as in keratoconus (KCN). Corneal crosslinking (CXL) is the mainstay treatment used to combat this gradual progression. CXL is a process by which adjacent collagen fibrils form chemical bonds to stabilize the extracellular stromal structure. However, it does little to improve the refractive complications associated with the disease. Over the last 15 years, CXL has been experimentally combined with photorefractive keratectomy (PRK). PRK is a type of corneal ablative surgery characterized by removing a small layer of epithelial and anterior stromal tissue via an excimer laser and modifies the anterior stroma shape resulting in improved refractive index.

The purpose of this review is to compile the different surgical approaches of combined PRK and CXL into one paper, providing the primary outcomes and adverse events of each, to assist clinicians in choosing the surgical approach that will be best suited for them and their patients.

A literature review was conducted as outlined by the Preferred Reporting items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The following electronic databases were searched: NoordaCOM Library, RVUCOM Library, PubMed, Google Scholar, OVID Medicine, ScienceDirect, Cochrane Library, and Medline Plus. Key words included a combination of “corneal crosslinking”, “CXL”, “corneal collagen crosslinking”, “PRK”, “photorefractive keratectomy”, “PTK”, “phototherapeutic keratectomy”, and “excimer-laser ablation”. Total results from combinations of these search terms were 823 articles. From the 823 articles a total of 37 articles were reviewed, summarized in detail, and discussed in this literature review. The articles

included in this study used PRK, or PRK combined with phototherapeutic keratectomy (PTK), immediately followed by CXL for corneal stabilization with the goal of improving patients' visual acuity. Any variant of PRK, PTK, and CXL were included. The treatment of KCN was not a part of the inclusion criteria. Exclusion criteria included studies where the patients only received one of the treatments mentioned, did not receive CXL immediately following PRK or patients who received PTK only, followed by CXL. Papers that did not have at least 8 eyes were also excluded.

Primary outcome improvements were found to exist when the average change was analyzed across all papers reviewed. Uncorrected distance visual acuity (UDVA) improved by 0.7 ± 1.23 logMAR (CD 0.57; $P < 0.001$) and corrected distance visual acuity (CDVA) improved by 0.18 ± 1.49 logMAR (CD 0.12; $P < 0.02$). Mean K was found to be reduced by 2.33 ± 0.25 D (CD 9.17; $P < 0.001$) and Spherical equivalent was found to be reduced by 2.61 ± 0.38 D (CD 6.73; $P < 0.001$). Combining PRK and CXL appears to improve visual acuity, keratometric measurements, and post operative manifest refraction.

Limitations of the study include that the global averages across different approaches are not to be taken as statistically significant or otherwise meaningful beyond a general representation of the outcomes found within that group as the protocol approaches vary widely. Moreover, studies have large variety in methodology regarding the use of PTK before PRK, use alcohol or mechanical removal methods, MMC use, or use transepithelial approaches. Additionally, the methods being applied to PRK and CXL are changing rapidly which makes it difficult to discriminate with any certainty which, if any, of the presented protocols are superior. Despite the many challenges mentioned above, the greatest limitation remains that these aforementioned approaches aren't FDA approved as of Summer 2023.

Combining the two procedures appears to be of net benefit, showing stabilization and improvement of ectatic disease, while also providing modest gains in visual acuity. Since customized PRK and CXL approaches appear superior, a combination of these would likely be best for patients.

POSTER PRESENTATION

Abstract #137

Caspases: Potential Target for Alzheimer's Disease

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Due to population aging, the number of new cases of Alzheimer's disease is expected to rise dramatically in the coming years. Despite significant efforts in research and drug development, finding effective treatments that can substantially alter the clinical course of Alzheimer's disease (AD) remains a challenge. Alzheimer's disease has a complex molecular pathology that is characterized by the presence of β -amyloid plaques and tau tangles in the brain, leading to cognitive decline. The complex and multifaceted nature of the disease has made it difficult to identify therapeutic targets that lead to meaningful improvements in patients. Current research has demonstrated potential connections between these molecular mechanisms and caspases (apoptotic pathway). This literature review examines the current research on caspases as a potential therapeutic target in the treatment of AD and proposes potential mechanisms of action.

POSTER PRESENTATION

Abstract #138

One Mechanism of Injury – Two Distinct Injuries: Acute Rotator Cuff Tear with Acute Acromioclavicular Joint Separation

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An older male sustained a shoulder injury after falling directly onto his shoulder after falling off his bike. He was evaluated in the emergency room with evidence of an acromioclavicular (AC) joint separation and a referral to orthopedics was recommended. Upon orthopedic evaluation, the patient displayed clinical signs and symptoms of an acute rotator cuff tear as well. Literature shows that the common mechanism to sustain these two distinct injuries are quite different and something that is rarely seen. An MRI was obtained and confirmed rotator cuff tear with concomitant AC separation, therefore, surgery was the next step. However, surgery planning proved difficult due to the need to repair the rotator cuff and AC joint. To make matters more complicated, the literature is sparse for a one-stage repair of these two injuries. A well-seasoned orthopedic surgeon had been in practice for 12 years and is board certified in adult trauma, sports medicine, total joint replacements, and pediatric trauma. However, he had never seen an acute rotator cuff tear concomitant with an AC joint separation. This is an incredibly rare finding due to the different mechanism of injuries for both injuries. Overall, this case is now the 20th documented patient to have a successful recovery with a one-stage repair which shows a promising future for other patients and surgeons.

POSTER PRESENTATION

Abstract #139

Aquaporin-4 Ocular Manifestations in the setting of joint abnormalities

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Aquaporin-4 (AQP4) may be implicated in the pathogenesis of osteomyelitis, osteoarthritis, diabetes, and glaucoma. AQP4 has been identified in the ciliary body and is responsible for aqueous humor secretion, so there may be a connection between patients with osteoarthritis and glaucoma due to systemic AQP4 expression alteration.

We will investigate expression of AQP4 surrounding the optic nerves of cadavers status post orthopedic surgery compared to normal controls. Given osteoarthritis is a common indication for orthopedic surgery, we expect to see a change in AQP4 expression surrounding the optic nerve due to systemic comorbidities.

The optic nerves from six pairs of cadaveric eyes were dissected for examination. Of the six pairs, three pairs were obtained from donors' status post orthopedic surgery and two pairs from relatively healthy controls. Immunohistochemistry will be performed using antibodies against AQP4. Each optic nerve will be sectioned for histology slides and each slide will be examined for staining of immunoprecipitants.

According to previous studies, patients with osteoarthritis have an increased expression of AQP4 channels in their joint tissue. Therefore, we expect to see AQP4 alterations near the optic nerve head in patients who had joint disease corrected with orthopedic surgery. Limitations of our study includes sparse past medical history, small sample size, and limited age range of cadavers.

We will contrast the AQP4 concentrations near the optic nerve in donors who underwent orthopedic surgery compared to cadavers without reported arthritic changes. Further analysis is required to evaluate potential connections between joint pathology and ocular disease. Our goal is to investigate if patients with AQP4 channel abnormalities in one organ system can potentially have changes in these channels systemically.

POSTER PRESENTATION

Abstract #140

Malnourishment and Microbiome in Breastfed Babies of Venezuelan Refugees

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Venezuela is the primary refugee source in Colombia, the third largest receiver globally. The most immediate health barrier migrants face is malnutrition due to food insecurity. Past studies indicate that malnourished individuals experience a decrease in their gastrointestinal microbiome diversity, exacerbating initial malnourishment. Lack of nutrients is particularly concerning in children and infants due to the physical and cognitive developments that occur during this period of life. There is still a need to investigate how malnourishment in breastfeeding mothers affects the microbiome of their infants. We suspect that babies to whom malnourished mothers feed experience a decrease in the diversity of their microbiome. We aim to examine the nutritional profiles of breast milk from Venezuelan migrants and gastrointestinal tract samples from their infants to correlate microbiome deficiencies in infants fed by malnourished mothers.

To assess malnourishment status, we recorded vital signs and anthropometric measurements from mothers and infants in our target population. In addition, we completed a comprehensive health history and a survey focused on vitamin and mineral deficiencies. We gathered breast milk samples from the mothers and attempted to collect stool samples from their infants to assess their microbiome diversity. Due to comorbidities such as severe dehydration and infectious diarrhea, we could not obtain stool samples in the field. We will discuss the data collected, difficulties encountered, and improvements for future research efforts.

From our data, four of the ten mothers displayed signs of malnutrition, including hair loss, gingivitis, and skin hypopigmentation. All mothers and infants showed various signs of dehydration, such as a lack of sweating and urination, constipation, low blood pressure, and pale oral mucosa. We faced several logistical challenges during our research on a newly studied population in an impoverished border town. We learned that collecting infant stool samples is difficult for a chronically dehydrated population. As such, we propose assessing microbiome diversity through oral swabs instead of stool samples. Ultimately, additional samples and 16s ribonucleic acid sequencing are necessary to draw significant correlations between malnutrition and decreased diversity in the microbiome. This critical information could impact how we treat migrant patients suffering from malnutrition.

POSTER PRESENTATION

Abstract #141

Novel case of infertility due to balanced Y:1 translocation

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Infertility struggles are experienced by 1 in 6 couples, 50% of which are caused by male factor infertility. Among variable genetic causes of male infertility, balanced Y:1 translocations are rare with few documented cases. Balanced translocations result in maintained genetic information, but often lead to reproductive failure due to chromosomal abnormalities. In this report, a male in his mid-20s presented to the clinic following unsuccessful attempts to conceive with his partner and was found to have asthenozoospermia and cryptozoospermia. Blood chromosome analysis revealed a balanced Y:1 translocation of the azoospermia factor gene (*AZF*) as well as fibrotic tissue in the seminiferous tubules.

Microdeletions in the *AZF* gene are among the most common causes of male infertility, demonstrating its necessity in sperm production. While balanced Y:1 translocations have been documented in a handful of cases, this patient's exact karyotype, 46, X, t(Y:1) (q11.21, p32.1), is novel and has not been reported to date. As there is no well-known treatment for this translocation, the couple underwent two rounds of in vitro fertilization which were unsuccessful. The underlying pathology of this mutation involves the *AZF* gene, though its function is not completely understood and there are currently no treatment regimens. Understanding the fertility issues associated with this genetic anomaly may help to elucidate the function and importance of the affected genes.

POSTER PRESENTATION

Abstract #142

Ketorolac vs. Fentanyl: A Retrospective Chart Review of Analgesia in the Prehospital Environment

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Background: Pain is both a common complaint and undertreated condition in the prehospital setting. With growing concerns regarding the worsening opioid epidemic and provider hesitation for opioid use, opioid-sparing treatment regimens are being introduced such as ketorolac administration. The primary aims of this study are to compare the safety and efficacy of ketorolac to fentanyl in the prehospital setting and to determine ketorolac's potential as a viable alternative analgesic in the prehospital setting.

Methods: A retrospective chart review of patient encounters obtained from a prehospital emergency medical services agency in New Mexico was conducted to evaluate the safety and efficacy of ketorolac vs. fentanyl in the prehospital setting. Data was assessed for differences between medication complications, initial pain, last pain, and pain reduction. Data was evaluated using unadjusted and adjusted (age, gender, and weight of the patient) models.

Results: A total of 4,102 records were evaluated (3,182 fentanyl cases vs. 920 ketorolac cases). No significant differences in initial, last pain or pain reduction were observed for age, gender, or weight in unadjusted models. However, adjusted models displayed a difference in the number of complications that occurred whereas all cases of medication complications occurred within the fentanyl group ($P < 0.0001$).

Conclusion: Findings suggest that ketorolac is both effective and safe in the prehospital environment when compared to fentanyl. These findings encourage prehospital agencies to adopt opioid-sparing treatment protocols to encourage increased treatment of pain without potentiating the current opioid epidemic. Future studies should investigate the intermediate and long-term analgesia and adverse effects of non-opioid medications in the prehospital setting.

POSTER PRESENTATION

Abstract #143

Can the implementation of AI decrease the occurrence of adverse anesthetic complications?

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The potential of Artificial Intelligence (AI) in the realm of Anesthesiology to enhance patient outcomes and mitigate adverse events has been widely acknowledged. This literature review delves into the utilization of AI to reduce complications and highlights the limitations of AI in Anesthesiology.

Our review involved searching databases such as PubMed, Scopus, and Google Scholar using keywords such as AI, machine learning, intraoperative awareness, anesthesia awareness, intraoperative monitoring, and artificial intelligence, which yielded 77 articles. The findings suggest that AI can significantly reduce the occurrence of intraoperative awareness with recall (AWR) by monitoring anesthesia depth, measured using electroencephalography (EEG) and bispectral index (BIS). Recent studies have utilized AI to analyze raw EEG data with a 93% accuracy rate in distinguishing between awake and anesthetized patients.

However, limitations to the use of AI in anesthesia include the need for large, unbiased datasets to train models and the proprietary nature of AI models, limiting customization to specific patient populations. Additionally, AI models lack transparency and the ability to provide reasons for their decisions, making clinical decision-making challenging.

Despite these limitations, the potential of AI to revolutionize anesthesia care is evident. Further research and development are necessary to maximize benefits and ensure safe implementation in clinical settings. Overall, AI can potentially improve patient outcomes and mitigate adverse events in anesthesiology.

POSTER PRESENTATION

Abstract #144

Remimazolam Sedation for Nerve blocks

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Background

Remimazolam was FDA approved in 2020 for procedural sedation in 30 minutes or less. With a safety profile equivalent to midazolam and faster onset with shorter duration of action, remimazolam may be a reasonable choice for a short, mildly stimulating procedure such as preoperative nerve blocks. Our study aim was to measure sedation levels in patients undergoing peripheral nerve blockade with intermittent doses of remimazolam. We hypothesized that remimazolam would provide minimal to moderate sedation during nerve block placement.

Methods

50 patients participated by convenience sampling in a prospective, open-label, observation study. Remimazolam was administered to participants 1 minute prior to a preoperative nerve block according to FDA dosing guidelines (Table 1). The primary outcome was level of sedation using the Modified Observer's Assessment of Alertness and Sedation scale (MOAA/S). Measurements were recorded every minute during nerve block placement until three consecutive MOAA/S scores of 5 were obtained (Table 2).

Results

86 nerve blocks were performed in 50 patients. All nerve blocks were successfully completed. 90% were sciatic nerve blocks in the popliteal fossa with or without a perineural catheter. Figure 1 presents the distribution of MOAA/S scores and sedation level. 38% of patients developed minimal and moderate sedation. 34% had no sedation. 28% experienced deeper than intended sedation.

Conclusion

Our results in part confirmed our hypothesis. As dosed, remimazolam provided minimal or moderate sedation in over one third of patients. However, sedation onset and duration for the most part did not necessarily coincide with nerve block placement. Drug dosing based on ASA score and not other variables, e.g., weight, could have contributed to the inconsistency in patient sedation. Although 28% experienced deeper than intended sedation levels, they were of brief duration and required no rescue interventions.

POSTER PRESENTATION

Abstract #145

Diagnostic ultra-sound in juvenile scleroderma

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Background:

Juvenile scleroderma (JS) presents as a rare, chronic rheumatic disorder characterized by an aberrant accumulation of collagen. This condition poses a unique clinical challenge due to its low incidence, resulting in a dearth of effective diagnostic and therapeutic options. In recent years, ultrasound (US) imaging has emerged as a potential tool to help in managing JS. The goal of this literature review is to provide a comprehensive overview of JS and the application of US for diagnosing, tracking treatment efficacy, and gauging disease activity in JS.

Methods:

A literature search of PubMed database was conducted to find articles on the landscape of JS and the use of US in JS applications for the period spanning 2016-2023. The following search criteria was developed and applied to capture research articles relevant to the scope of this review: "scleroderma" AND "Children" AND "Ultrasound" "Juvenile scleroderma) AND (Ultrasound imaging" Filters: from 2016 – 2023. Only peer-reviewed studies published or translated into English were included in the review. Animal studies, non-peer-reviewed articles, conference abstracts, editorials, opinions, and commentaries were excluded.

Results:

Ten articles were retrieved using the search criteria. The literature revealed that using US techniques such as Shear Wave Elastography (SWE) and High-Frequency Ultrasound (HFU) can effectively be used to assess complex JS clinical features such as thickness, echogenicity, elasticity and vascularization of affected tissues. While these results showed promise, a conspicuous lack of dedicated US imaging studies catering specifically to the JS population limits a consensus on appropriate methods and approaches for the use of US in JS applications. Limitations in our literature search methodology may result in underrepresenting available literature on the subject matter.

Conclusions:

Currently, treatment modalities and monitoring techniques remain limited in JS. There are no standard procedures for US imaging as an established diagnostic tool for JS. Our findings suggest an intriguing avenue of exploration into the fusion of current JS clinical practice methods with ultrasonography, particularly SWE and HFU. This synergy holds the potential to revolutionize early detection and the continuous monitoring of JS disease progression.

POSTER PRESENTATION

Abstract #146

Communication about Prognosis across Advancing Childhood Cancer: Preferences and Recommendations from Bereaved Parents

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Background: Most parents of children with cancer want to hear transparent information about prognosis from their child's oncologist, even when prognosis is poor. Yet a recent study of longitudinal recordings of serial scan discussions revealed that pediatric oncologists often avoid or stall frank prognostic disclosure. The "right" way to communicate about prognosis remains unclear, particularly from the perspectives of parents and patients. Through the RIGHTTime study, we aimed to explore stakeholder preferences and recommendations for delivery of prognostic information.

Methods: In this cross-sectional qualitative study, semi-structured interviews were conducted with pediatric cancer stakeholders including patients, parents, and oncologists at diverse timepoints across the illness course. Interviews were recorded, transcribed, and analyzed using a rapid qualitative approach. This paper presents analyses from the bereaved parent cohort.

Results: Three dominant themes emerged regarding parent recommendations for how the oncologist should disclose prognosis: 1) timely and transparent communication (encouraging prompt, transparent, compassionate dialogue), 2) individualized approach (tailoring discussion about prognosis to the preferences of a specific patient or family), and 3) creating space for preserving hope (honoring the importance of hope, even in the face of a grim prognosis).

Conclusion: A diverse cohort of bereaved caregivers expressed preferences for transparent, timely prognostic disclosure tailored to the patient's and family's individualized attributes and goals. Future work will explore the perspectives of oncologists, pediatric patients, and parents at different time points across progressive illness, with the goal to translate stakeholder recommendations for best practice into a clinical intervention which encourages timely individualized prognostic communication in advanced pediatric cancer.

POSTER PRESENTATION

Abstract #147

Year two of yoga as an educational aid for osteopathic medical students studying musculoskeletal anatomy

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In medical education, there is ongoing research into the most efficacious method of exam preparation. Yoga, a form of mind-body fitness that combines muscular activity with internally directed mindful focus, has been found to successfully decrease stress and increase anatomy exam performance in allopathic students. To evaluate this in osteopathic students, this study assesses exam scores and stress levels of first year osteopathic students in their musculoskeletal block after attending a yoga class with incorporated anatomy review.

This study included a control group and a yoga group. The yoga group participated in three classes during their musculoskeletal block, one before each anatomy practical exam. All study participants completed a pre-class survey to evaluate the student's previous anatomy and yoga experience, as well as their Perceived Stress Score (PSS). A post-class study was also administered to evaluate the students' experience and the efficacy of the study as well as another PSS evaluation. In the yoga group, participants attended a yoga class which covered poses that correlate with muscles tested. Alongside the yoga class, there was an educational slideshow with models, a muscle/pose handout, and quiz questions that covered high yield material. The topics covered included origins and insertions, innervations and perfusions, and clinical correlations. The test scores will be retrieved from an RVU faculty member and will be made anonymous for further analysis.

Previous results in this ongoing study were promising as students who attended the educational yoga session received overall higher-than-control anatomy practical grades. Similar results are anticipated following analysis from the new cohort, as the sessions were conducted in the same format with the same study materials. Limitations include that individuals decided whether to join the yoga group or control group, thus participation was not randomly assigned. Additionally, a decreased response on the post-survey will limit findings from the PSS evaluations. The data retrieved from this study contributes to medical education by potentially showing that incorporating a kinesthetic yoga component to the curriculum could help students learn the practical content and yield better results.

Abstract #148

Spontaneous Fracture of Humerus secondary to Hemangioma

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A 28-year-old male presented to the orthopedics office with severe pain in his right arm, after throwing a light object. Upon physical examination, he demonstrated with localized tenderness and swelling on the proximal aspect of the right humerus. X-ray and MRI imaging revealed a displaced fracture at the midshaft of the humerus and a mass by the fracture. Subsequently, a MDM2 Probe (PET) biopsy was performed on the mass to obtain tissue for histopathological analysis. The biopsy revealed a nonmalignant fibro osseous lesion. The exact cause of this intraosseous lesion remained unclear. The patient had an uneventful recovery and was discharged with instructions for regular follow-up.

Intraosseous epithelioid hemangiomas are rare tumors that make up less than 1% of all bone tumors.² They typically present with localized pain, swelling. The exact etiology of this patient's intraosseous epithelioid hemangioma remains unclear. They are considered benign vascular tumors, but have a locally aggressive behavior and potential for recurrence which necessitate careful management.⁴ Curettage and bone grafting are the mainstay of treatments⁵; however, this patient was able to heal without surgical intervention and with the use of an orthopedic cast. Spontaneous fractures without history of significant trauma are unusual and raise suspicion for an underlying bone pathology. Underlying pathologies that should always be considered include: hemangioma, intraosseous lipoma, fibrous dysplasia, Paget's disease, non-ossifying fibroma, and malignancy.

This case holds substantial value in medical education, showcasing the intricate diagnosing pathway considerations surrounding complex clinical presentation. It demonstrates the importance of ruling out malignancy and other pathologies when bone fractures are non-traumatic. It exemplifies that the utilization of supplementary procedures like biopsy, advanced imaging modalities such as MRI, and meticulous histopathological analysis becomes indispensable.

POSTER PRESENTATION

Abstract #149

Multiple System Atrophy Cerebellar Type: a case report

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Multiple system atrophy (MSA) is a rare neurodegenerative disease characterized by a spectrum of motor and autonomic symptoms, including parkinsonism, cerebellar dysfunction, and autonomic dysfunction. Diagnosis of MSA can be challenging and often delayed, leading to significant patient and caregiver distress. Here, we present a unique case of MSA, specifically the cerebellar subtype (MSA-C), emphasizing the diagnostic complexities and the importance of considering MSA as a potential etiology in cases with atypical presentations.

A male patient in his seventies initially presented with gait ataxia reminiscent of intoxication in the early 2000s. Over time, his condition progressed, accompanied by sensory polyneuropathy, posterior column dysfunction, mild tremors, and increased muscle tone. Autonomic testing in 2021 revealed significant blood pressure fluctuations, cold extremities, and urinary and fecal incontinence, in addition to a history of prostate cancer and perineal sensory disturbance. Despite extensive investigations, including neuroimaging, genetic testing, and paraneoplastic workup, a definitive diagnosis remained elusive.

The patient met the criteria for possible MSA-C, displaying autonomic dysfunction, cerebellar symptoms, and an unresponsive parkinsonian syndrome. The differential diagnosis included hereditary ataxias, paraneoplastic syndromes, and idiopathic sensory-predominant polyneuropathy. Ultimately, the clinical presentation and findings led to a probable MSA-C diagnosis.

Treatment for MSA primarily focuses on symptom management, including medications for specific symptoms and therapies to address mobility and activities of daily living. Autonomic dysfunction management involves lifestyle modifications and, if necessary, medication. Supportive care and regular follow-up are essential components of the treatment plan, with considerations for clinical trial participation.

This case highlights the diagnostic challenges posed by MSA, particularly when clinical symptoms overlap with other conditions. It underscores the importance of considering MSA as a potential diagnosis, even in cases with atypical presentations. Continued research into MSA, especially its less common subtypes, is crucial for refining diagnostic criteria and developing more accurate diagnostic tools.

Keywords: Multiple system atrophy, MSA-C, cerebellar dysfunction, autonomic dysfunction.

POSTER PRESENTATION

Abstract #150

Osteopathic medical students' utilization and perceptions of artificial intelligence (AI) tools in medical education: a survey study

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The integration of Artificial Intelligence (AI) into medical education and practice holds transformative potential for healthcare delivery. Prior research highlights the increasing interest and potential advantages of AI in medical education, including aiding comprehension, offering personalized learning experiences, and bridging theory and practice. Nonetheless, the extent of AI application in pre-clinical osteopathic medical education remains largely unexplored. This study aimed to examine the prevalence of AI utilization, particularly tools like ChatGPT, for enhancing studying, clarifying concepts, and reducing apprehension about future practice among Rocky Vista University osteopathic medical students. Additionally, the research investigated potential correlations between AI usage and academic performance, as self-reported by students during their pre-clinical Neuroscience courses. By achieving these objectives, this study contributes to the evolving integration of AI in medical education.

An anonymous cross-sectional survey through the Qualtrics platform was employed to gather data from second and third-year osteopathic medical students at Rocky Vista University. The survey encompassed inquiries related to the utilization of AI tools for studying, concept clarification, and alleviating apprehensiveness, as well as self-reported grades in pre-clinical Neuroscience courses. Demographic characteristics, AI experience, and perceptions of AI's utility in medical education and practice were also collected. Statistical analyses will be conducted on the collected data to discern prevalence, trends, and relationships between AI use and academic performance.

The findings of this research project will provide insights into the extent of AI incorporation in medical students' study routines and its potential influence on academic achievement. This may result in the potential to contribute to the integration of AI-assisted learning in medical school curricula as well as structured student exposure to prepare for the incorporation of AI into their future medical practice. Initial predictions suggest that a substantial proportion of respondents utilize AI tools for educational purposes. Furthermore, a positive correlation is anticipated between AI usage and self-reported academic performance in pre-clinical Neuroscience courses, suggesting a potential link between AI-assisted learning and improved outcomes. Limitations of the study include self-reported data and the cross-sectional nature of the survey.

This research anticipates an advancement in the understanding of AI's role in medical education and medical students' experiences by examining its impact on osteopathic medical students' learning experiences and outcomes.

POSTER PRESENTATION

Abstract #151

Preference for Large Language Model or Physician Generated Responses to Clinical Prompts

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The advent of Large Language Models (LLMs) and Generative Artificial Intelligence (AI) has started to merge the disciplines of data scientists and physicians to potentially revolutionize patient interactions in healthcare settings. AI models, particularly generative models like Chat-Generative Pre-Trained Transformer (ChatGPT), exhibit an ability to produce human-like responses when prompted, offering a unique integration potential within healthcare.

AI has been shown to be high quality and accurate with medical responses as appraised by healthcare professionals. Considering the prevalent gaps in healthcare accessibility and quality, AI could offer significant benefits to patient groups contending with such barriers.

This report investigates the potential and limitations of employing LLMs and generative AI in composing quality responses in patient interactions, by drawing comparisons with responses given by human physicians.

Our objective is to assess the 2026 cohort enrolled in the Digital Health Track at Rocky Vista University through an educational exercise, contrasting the perceived quality and empathy of LLM responses to those of human physicians.

We will be completing a literature review of previous studies comparing LLMs to physician responses. Using Scopus and PubMed with Boolean phrases “ (patient AND preference OR empathy) AND (chatbot OR “artificial intelligence” OR “large language model”) AND preference.” Our inclusion criteria included a timeframe of the past five years and study designs focused on LLM utilization in healthcare. We excluded non-English articles and non-experimental designs (i.e. book chapters, posters).

We anticipate that LLM responses will be perceived as more empathetic and of higher quality than those of human physicians. Some limitations in our study include the number of available, relevant articles and lack of qualitative analysis of LLM responses.

There are many barriers within the field of medicine which could benefit from the utilization of AI in the generation of high quality, accurate, and empathetic responses to patient concerns. The ability to utilize this rapidly expanding tool within the healthcare field could aid in enhancing patient experiences and increasing healthcare accessibility.

POSTER PRESENTATION

Abstract #152

The clinical utility of perioperative genetic testing for the prevention of post operative nausea and vomiting

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Postoperative nausea and vomiting (PONV) is a common, distressing complication that affects one third of surgical patients. While current antiemetic prophylaxis strategies have relied on the same risk stratification model for over two decades, the persistence of high PONV rates suggests a need to explore additional factors, specifically genetic factors, that influence PONV incidence. This review aims to explore the potential benefits and considerations of using genetic testing to guide PONV risk assessment and treatment in clinical practice. While many studies have investigated genetic factors related to PONV susceptibility, the clinical utility of perioperative genetic testing for personalizing antiemetic prophylaxis has not been extensively explored. A comprehensive review of the existing literature was conducted to evaluate well-studied genetic factors that have been shown to influence PONV. Cost analysis of genetic testing in the perioperative setting was performed alongside review of current guidelines to identify groups that would benefit most from personalized antiemetic prophylaxis. A thorough search of PubMed and Google Scholar was conducted utilizing keywords such as “PONV” and “genetic”. Included studies were full-text reports in English that were published between 1990 to 2023. In review of genetic factors, only SNPs were considered, and articles were excluded if they were reviews or meta-analyses or if PONV was not the primary focus of the study. 19 articles were selected for review. A total of 24 unique SNPs were significantly associated with PONV, and 7 were found to be associated with PONV in at least 2 independent studies. 2 studies found that the addition of genetic risk factors to PONV prediction models holds promise for improving risk stratification. Cost analysis revealed that basic, inexpensive genetic testing for common mutations could be beneficial, especially to groups identified as intermediate risk by current guidelines. Additional research is needed to determine whether this strategy is superior to liberal multimodal prophylaxis in terms of cost-effectiveness and adverse events. The findings presented in this review will assist clinicians and researchers in determining how genetic testing should be integrated into clinical practice to enhance the effectiveness of antiemetic prophylaxis in the ongoing quest to mitigate PONV.

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POSTER PRESENTATION

Abstract #153

Brain Metastases as only site of metastasis in a prostate cancer patient

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Case description

This is the case of a 76 year old male who was diagnosed with prostate cancer adenocarcinoma type 2004 and was treated with brachytherapy, Adriamycin, Taxotere, and Hydrocortisone. This was followed by Xtandi and Lupron injections between 2004 and 2010. The patient was having episodes of hematuria that was thought to be due to radiation cystitis. Patient started giving himself intramuscular Testosterone injections 0.4ml IM twice a week for almost 11 months between January to November, 2022. His PSA levels started to rise from < 0.1 to 0.3 to 1.1ng/mL by November, 2022. His Testosterone levels were also elevated at 625 ng/dL. A standard F-18 PSMA PET/CT was ordered to evaluate the etiology of a rising PSA level.

Treatment

The patient PSA levels continued to rise to 20.9 ng/mL. He underwent resection of the right cerebellar lesion and pathology results confirmed metastasis from primary adenocarcinoma of prostate cancer.

The patient is being treated with radiation to the brain lesions.

Discussion

Metastases to the brain from prostate cancer are extremely rare accounting to less than 1% of all other sites of metastases, particularly in the absence of other sites of metastases in the body and of adenocarcinoma type.

This patient self administered Testosterone intramuscularly against his physician directions which could have contributed to rapid increase in size and number of his brain lesions in a relatively short time.

Prostate cancer metastases to the brain have a typical peripheral/dural distribution which makes it difficult to differentiate from meningiomas on PSMA PET/CT scans. However, the continued rise in the PSA level and with no evidence of disease in other sites of the body support the diagnosis of prostate cancer metastases to the brain.

POSTER PRESENTATION

Abstract #154

A review of the long-term use of proton pump inhibitors and risk of Celiac disease in the context of HLA-DQ2 and HLA-DQ8 genetic predisposition

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Introduction

Proton pump inhibitors (PPIs) are among the most prescribed and widely used medications; however, the long-term effects of these medications are only beginning to be investigated. Since the introduction of omeprazole in 1989, PPIs have become the first-choice treatment for esophagitis, peptic ulcer disease, and dyspepsia. Unlike other anti-acid drugs, PPIs temporarily halt the end pathway of gastric acid production until compensatory mechanisms resume; therefore, they have excellent benefits when prescribed appropriately. Recent studies have specifically examined the rise in celiac disease (CD) in the context of long-term PPI use.

Research Question

This review explores how PPIs may impact and manipulate the development of CD and highlights the need for additional research into the environmental and genetic factors that influence the development and progression of the disease.

Methodology

A literature search review was performed using the keywords celiac disease, proton pump inhibitors, HLA-DQ2, HLA-DQ8. The literature search was performed using the PubMed database.

Results

Recent studies have suggested the rise in CD could be attributed to early life infections, antibiotic use, and dietary changes that affect the gut microbiome, highlighting the significant role that gut microbiota is proposed to play in CD pathogenesis. Further focusing on the importance of the gut microbiome in the pathogenesis of CD, pharmaceuticals, such as PPIs, that cause gut dysbiosis have been linked to the inflammatory response present in CD. Although PPI therapy is helpful in reducing acid production in gastroesophageal disorders, additional information is needed to determine whether PPIs are still an appropriate treatment option with the possibility of developing CD in the future, particularly in the context of HLA-DQ2 and HLA-DQ8 predispositions. The pathogenesis of CD is multifactorial, and human leukocyte antigens are one factor that may contribute to its development.

Contributions to the field

The review emphasizes the importance of personalized medicine for individuals with gastroesophageal disorders that require long-term use of PPIs. If prolonged PPI treatment causes more harm than benefit in certain individuals, both a new standard for prescribing PPIs and advanced alternative treatments will be necessary to avoid potential adverse effects.

POSTER PRESENTATION

Abstract #155

Navigating the visual maze: the impact of visuospatial intelligence on diagnostic imaging success

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Accurate interpretation of complex visual information is crucial in medical specialties, especially in diagnostic radiology. Visual-spatial intelligence, which enables the mental manipulation of 2D and 3D images, plays a pivotal role in this process. However, the precise relationship between visual-spatial intelligence and diagnostic image performance in the medical field is an under-explored area of investigation. This literature review aimed to examine existing evidence and investigate the correlation between visual-spatial intelligence and successful diagnostic image interpretation across medical professionals at different stages of their careers.

The comprehensive search used keywords like visual-spatial intelligence, diagnostic radiology, visual perception, medical imaging, cognitive ability, diagnostic accuracy, and observer variation. PubMed, Scopus, Google Scholar, and Cochrane Review were searched, following Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. This review employs a thematic analysis approach to categorize the amassed findings. The categories encompass providing essential contextual background, explaining the methodologies used for measuring visual-spatial intelligence, discussing its predictive utility, investigating diagnostic error, examining training strategies, and delving into the nuances of physician expertise. Initial searches yielded 1360 results that were meticulously narrowed to 68 papers using predetermined inclusion criteria, such as being published within the last ten years, involving medical professionals as participants, source credibility, and focusing on visual perception or cognitive processes within medical image interpretation/medical education.

Findings consistently demonstrated a positive relationship between visual-spatial intelligence and successful diagnostic image interpretation for medical students, residents, and physicians. Moreover, perceptual learning, a critical process involving repeated exposure and practice with specific stimuli or tasks, was identified as a fundamental factor in enhancing the visual skills required for accurate and efficient image interpretation. This understanding contributes to improved perceptual skills, pattern recognition abilities, and image interpretation efficiency, thus enhancing visual-spatial intelligence and enabling healthcare professionals to detect subtle changes, identify relevant structures or abnormalities, and make accurate judgments based on visual cues.

This comprehensive exploration provides insights into the intricate relationship between visual-spatial intelligence and diagnostic image interpretation and the implications for medical education, aimed at enhancing medical professionals' competencies and ultimately improving patient care.

POSTER PRESENTATION

Abstract #156

Effect of Cryotherapy on Hormones, Neurotransmitters, and the Microbiome

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As Doctors of Osteopathic Medicine, our approach to mind, body, and spirit should inspire finding new approaches to help the body recover on its own without the use of medications and procedures, which may include the use of cryotherapy. While whole body cryotherapy has seen several advancements in recent years, they are more observational in nature. A fundamental understanding of the mechanisms underlying the myriad of cryotherapy benefits is lagging behind. A lack of precise protocols has proved a significant challenge to establishing such knowledge. Developing a precise protocol to evoke measurable biological and psychological changes would be a significant advancement in the field. The aim of this study is to examine how cryotherapy can encourage health and mental wellness in athletes and students by altering hormone and neurotransmitter release. Using a commercial ice bath that maintains exact temperatures, our team will be able to assess both qualitative (survey responses) and quantitative (cortisol, thyroid hormone, cytokines, blood pressure, etc.). We expect that the use of ice baths will broaden knowledge and research done at Rocky Vista University regarding the body's response to cryotherapy in muscular recovery, metabolic and hormonal changes, and possible addiction recovery. Our results would have implications in the general medical community. The greatest challenge of our study will be that of gathering a large enough pool for statistical relevance and funding the blood test done on said pool. We hope both of those challenges will be overcome by the potential of finding cheap and effective options for recovery, healing, and development that can be at home for the patient's specific ailment and directly supports our osteopathic approach to medicine, helping the body recover on its own.

POSTER PRESENTATION

Abstract #157

Optimizing athletic performance: an examination of Osteopathic Manipulative Therapy's effects

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Osteopathic Manipulative Therapy (OMT) has been shown to improve functions in a variety of body systems. However, despite its ability to assist in returning to “normal” function OMT is not currently employed as a method to amplify athletic performance and is used primarily as a rehabilitation therapy. Since OMT is frequently utilized to improve functions of the musculoskeletal, pulmonary, and cardiac systems, it is believed that OMT can enhance athletic performance by optimizing movement of the ribs and diaphragm and promoting appropriate autonomic nervous tone to the heart and lungs. OMT's effects on athletic performance will be measured via VO₂max testing utilizing the YMCA submaximal testing protocol. Participants will undergo initial VO₂max testing with sham OMT treatment for baseline results. After one week of recovery, participants will undergo OMT treatment followed by additional VO₂max testing. Historically, VO₂max testing is performed on a treadmill or stationary bike while monitoring the participant's heart rate and respiratory output. These tests require specialized testing equipment and often necessitate prior training to obtain accurate results. The YMCA testing protocol is a predictive model that will enable results to be extrapolated without maximal exertion. This eliminates the potential of a “mental block” that can accompany testing protocols requiring maximal exertion especially in an untrained population. Results showing an improved VO₂max with statistical significance are anticipated though vast improvements from baseline are not expected. It is likely that a lack of clinical significance will be the major limitation of the study, though future studies utilizing a measured rather than predicted VO₂max may be able to expand upon these initial results. Improved athletic performance suggests the range of OMT applications can be expanded to encompass pre-sports participation treatment in addition to its role in rehabilitation therapies.

POSTER PRESENTATION

Abstract #158

Weight Loss Drugs and Mental Health

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Recent data from the Food and Drug Administration's Adverse Events Reporting System (FAERS) and media reports have suggested adverse mental health changes while taking new weight loss drugs such as Semaglutide (Wegovy, Ozempic), Tirzepatide (Mounjaro) and Liraglutide (Victoza). However, no direct study has been conducted evaluating the emergence of depression after the introduction of these medications. We intend to investigate the incidence of depression and suicide risk in participants while using these new weight loss drugs through a non-randomized, focused survey to 1000 participants recruited from social media sites Reddit and Med Twitter forums. Participants will be asked about their mental health and alcohol use. Data will be analyzed using paired t-test or ANOVA. We expect to find that subjects taking weight loss drugs will have experienced increased adverse changes in their mental health. We anticipate these preliminary findings will lay the groundwork for future, more encompassing research on the correlation between weight loss medications and mental health.

POSTER PRESENTATION

Abstract #159

Non-Arteritic Anterior Ischemic Optic Neuropathy Sequela From Potential COVID-19 Associated Coagulopathy

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Non-Arteritic Anterior Ischemic Optic Neuropathy (NAION) is an uncommon idiopathic disease presumed to result from a microcirculatory insufficiency within the optic nerve head leading to swelling and neuropathy. Given its low prevalence, studies show COVID-19 infections can lead to the development of this disease in a subset of the effected population. Emerging research demonstrates the potential linkage between micro thrombotic events in the eye due to COVID-19 infection and the development of NAION. The intention of this case report is to present evidence for the plausibility of this link and to raise awareness regarding potential ophthalmologic complications caused by COVID-19.

POSTER PRESENTATION

Abstract #160

FATIGUE AND THE ORAL MICROBIOME

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The human microbiome is an integral part of human health and quality of life. It is also a subject of which we know little. There are massive gaps in our knowledge of how changes in the microbiome affect the human body and how changes in the human body affect the microbiome.

We hypothesis that fatigue in medical student will lead to alterations in the oral microbiome which could correlate to downstream effects on the health of the host.

To test this hypothesis, we will sample the oral microbiome of medical students at the beginning of school and two subsequent times throughout the semester. We will also provide them with a survey to help gauge their changes in fatigue over this time. Finally, we will use the recorded microbiome samples and survey results to analyze if there is a correlation between increase in fatigue and changes in oral microbiome composition.

We expect that increase fatigue in these medical students will lead to a change in the oral microbiome and the microbiome as a whole.

If a relationship between fatigue and the oral microbiome is established, this relationship could be used to not only help maintain a healthy microbiome in fatigued patients, but also to use the oral microbiome to treat patients with fatigue.

POSTER PRESENTATION

Abstract #161

The Use of Osteopathic Manipulative Treatment for Chronic Pain in Musicians

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Instrumental musicians as a population experience a high occurrence of chronic pain that can come at a detriment to their occupation. Performance requires sustained positions with asymmetric stress on various parts of the body, which often result in chronic pain, also known as Performance Related Musculoskeletal Disorders (PRMD). One of the most common forms of postural pain experienced by musicians is pain in the neck and shoulder region. This literature review will explore the applications of osteopathic manipulative treatment (OMT) as an effective method to treat performance related neck and shoulder pain seen in instrumental musicians. We performed a literature search of various electronic databases including PubMed, UpToDate, and Google Scholar with search terms including “musicians and neck or cervical pain and OMT” and “musicians Osteopathic Manipulative treatment” and “musicians and pain” including interventional or observational studies between 1990 and 2023. Papers that were excluded did not address at least two of the following subjects: cervicothoracic pain, musicians, or the use of OMT. Out of 32 articles included, 1 RCT, 1 case report, 1 case report review, and 2 systematic reviews, or 16%, mentioned the use of OMT for PRMD, but not necessarily for cervicothoracic regions. While 69% articles established chronic cervicothoracic PRMD in musicians, only 9% (3 articles) assessed the use of OMT in chronic cervicothoracic PRMD, and 72% of the papers included that addressed effective use of OMT to treat chronic neck pain did not mention musicians at all.

Limitations of this study include limitation to the English language, only 32 papers included due to limited research, and lack of previous research on OMT and chronic cervicothoracic PRMD. While many articles express the prevalence of chronic cervicothoracic PRMD in musicians, and others express the effectiveness of OMT in treating chronic neck pain, there are very few exploring the use of OMT to treat musicians altogether. Performance associated pain, particularly chronic neck pain, is well established amongst musicians, and OMT is well established as an effective treatment for chronic neck pain; therefore, further studies applying the use of OMT to PRMD in musicians are warranted.

POSTER PRESENTATION

Abstract #162

The Use of a Whipple Procedure in a Pancreaticoduodenal Gastrointestinal Stromal Tumor

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Gastrointestinal Stromal Tumors (GISTs) make up 80% of all gastrointestinal mesenchymal tumors. GISTs that occur in the duodenum (dGISTs) are rare, making up only 3-5% of GISTs, yet make up 21% of all resected GISTs. In the case that chemotherapy (often imatinib mesylate) is not sufficiently effective, there are several viable surgical options. In a particularly large dGIST, the pancreas may also be involved, and a local resection may not be sufficient. In the scenario of pancreatic involvement, a Whipple resection may be performed, followed by further management with a preventative regimen of imatinib mesylate. In this report, we describe a case of a pancreaticoduodenal GIST that was surgically resected using the Whipple procedure. A healthy 37 year old patient presented to her physician with abdominal pain radiating from the epigastric region to the chest. Despite all labs within normal limits, the pain did not respond to any intervention. The patient went to the Emergency Department after 7 months of progressing pain, where a CT scan was performed. An approx. 8x10cm mass was found over the pancreas. Biopsy and MRI confirmed the diagnosis of a Gastrointestinal Stromal Tumor (GIST). The patient was then put on imatinib mesylate (*Gleevec*, 400mg 2x/day). The tumor initially responded, but plateaued after two months. Eight months following diagnosis, local resection of the duodenum was attempted which progressed to a 10 hour Whipple procedure. The patient was then given a lower dose of *Gleevec* as a preventative measure. The region is under surveillance with interval CT scans every 3 months.

The decision to perform a Whipple procedure was made in the operating room due to the uncovered extent of the tumor. Whipple procedures according to the literature are not the first choice surgery for dGISTs, as a more local resection is preferred. The patient's young age is also anomalous, as the median age of onset is 60-65 years. This is possibly due to a mutation in the KIT exon-9 gene. Understanding the circumstances surrounding mutations such as in the KIT exon-9 gene may help explain why these tumors are occurring with higher frequency in younger populations.

POSTER PRESENTATION

Abstract #163

Recovery From Post-Total Knee Arthroplasty Infection Without Polyethylene Liner Exchange

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Although the rate of infection in total knee arthroplasties (TKA) is as little as 1-2% in the population, the ramifications of infected orthopedic prostheses are significant. In this case report, an unstandardized method of care is described in a patient with plummeting vitals who later experienced a full recovery. We describe a patient who presented with sepsis after contracting an orthopedic prosthetic infection (PJI) 3 months status post-TKA. The choice to forego the standard of care and opt to perform a less invasive procedure resulted in a positive outcome and full recovery of the patient. The patient was monitored after surgery and showed no further signs of infection.

Abstract #164

A Case Report: Acute Disseminated Encephalomyelitis Possibly Linked to Guillain-Barré Syndrome Induced by mRNA Covid-19 Vaccination

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Intro: With increasing publication of medical literature regarding Covid-19 vaccines, uncommon adverse effects are being documented with greater frequency. This specific case report centers around a person who was administered an mRNA Covid-19 vaccine and developed Acute Disseminated Encephalomyelitis (ADEM) coupled with potential Guillain Barré Syndrome (GBS). This is a unique progression that has not been previously documented.

Case description: A 52-year-old male presented with flu-like symptoms following an Influenza B infection that rapidly progressed to total body paralysis. The differential diagnosis included ADEM coupled with GBS-like symptoms. The patient's recent infection with Influenza B was speculated to be the cause of encephalitis. While encephalitis is more commonly a complication of Influenza A, there have been a few documented cases with Influenza B in adults. However, the rapidly progressive total body paralysis was indicative of GBS. It was speculated, though not conclusive, to be a direct result of the recent Covid-19 vaccination. An MRI of the patient's head displayed multiple diffusion abnormalities that were indicative of encephalitis, and a CSF analysis was completed. The case report is described, including presentation, analysis, and management. This is a difficult case since an official diagnosis was never established. Intravenous steroids and IVIg were administered to the patient. After being discharged from the hospital, the patient underwent ongoing physical rehabilitation and encountered no subsequent complications, necessitating no further medical involvement.

Discussion: It is important to understand that most recipients of Covid-19 vaccines experience only minor, expected side effects such as temporary soreness at the injection site or transient fatigue. Crucially, serious adverse events following vaccination are exceedingly rare. In such instances, it is vital to acknowledge that these cases undergo meticulous investigation. His dysregulation could potentially contribute to the occurrence of both ADEM and GBS. While progression of Influenza B to ADEM has been documented previously, the total body paralysis in this case exemplifies the further complexities that can arise when a vaccine is involved. Cases such as this can inform healthcare providers of unknown adverse vaccine events and can aid in preventing future complications.

POSTER PRESENTATION

Abstract #165

Drug Induced Musical Hallucination

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Musical hallucination (MH) is a rare perceptual phenomenon in which individuals hear music without an external auditory stimulus. This phenomenon occurs across diverse medical conditions and can be triggered by certain drugs. However, the mechanisms behind drug-induced MH remains poorly understood, with limited research available beyond sporadic case reports. This study aims to investigate the pathophysiology and treatment of drug-induced MH through a comprehensive literature review.

A systematic search of Pubmed, WorldCat, Google Scholar, and DOAJ databases, conducted until January 2023, used search terms such as "drugs induced musical hallucination" and "drugs" combined with "musical hallucination." Inclusion criteria encompassed reports of musical hallucinations, associated trigger drugs, patient details, and English-language articles. Twenty-four articles met these criteria.

Analysis of 27 cases within the 24 selected articles revealed an average patient age of 58.3 (range: 21-88), with 67.9% being female. Among these cases, 33.3% had hearing impairments, 33.3% had mental disorders, 25.9% had cancer diagnoses, and 11.1% had neurodegenerative conditions. The primary trigger drugs included antidepressants (18.5%), opioids (11.1%), anti-Parkinson drugs (11.1%), ketamine (11.1%), and voriconazole (11.1%). Musical hallucination descriptions varied widely, encompassing familiar or unfamiliar church songs, Christmas carols, party songs, rock music, folk tunes, and the national anthem. Six patients also experienced visual hallucinations. Onset of MH ranged from 75 minutes to 240 days, with a median of 2 days. Treatment approaches included discontinuing trigger drugs in 19 cases, reducing dosages in 5 cases, switching administration routes in 2 cases, and employing electroconvulsive therapy (ECT), risperidone, clonazepam, sultopride, or amitriptyline in 6 cases. Outcomes indicated MH resolution in 85.2%, symptom reduction in 11.1%, and unchanged symptoms in 3.7%.

Drug-induced MH may result from the interplay between trigger drugs and underlying conditions, such as hearing impairments, mental disorders, and neurodegenerative diseases, potentially affecting neurotransmitter balance in the brain. Discontinuing trigger drugs proves effective in resolving MH in the majority of cases.

Limitations of this study include publication bias and lack of control in each case which should be addressed in future research.

This study represents the first comprehensive literature review focusing on drug-induced MH. Furthermore, being aware of potential side effects and underlying medical conditions is crucial for conducting a comprehensive medical evaluation. Physicians who create treatment plans that

include drugs with potential to provoke MH should keep this unique side effect in mind as well as how to treat it.

POSTER PRESENTATION

Abstract #166

Tib-Fib Fracture Requiring Surgical Intervention Associated with Deep Fibular Nerve Branch Injury

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A 42-year-old patient sustained a right tibia and fibula (tib-fib) fracture after falling off a ladder which was treated surgically. Several weeks post-operation, the patient noticed that he was unable to move his right big toe. After an electromyography (EMG) was conducted, it was shown that his extensor hallucis longus was demyelinated due to a lesion in the deep fibular nerve branch. This nerve palsy is incredibly rare with a reported 11 cases in the literature. This presentation stumped a well-seasoned orthopedic surgeon. Due to the impact this deficit had on the patient, a nerve graft surgery was scheduled with a foot and ankle specialist. However, prior to the date of this surgery, his deficit resolved without any intervention.

POSTER PRESENTATION

Abstract #167

The Use of Hydrodissection in Chronic Neck Pain

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Hydrodissection is a novel injection procedure used for peripheral nerve inflammation and/or injuries. It is typically performed under ultrasound to guide the needle through the skin and fascia to decompress the irritated nerve by surrounding the tissues with different injection contents. It has previously been used mostly in carpal tunnel syndrome or sciatica. However, it has been used successfully in other cases as well. A 38-year-old female had a history of chronic right upper back/neck pain that was refractory to most treatments. Her pain was affecting her ability to participate in activities she loves. The use of hydrodissection in this case, was a novel attempt to alleviate her symptoms. There have been excellent results in the reduction of pain and symptoms with hydrodissection in the literature, but the sample sizes used in these high-quality studies have not been significant enough to be a recommended therapy. This case is proof that hydrodissection can be used for wider ranges of musculoskeletal complaints than what is documented in the literature.

POSTER PRESENTATION

Abstract #168

Elbow Plica: A Case of Advanced Progression

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Background: Symptomatic elbow plica is a considerably rare condition with an etiology and prevalence not completely understood. Only 7.2 to 8.7% of individuals with an elbow plica experience symptoms ranging from pain and stiffness with activity to constant paresthesias radiating along the affected arm. The clinical presentation of an elbow plica is often misdiagnosed as lateral epicondylitis, loose bodies, or degenerative arthritis. In this case report, misinterpretation of magnetic resonance imaging (MRI) as normal findings resulted in progression of the elbow plica without intervention.

Methods: Medical records were obtained from an orthopedic of a 24-year-old right-hand-dominant (RHD) male who presented with complaints of acute on chronic right (R) elbow pain exacerbated by forceful extension.

Results: The patient had a fifteen-year history of playing baseball and did not have any documented comorbidities. 6/10 pain was reported and approximated to the medial and lateral epicondyle with neuropathy and weakness to digits 1-3 and the extensor compartment of the forearm. The patient denied previous physical therapy attendance, corticosteroid injections, or usage of pain medication. Physical examination revealed tenderness over medial and lateral epicondyle and pain induced by forceful extension and deep palpation of the joint. Additionally, marked decreased elbow extension was observed and measured 10 to 130 degrees. A preliminary MRI report noted normal findings and the patient continued without intervention for over one year. Symptoms worsened over the untreated period, prompting a secondary interpretation of the MRI. The new MRI interpretation resulted in findings consistent with intra-artrochordal elbow plica with radial nerve entrapment. From symptom onset, the patient experienced a drastic 28° regression in range of motion (ROM) from the original full ROM.

Conclusion: The purpose of this case report is to observe and record the progression of symptoms in an untreated elbow plica and highlight the dearth of knowledge in the current literature regarding the diagnosis, management, and treatment of an elbow plica.

POSTER PRESENTATION

Abstract #169

Primary survey to measure the differences in emergency clinician intent to administer nitroglycerin in the management of inferior wall acute myocardial infarction

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Nitroglycerin (GTN) is often administered in the incidence and treatment of acute myocardial infarction (MI), but is often withheld as treatment in cases of inferior wall MI/right ventricular involvement. Withholding GTN in inferior wall MI cases is a protocol which is relatively new and is based on limited clinical evidence. Without sufficient evidence it is possible that GTN is being wrongfully withheld in patients with this particular type of MI. This study looks to evaluate the intent of emergency and cardiac medicine practitioners and pre-hospital emergency employees to evaluate practice regarding Nitroglycerin administration to patients experiencing inferior wall MI. The evaluation of this belief aims to study whether appropriate care is being withheld from patients where they may benefit from Nitroglycerin. Additionally, this study aims to identify the trends that occur when standard of care is changed or unclear, mainly regarding the length of time it takes for uniform treatment protocols to be used after they have become the recommended standard of care. To evaluate GTN usage in clinical practices with patients experiencing inferior wall MI/right ventricular involvement, a survey was sent out to physicians, prehospital emergency medical staff, and advanced practice providers which displayed an electrocardiogram (ECG) demonstrating ST-segment elevation in inferior leads II, III, and Avf as well as reciprocal changes in leads I, and Avl all of which indicate a classic inferior wall ST elevation Myocardial infarction (STEMI) ECG presentation. After displaying the ECG, survey respondents were asked if they would or would not treat the patient to whom the ECG belonged with GTN. The survey also included questions to help identify respondent demographic information. Preliminary data exhibits split practices, and no clear preference of administration or withholding of GTN for Inferior wall MI. This was the case for providers of all levels, across several different clinical settings, and across all national/state/local/clinical guidelines used in each setting. Our study has the potential to demonstrate several trends including wrongful or rightful withholding of nitroglycerin in inferior wall MI as well as incongruence in clinical practice when protocols are changed for a medication, commonly used or otherwise.

POSTER PRESENTATION

Abstract #171

Palpation Accuracy of Osteopathic Medical Students Determined by Ultrasound Evaluation

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Contradicting success rates of palpation accuracy have been reported among physicians. Previous research indicates as little as 35.7% and 37.5% accuracy of palpation among chiropractors and PM&R residents, respectively. We aim to assess the palpation rate of osteopathic medical students.

There are many procedures requiring accurate palpation, including diagnostic or therapeutic injections, osteopathic manipulation therapy, and diagnostic or physical evaluations. We hypothesize that (1) Palpation accuracy and length of osteopathic medical education will be positively correlated and (2) Osteopathic medical students will have greater palpation accuracy as compared to other professional counterparts.

Participants palpated one male model and one female model while identifying various anatomical landmarks of the upper and lower extremities. Each landmark was documented and confirmed via ultrasound. Palpation accuracy was measured using the following scale: successful (S), unsuccessful (U), or partially successful (P). Pre-determined values were assigned to the corresponding level of accuracy (S = 1.0; P = 0.50; U = 0.0).

There is a significant positive correlation between palpatory accuracy and time spent at an osteopathic medical school. An early introduction to palpatory technique leads to greater success in palpating procedural landmarks. Reinforcement of anatomy with hands-on practice, such as osteopathic techniques, leads to increased palpatory success. Limitations identified included a small sample size of each osteopathic student year, which did not include allopathic medical students, residents, or third-year osteopathic medical students. The number of anatomical landmarks was concise. Although the sample size is small and limited, this study suggests osteopathic medical students have greater success at palpating necessary procedural landmarks. We hypothesize this is due to the strong educational background in anatomy and osteopathic manipulative techniques.

POSTER PRESENTATION

Abstract #172

The influence of perioperative and postoperative opioid use on survival and recurrence in surgically treated lung cancer patients

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Opioids are integral to pain management, especially in cancer patients and post-operative pain management after tumor resection. Their administration in lung cancer patients has been linked to poorer prognosis, showing associations between post-operative opioid use and shorter overall survival, disease-free survival, and increased recurrence rates in lung cancer patients. The precise mechanisms linking opioids with cancer progression involve complex alterations in cellular signaling, immune responses, and the gut microbiome. One proposed mechanism of cancer recurrence is via the activation of the glucocorticoid receptor signaling pathway. This pathway enhances cell survival and inhibits apoptosis. Opioids also interact with the immune system, leading to alterations in immune responses via opioid-induced activation of the hypothalamus-pituitary-adrenal axis and the sympathetic nervous system. This suppresses NK cells and T lymphocytes (T cells) and increases immunosuppressive and pro-inflammatory cytokines that can promote angiogenesis and cancer cell proliferation. Opioids have been shown to cause gut microbiota dysbiosis, further complicating the effects of opioids. Dysbiosis has been demonstrated across a range of opioids, including heroin and other prescription opioids, which have been found to increase the abundance of specific microbial species that have been observed in higher quantities in lung cancer cases, suggesting a potential link between opioids, gut microbiota alteration, and lung cancer development. More research is necessary to explain these mechanisms and develop strategies to minimize the risks associated with opioid use in lung cancer patients.

POSTER PRESENTATION

Abstract #173

Use of COMT and BDNF biomarkers to predict rTMS efficacy for TRD

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Background: As per registry data, the remission rates of Treatment-Resistant Depression (TRD) through repetitive transcranial magnetic stimulation (rTMS) range from 28% to 62%. However, the varying response to rTMS highlights the need to identify specific patient characteristics, such as genetic biomarkers, that can predict the effectiveness of rTMS and help with optimal patient selection. Researchers have suggested genetic biomarkers like Catechol-O-methyltransferase (COMT), brain-derived neurotrophic factor (BDNF), Methylenetetrahydrofolate reductase (MTHFR), and 5-hydroxytryptamine receptor 2A (HTR2A) polymorphisms, but the results have been conflicting. **This study is the largest one to date**, evaluating the effect of COMT, BDNF, MTHFR, and HTR2A genotypes, together and separately, on rTMS efficacy for TRD.

Methods: A retrospective chart review was performed on 95 patients (ages 15-69) with moderate or greater severity Major Depressive Disorder (MDD) (based on DSM-V diagnostic criteria and PHQ-9 score ≥ 10) who underwent acute rTMS therapy and who submitted saliva for Genomind or Tempus analysis of COMT and BDNF biomarkers. PHQ-9 was assessed at baseline and the end of acute rTMS treatment. Baseline depression and anxiety severity, age, and sex were analyzed to eliminate confounding variables.

Results: The examination of COMT and BDNF polymorphisms, both individually and in combination, did not reveal any potential predictive value in terms of response or remission to rTMS. Furthermore, no significant correlation was observed between the genotypes of COMT and BDNF and any changes in PHQ-9 scores. However, the MTHFR gene exhibited clinical relevance, showing an association with response and remission. This association was limited to the younger age group and was not observed in the older population. This could be attributed to epigenetic factors, such as the loss of methylation, leading to reduced activity. When MTHFR was combined with BDNF, HTR2A, and gender, it displayed a significant response and remission to rTMS treatment. These trends were also only observed in the younger population and not among older individuals.

POSTER PRESENTATION

Abstract #174

Exploring the Therapeutic Potential of Cannabis in Inflammatory Bowel Disease: A Comprehensive Literature Review

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Background: Inflammatory bowel disease (IBD) encompasses chronic inflammatory conditions of the gastrointestinal tract, namely Crohn's disease and ulcerative colitis. While conventional treatments exist, patients often seek alternative therapies due to persistent symptoms and side effects. Cannabis has gained attention as a potential remedy, but comprehensive research beyond recreational use remains limited.

Methods: This study conducts a thorough literature review on PubMed to investigate the impact of cannabis on IBD, examining both clinical trials and observational studies. The review aims to explore the existing evidence, elucidate the potential mechanisms of action, and assess the safety and efficacy of cannabis-based interventions.

Results: The results of this literature review are currently pending. However, an initial assessment reveals a scarcity of high-quality studies examining the direct effects of cannabis on IBD symptoms and disease progression. There is a pressing need for rigorous, controlled investigations to discern whether cannabis can be a viable adjunctive therapy for IBD patients.

Discussion: The potential use of cannabis in managing IBD symptoms holds promise but demands further elucidation. This discussion will critically assess the available evidence, address methodological limitations, and offer insights into the therapeutic potential and safety profile of cannabis in IBD. Furthermore, it will underscore the necessity for more comprehensive research to guide clinical recommendations and improve the quality of life for individuals grappling with this challenging chronic condition.

POSTER PRESENTATION

Abstract #175

Scope of practice and pharmacology of dexamethasone as a peripheral nerve block adjuvant

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Peripheral nerve blocks (PNB) have emerged as an integrative component of balanced anesthesia and effective postoperative pain management. They offer the potential to reduce opioid usage, enhance clinical rehabilitation, and play a vital role in multimodal analgesia strategies. Coupled with advancements in ultrasound technology, precise visualization of nerves and surrounding tissues allows for improved drug diffusion and enhanced block efficacy in PNB. Dexamethasone, a potent corticosteroid, has emerged as a promising adjuvant in PNB due to its anti-inflammatory and pain-modulating properties. Dexamethasone shortens the onset time of anesthesia, prolongs the duration of sensory and motor nerve blocks, and improves overall block effectiveness. As an adjuvant in PNB, dexamethasone's role in optimizing pain relief and extending the duration of anesthesia has shown promising results in numerous studies. Dexamethasone's use in PNB is currently off-label, lacking formal approval from the US Food and Drug Administration (FDA). As such, evaluating the risk-benefit ratio is crucial when considering dexamethasone as an adjuvant in these procedures.

This literature review explores the pharmacology and mechanisms of dexamethasone as an adjuvant in PNB, detailing its effects on various types of peripheral nerve blocks. Databases used include PubMed, Scopus, and Google Scholar. The medical subject heading (MeSH) and text words related to dexamethasone were sought as interventions to avoid omitting potentially relevant articles. The results were combined using the Boolean operator “AND” with MeSH and text words, including PNB, local anesthesia, infiltration anesthesia, “anesthetics”, local [MeSH], “nerve block” [MeSH], “adjuvants”, pharmaceutical [MeSH], adjuvant, and regional anesthesia. The search included RCTs, meta-analysis, and a literature review. There was no restriction regarding the publication language. In total, sixty-nine articles were used as references. By summarizing the current application of dexamethasone in this context, this review aims to shed light on its potential as a valuable tool in perioperative pain management. Articles cited in this literature review repeatedly show increased duration of analgesia, ranging from 2.8 hours to 13 hours. As the research in this area continues to evolve, this review also outlines possible future

research directions to further optimize the use of dexamethasone as an adjuvant in peripheral nerve blocks.

POSTER PRESENTATION

Abstract #176

Factors influencing bias towards administration of contraceptive anesthesia

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Intrauterine devices (IUDs) are a popular long-term birth control option shown to be 99% effective. Guidelines for mitigating pain during IUD insertions are inconclusive on the basis that current options for anesthetics are ineffective or unnecessary. However, a study found that 78% of nulliparous participants rated insertion pain as moderate to severe, with 46% experiencing vasovagal symptoms (Hall). Despite the lack clear of guidelines, providers may or may not choose to provide anesthetic using their own clinical discretion. Our study aims to identify any bias present in methods of providing pain control during IUD insertion by comparing the provider's degree title (DO, MD, PA, NP), gender, and time out of training. A survey was sent to providers to determine whether they provide pain management, and if so, what type and under what circumstances. It is expected to find differences in the use of anesthetic by providers depending on their degree title, gender, and length out of training. We hope these findings lead to the improvement of patient care by bringing light to inconsistencies in pain management during IUD insertions. Having clear guidelines on appropriate pain management will make an uncomfortable experience a more tolerable one, allowing patients to make an informed decision when choosing a method of birth control, and may help maintain the provider-patient relationship.

POSTER PRESENTATION

Abstracts #177

Assessing Migraine Prevalence Among First-Year Medical Students

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Medical school is hard, and many medical students recognize the physical and mental obstacles associated with the challenging curriculum and lifestyle. Among these obstacles are headaches. Headaches can increase in severity and become migraines: throbbing, recurrent headaches that are usually accompanied with nausea and blurred vision. Previous studies have looked at the subjective impact on academic performance¹ and have found possible common causes of migraines to be dehydration, hypertension, or idiopathic². However, most of the studies on this issue are from medical schools outside of the United States³⁻⁶. Studies assessing headaches are limited on populations of osteopathic medical students. We hypothesize a greater prevalence of migraines among a medical student population when compared to the general American population. We hypothesize common causes to be associated with lack of hydration, stress, and fatigue related to number of hours spent studying. The aim of this study is to identify the prevalence of migraines among a population of first year osteopathic medical students. We also aim to identify possible correlative causations of migraine. This was done through a cross-sectional online questionnaire containing a standardized assessment tool, the HIT-6TM, which was given out to around 300 students three times over a three-month period. A total of 143 responses were recorded over the three months with results indicating 64.4% of respondents with scores of 50 or higher on the HIT-6TM, suggestive of the respondent receiving frequent migraines. Scoring high on the HIT-6TM was correlated with high levels of stress (81% of all respondents). Limitations included an expected drop in response rate for each successive survey and results suggest that the students who experience frequent migraines and rate higher stress levels are more likely to respond to the survey than the students without these issues. The results of this survey indicate the importance of educating medical students in the United States on migraine prevention and management. Migraines and stress are alarmingly prevalent among medical students, suggesting the need for widespread mental health support. Further research should focus on correlating which activities lower HIT-6TM scores, migraine rates, and perceived stress to identify what interventions should be used to maximize the performance and wellbeing of medical students.

POSTER PRESENTATION

Abstract #178

Barriers to healthcare in American Indian and Alaskan Native Populations as perceived by osteopathic medical students

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Indigenous people, including American Indians & Alaskan Natives (AI/AN), are at risk for and experience health disparities at a greater proportion than other U.S. populations. However, there has not been research published specifically evaluating what osteopathic medical students perceive those barriers to be and how implicit bias within medical students affects these populations and the medical care they receive. We hypothesize that the perceptions held by osteopathic medical students regarding the barriers to healthcare encountered by AI/AN populations do not align with the real challenges the people in these groups experience. To analyze this, a three-phased approach will be taken. The first phase consists of a survey being sent out to first and second-year osteopathic medical students which will evaluate the current knowledge, perceptions, and attitudes regarding AI/AN healthcare, barriers that exist, and students' ability to provide care to these populations. Phase two will use focus groups to gain a deeper understanding of students' perceptions and determine how schools can best mitigate differences between perceptions and reality. Phase three is implementation of an educational tool to improve the knowledge of medical students regarding these populations. Upon conclusion of the survey and focus group, it is expected to see a gap in knowledge between the barriers to healthcare that exist in AI/AN populations and students' perceptions of these barriers. After implementation of the education tool, it is expected that this gap will lessen, and osteopathic medical students will feel more informed about AI/AN populations and have an increased confidence in their ability to provide culturally competent care. This study aims to provide valuable insights to medical schools about the perspectives of medical students, who are the future healthcare providers, regarding the barriers to healthcare access experienced by AI/AN populations. By comparing these perceptions with the actual barriers encountered, this study will empower schools to integrate supplementary educational modules into students' learning. Ultimately, this will elevate the standard of care that will be provided to patients of diverse backgrounds.

POSTER PRESENTATION

Abstract #180

Genetic Analysis of Patients with Nausea and Vomiting in Pregnancy and Hyperemesis Gravidarum

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Nausea and vomiting are common complications that occur in 70% of pregnancies. Hyperemesis Gravidarum (HG) is the most severe form of these symptoms and is estimated to be prevalent in 0.3-2% of pregnancies. Growth/differentiation factor 15 (GDF-15) is associated with Hyperemesis Gravidarum (HG) and Nausea and Vomiting in Pregnancy (NVP). GDF-15 is a member of the transforming growth factor β superfamily, which has a role in cell proliferation, differentiation, and apoptosis. Four alleles (two genetic variations of the GDF-15 gene in the mother and two in the child in utero) could contribute to the severity of HG. The interplay of how these four alleles contribute to the severity of symptoms in patients with HG is not fully characterized. We hypothesized that the child's genotype (genetic makeup) in utero contributed to the severity and morbidity of the HG (and NVP) for the mother during the pregnancy with that child. The severity of symptoms were assessed utilizing the mother's retrospective reporting. We performed a case study analysis of a mother and her child from a pregnancy that was associated with HG. The procedure was to collect cheek swabs from a mother and her child. The sample was PCR amplified and sequenced to determine the genotypes from the four alleles. An analysis of the interplay between the alleles was compared to symptom severity, as reported by the mother electronically. We expect to find a positive correlation between GDF-15 and nausea and vomiting severity in HG pregnancies. Potential limitations include our sample size of 1 family and limited funding to further our research and help make an impact on the topic. Overall, these results will help us understand a cause of severe nausea and vomiting in HG pregnancies, which will allow us to further explore treatment options for this population.

ABSTRACT RUBRIC

Case Report	0	1	2	3
	Missing	Poor	Good	Excellent
Case Description		Limited background and details of examination	Adequate	Comprehensive and clear detail including history and examination
Uniqueness	Not unique	Unclear uniqueness	Moderately unique	Clear description of uniqueness and is instructive.
Importance in the field	Not discussed	No clear importance in the field	Limited impact in the field	Clear description of importance. Could have significant impact on the field
Diagnosis/Treatment	Not described	Unclear diagnostic strategy, no justification of treatment	Adequately described diagnostics and treatment regimen	Clearly described diagnostics and justified treatment
Discussion	Missing	Case is not discussed in the context of the literature	Case is summarized but not connected to the current literature	Case is summarized and placed in the context of the literature and the field with clear impacts identified
Overall				
Professional Writing	Grammatical errors, typos impede understanding, inappropriate verb tense; Non-compliant with template	Many grammatical errors and typos but it <u>does</u> not impede understanding; inappropriate verb tense; Writing is unfocused or not engaging; Too much jargon	Few grammatical errors and typos; mixed verb tense; Writing is somewhat engaging	Writing is appropriate for the profession; Acronyms are defined at first use; Appropriate verb tense; Writing is engaging

RESEARCH COMPETITION JUDGES

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Joseph Stasio, DO
Jennifer Hellier, PhD
Becky Steenburg
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Talal El-Hefnawy, PhD., M.D.
Amanda Brooks, PhD
Benjamin Brooks, PhD
Qing Zhong, MD

INTRAMURAL GRANTS

Awarded	Project Title	Investigators
11/21/2022	Challenges of Ergonomics Encountered by Women in Surgery	Dr. Susan Carter, SD Shehr Hussain
11/21/2022	A novel, portable training model for skull trephination by non-neurosurgeons	Dr. Ross, SD Kowal, SD Schearer, SD Sposet
12/15/2022	Histological Analysis of the Gastrointestinal tract layers post-one anastomosis gastric bypass	Dr. Amanda Troy, SD Oladapo Durodola, SD Abigail Limov, SD Brynn Ellis, SD Matthew Boutelle,
2/17/2023	Efficacy of Virtual Reality in Medical Education: Use of Virtual Reality Pulmonary embolism case simulation in pre-clinical health profession students	Dr. Simon and SD Christopher Houser
2/22/2023	Community-Based Participatory Research for Critical Health Interventions for the Quichua people in Llullundongo, Ecuador	Dr. Trawick and SD Christoph Isbjorn
3/10/2023	Evaluating Two Variations of SODOTO Method in Vaccine Hesitancy Interactions in Pre-Clinical Simulation	Dr. Ben Brooks
5/22/2023	Exploring salivary biomarkers for autoimmune predisposition in first responders	SD Mitchell Hodge, SD Krista Yasuda, and SD Carter Moon
6/2/2023	The Metabolic Benefits of Soleus Pushups	SD Benjamin Elgan, Dr. Amanda Brooks

INTRAMURAL GRANTS

Awarded	Project Title	Investigators
6/6/2023	Stress and East Asian Medicine Technique	SD Mia Panlilio, SD Oladapo Durodola, Dr. Keith Bodrero
8/29/2023	Assessment of medical students' attitudes towards substance use disorder, opioid use disorder, and alcohol use disorder	SD Brittany Quinn, SD Alma Dizdarevic, SD Jennifer Frazee, SD Sophie Zachary, SD Megan Schrage, SD Marina Yamada, Dr. Rachel Linger
9/5/2023	Fatigue and the Oral Microbiome	SD Laura Presutti, SD Madison Gueningsman, Dr. Amanda Brooks, Dr. Isain Zapata
9/21/2023	Supplementation of Palmitoylethanolamide and the Impact On Inflammatory and Degenerative Markers	SD Christopher Hole, Dr. Rebecca Ryznar

Publications from RVU Faculty and Staff

FROM JULY 2022- JULY 2023

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Presentations from RVU Faculty and Staff

FROM JULY 2022- JULY 2023

- Mescher O, Musick C, Landis BC, **Anderson R, Pappas A**. Visual perceptual learning occurs during ultrasound training but is quickly lost without continued experience. ePoster presented at: ACR 2023; May 6, 2023; Washington DC. Accessed June 30, 2023. <https://acr2023.eventscribe.net/posters/posterWall.asp>
- Linomaz J, Chee D, **Thomas S**. Interactive Module's Effectiveness on Empathy and Attitudes of Healthcare Students. Presented at: 2023 Innovation Summit for Health Professions Education; June 22, 2023; Omaha, NE. https://www.creighton.edu/sites/default/files/2023%20Innovation%20Summit%20Schedule_0.pdf
- Ryan Z, Steins H, Miller M, Santelli J, **Gubler KD**. A Survey on Implementation of the EFAST Exam into Slope-side Care and Management of US Ski and Snowboard Team Athletes. Poster presented at: AMOPS; March 3, 2023; Orlando, FL.
- Miller Z, Williams K, Zeigerson C, Tucker L, Zapata D, **Ross D**. Military Applications of the American College of Surgeons' Stop the Bleed Course During Wartime. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Speakman S, White K, **Ryznar RJ, LaPorta AJ, Payton ME, Gubler KD**. Cytokine Fluctuation During Acute Stress is Correlated to Life Trauma. Poster presented at: AMOPS; March 2, 2023; Virtual.
- LaPorta AJ, Andrews N**, Morton S, Shelton R, et al. Biometric Data Evaluation Following A Full Dive Virtual Reality Immersion Training Proof of Concept. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Seely KD, Higgs JA, Butts L, **Zapata I, Nigh A**, et al. Utilizing the Teach-Back Method Improves Surgical Informed Consent and Shared Decision-Making. Lecture Presentation presented at: 2022 ACOS-MSS Fall Conference; 2022; Austin, TX.
- Miknis A, Sumpter B, Dailey S, **LaPorta AJ, Roche R**, et al. A Thematic Analysis Following the Usability Testing of Full Dive Virtual Reality Immersion Trauma Training for Military Providers to Improve Mass Casualty Care. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- LeMunyon C, Burns AB, **Putnam K**. Identifying and Investigating New Therapeutic Interventions to Improve Concussion Recovery Time: A Review of Current Protocols, Sleep, and Glymphatics. Poster presented at: AOASM Clinical Conference; April 26, 2023; Anaheim CA.
- Speakman S, White K, **Ryznar RJ, LaPorta AJ, Payton ME, Gubler KD**. Cytokine Fluctuation During Acute Stress is Correlated to Life Trauma. Poster presented at: AMOPS; March 2, 2023; Virtual.
- Offner K, **Reynolds M**, Eno N, Bicher J. Traumatic Pan-Brachial Plexus Injury: A Case Report. Poster presented at: AMOPS; March 2, 2023; Orlando, FL.
- Haubeil S, Garlock M, **Troy A, Branda A**. An Osteopathic Approach to Head Impact Mitigation in Collegiate Athletes. Poster presented at: AOASM Clinical Conference; April 26, 2023; Anaheim CA.
- Oakes J**, Miller J. Collaborating on Quality. Workshop presented at: SPARQ Online Higher Learning Commission Workshop; April 14, 2023; Virtual. Accessed July 12, 2023. https://download.hlcommission.org/HLCResourceGuide_INF.pdf
- Mescher O, Musick C, **Anderson R, Pappas A**. Now you see it. Now you don't. Visual perceptual learning occurs during ultrasound training but is quickly lost without continued experience. Poster Abstract presented at: ARVO; April 22, 2023; New Orleans, LA.
- Gray Q, Nevins N, **LaPorta AJ**, et al. Development of Full-Dive Virtual Reality Immersion Trauma Training for Military Providers to Improve Mass Casualty Care from Point of Injury to Definitive Care: A Proof of Concept. Poster presented at: AMOPS; March 3, 2023; Orlando, FL.
- Hagenstein L, **Gao J**, Jenkins J. Ultrasound Normalized Local Variance and Liver/Kidney Ratio to Assess Nonalcoholic Fatty Liver Disease. Presentation presented at: UltraCon; March 27, 2023; Orlando, FL. Accessed July 13, 2023. <https://www.eventscribe.net/2023/UltraCon/fsPopup.asp?PresentationID=1195112&mode=presinfo>
- Bahra L, Viaud-Murat EM, **Brooks A**. Vaping, the Oral Microbiota, and Oral Carcinogenesis: A Review of the Literature. Poster presented at: Combined Otolaryngology Spring Meetings; May 4, 2023; Boston MA.
- Carmel S, **Thomas S**. PT and PTA Students' Perceptions of Physical Therapy Intraprofessional Relationships during an Online Learning Experience. Poster presented at: Education Leadership Conference; October 29, 2022; Milwaukee, WI.
- Zhong Q, Montemayor J**. Effects of online teaching and hybrid teaching on academic performance, course evaluation, and faculty evaluation in a cardiovascular system course during the coronavirus-2 pandemic. Poster Abstract presented at: IAMSE 2023: Poster & Exhibitor Viewing - Odd Numbered Posters to Present; June 12, 2023; Cancun, Mexico. Accessed June 26, 2023.
- Thomas S, Eckhardt D, Roberts J**, Forbes S, Meachum C. Comparison of Interprofessional Core Competency Attainment Between Groups Experiencing Didactic or Simulated Capstone Experience. Poster Abstract presented at: NEXUS Conference; September 10, 2022; Minneapolis MN.
- Burke T, Kimberling A, Klinger T, **Brooks A**. Methodological analysis of Reddyport™, an icu non-invasive ventilation mask voice amplifier (pilot study). Presented at: RMBS; April 14, 2023; Fort Collins CO.
- Devine Z, Edwards J, **Ryznar R, Gubler D, LaPorta A**. FGF2 and cortisol are dynamically correlated following repeated stress exposure in hyper-realistic simulation exercises. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Gao J, Zapata I, Park D**, Adamson C, Erpelding T. Quantitative Ultrasound Biomarkers to Assess Nonalcoholic Fatty Liver Disease. Presented at: UltraCon; March 27, 2023; Orlando, FL.
- Qureshi K, **Vidlock K**. Worsening Shortness of Breath after a Mild Case of COVID 19. Poster Abstract presented at: ENDO 2023: P28 - Adipose, Appetite, and Obesity: Adipocyte Biology and Obesity Impact/Complications; June 16, 2023; Chicago, IL. Accessed June 26, 2023.
- Chandra L, Ortiz J, **Gao J**. Ultrasound Elastography Detects Age-Related Changes in Adult False Vocal Folds. Presented at: UltraCon; March 28, 2023; Orlando, FL.
- Adamson C, Dolan J, **Wilde B, Gao J**. Ultrasound Derived Fat Fraction (UDFF) and Magnetic Resonance Imaging Derived Proton Density Fat Fraction (MRI-PDFF) of Adult Liver: A Preliminary Observation. Poster presented at: UltraCon; March 25, 2023; Orlando, FL.
- Landis BC, Wong W, **Pappas**. Comparison of optic nerve head blood supply in glaucomatous and healthy cadaveric donors. Presented at: Utah Osteopathic Medical Association; August 13, 2022; Lehi, Utah.
- Higham M, **Paz DC**, Gunther A, **Ryznar R, Gubler KD, LaPorta AJ**. Longstanding Recurrent Nephrolithiasis in a Patient with Medullary Sponge Kidney. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Jimenez R, Cao G, Bomstad C, **Branda A, Roettger V, Gubler D, Brooks B**, et al. International Overview of Osteopathic Manipulative Treatment in Infants with Nonsynostotic Plagiocephaly. Poster presented at: AAO Spring Convocation; March 16, 2023; Colorado Springs CO.
- Andrews N, Morton S, Shelton R, **LaPorta A**, . Biometric Data Evaluation Following A Full Dive Virtual Reality Immersion Training Proof of Concept. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Khan T, Czekajlo M, **LaPorta A**. The Formation of a Unique Not For Profit Care Giver Organization in Poland for the Care of Ukrainian Soldiers. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Wong C, Darling K, MacFarlane A, Wilkinson B, Brummett C, **Zapata I**. Proposed methods of evaluating the efficacy of ketorolac vs fentanyl as an opioid alternative in the pre-hospital setting. Poster presented at: AMOPS; March 3, 2023; Orlando, FL.
- Williams K, Santora S, Tucker L, **Ross D, LaPorta A, Zapata I**. Efficacy of Stress Increasing Knowledge Retention During a Mass Casualty Simulation Scenario. Presented at: Association of Surgical Education 43rd Annual Meeting; April 13, 2023; San Diego, CA.
- Curtis E, Eggett K, Knutson A, **Boulos S, Ross D**, et al. Evaluating Educational Modalities in a Simulated Model of Obese Patient Endotracheal Intubation. Poster presented at: AMOPS; March 4, 2023; Orlando, FL.
- Ho J, Afshari N, **Linton M**. The Impact of COVID-19 on Medical School Curricula: A Multi-Institutional Study. Oral Abstract presented at: Western Group Collaborative Spring Conference; April 16, 2023; Honolulu, HI.
- Armijo A, Eldeeb K, Fairley S, **Montemayor J**, et al. IAMSE Meeting Report: Student Plenary at the 26th Annual Conference of the International Association of Medical Science Educators. MedSciEduc. 2022;32(1):15-19.
- Glaser K, Linton M, Waller J**. Evaluating Osteopathic Knowledge, Perspective and Behavior: A Study of Employee Education. Lecture Presentation presented at: AACOM Educating Leaders 2023; April 26, 2023; Baltimore, MD. Accessed June 30, 2023.
- Liner R, Schwartz B, Zhong Q, Waller J**. Transformative reflection: qualitative analysis of pre-doctoral students' critical reflection. IAMSE (International Association of Medical Science Education) annual conference 2023. PO 501 (2023.06.11)

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