43rd Annual Kalamazoo Community and Health Sciences Research Day

Innovating Therapies, Expanding Access: Pharmaceutical Advances in a New Era

Western Michigan University
Homer Stryker M.D.
SCHOOL OF MEDICINE

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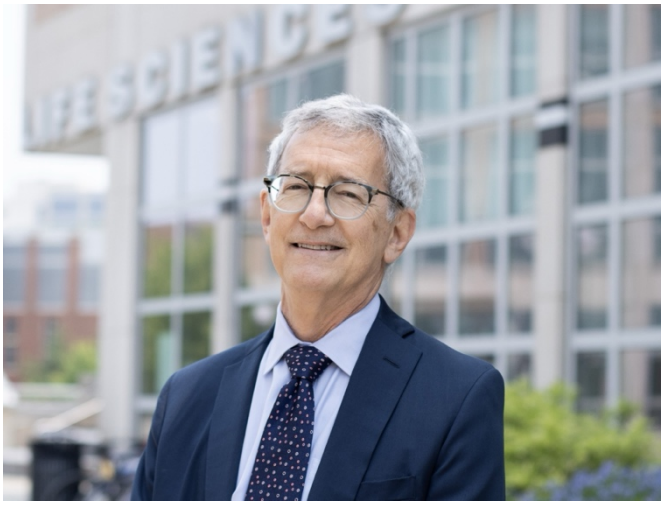
KEYNOTE SPEAKER

Roger D. Cone, Ph.D.

Understanding How the Brain Regulates Body Weight



Roger Cone joined the University of Michigan in 2016 as the Director of the Life Sciences Institute, and was appointed Vice Provost for the Biosciences Initiative in 2017. Prior to Michigan, Cone was Professor and Chairman of the Department of Molecular Physiology and Biophysics at Vanderbilt University from 2008-2016, and a faculty member of the Vollum Institute, Oregon Health Sciences University from 1990 - 2008. Cone is credited with the discovery of multiple fundamental biological roles for the melanocortin system in energy homeostasis. These findings resulted from studies cloning and characterizing the five receptors for the melanocortin peptides, and analyzing the pharmacological and physiological functions of these receptors. Cone's group provided the genetic and pharmacological validation of the melanocortin-4 and melanocortin-3 receptors as critical regulators of energy homeostasis, leading to the discovery of mutations in the MC4R as the leading cause of syndromic obesity, and development of the first drug for syndromic obesity, the MC4R agonist Imcivree, approved by the FDA in 2020. Cone has been elected to the National Academy of Sciences (2010), and the National Academy of Medicine (2016) for his work, and received numerous awards, including the Berson Award, Berthold Memorial Award, Ipsen Prize, and the Rolf Luft Prize.

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CE CREDIT

In support of improving patient care, Western Michigan University Homer Stryker M.D. School of Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

Credit amount subject to change.

Credits
AMA PRA Category 1 Credits™ (9.00 hours), Other Learner Attendance (9.00 hours), General Attendance (9.00 hours)

DISCLOSURES
No one involved in the planning or presentation of this activity has any relevant financial relationships to disclose. For more information and credit types, visit: wmed.cloud-cme.com/course/courseoverview?P=0&EID=34425

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WELCOME

Dear Colleagues,

On behalf of the Planning Committee Members, we are very pleased to welcome you to the 43rd Annual Kalamazoo Community Medical and Health Sciences Research Day.

The commitment and participation of Western Michigan University Homer Stryker M.D. School of Medicine, its leadership, faculty, residents, students, and the Kalamazoo scientific community in "Research Day" today marks a 43rd anniversary milestone. Overall, 113 research studies will be presented in various formats at our Research Day this year. We would like to thank the presenters, mentors, judges, and staff for their participation and support in making this event successful. We also thank our colleagues from Western Michigan University and Ferris State University for their research collaboration with our school and for participating in the event.

The Planning Committee worked diligently over an extended period to bring you an exceptional learning and networking opportunity. Members of this year's committee are:

Nancy Bjorklund, EdD | Co-Chair
Joshua Mastenbrook, MD | Co-Chair
Courtney Puffer, MA | Vice Co-Chair
Ali Vural, PhD | Vice Co-Chair
Theresa McGoff, MBD, RN | IRB Support
Maureen Owens, MM | IRB Support
Lizzie Jackson | Admin Support
Janelle Quick | Admin Support
Laura Counterman | Event Support
Mariah Dacy | Student Representative
Tara Subrahmanyan | Student Representative

We hope this year's Research Day will inspire you to pursue your own research and support the basic, clinical, and healthcare research of our Southwestern Michigan Community colleagues as well.

ACKNOWLEDGMENTS

We extend our grateful acknowledgment to the following members of WMed and WMU professionals.

Abstract Reviewers for Research Day 2025

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Erica VanderKooy, MD

Moderators for Research Day 2025

Heidi Baker
David Overton, MD
Julie Hodge
Maureen Owens
Kathryn Li
Taylor Schupan

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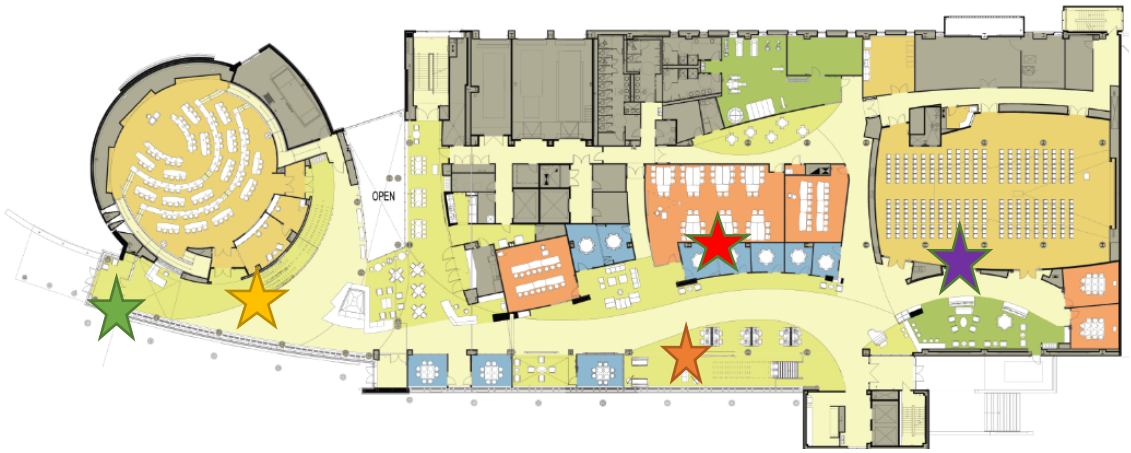


Entrance

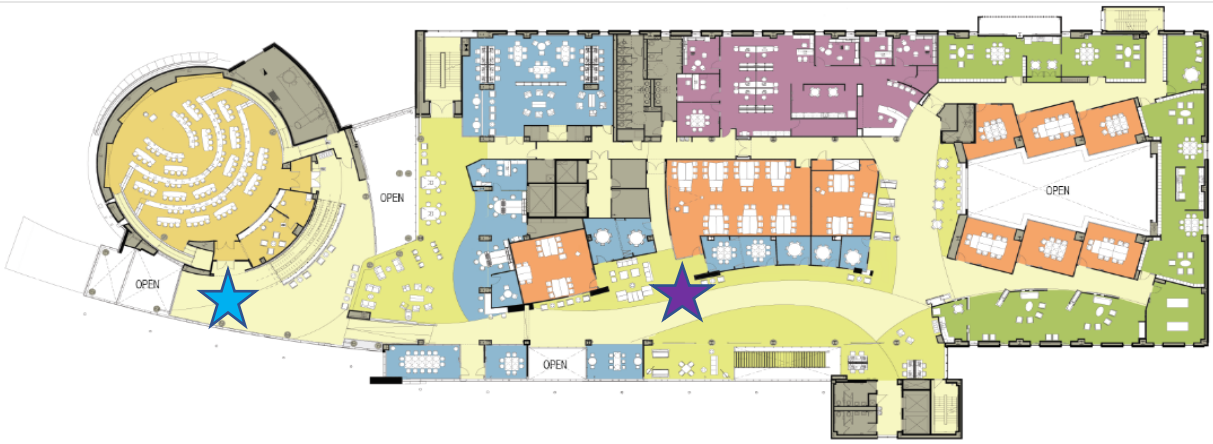
TBL Hall 1

Lobby

Classroom 111

Auditorium

WMed W.E. Upjohn M.D. Campus Second Floor



TBL Hall 2

Classroom 211

PROGRAM

Thursday, April 4, 2024

7:45 a.m. – 8:30 a.m.	**Check-in**	1st Floor Lobby
8:30 a.m. – 9:30 a.m.	**Poster Presentations – Session 1**	Classrooms, 111 & 211, 1st & 2nd Floor Lobby
9:30 a.m. – 10:30 a.m.	**Poster Presentations – Session 2**	Classrooms, 111 & 211, 1st & 2nd Floor Lobby
10:40 a.m. – 10:55 a.m.	**Welcome & Honoring Dr. Toledo** Joshua Mastenbrook, MD Robert Sawyer, MD – Dean Greg Vanden Heuvel, PhD	Auditorium
10:55 a.m. – 11:00 a.m.	**Keynote Speaker Introduction** Medical student representatives	
11:00 a.m. – 12:00 p.m.	**Keynote Address** Roger Cone, PhD	
12:00 p.m. – 12:45 p.m.	**Lunch**	
12:45 p.m. – 2:15 p.m.	**Oral Presentations** – *select one*	
	Session A	Auditorium
	Session B	TBL 1
	Session C	TBL 2
2:30 p.m. – 4:00 p.m.	**Oral Presentations** – *select one*	
	Session D	Auditorium
	Session E	TBL 1
	Session F	TBL 2
4:30 p.m. – 5:00 p.m.	**Student Research Awards and Farewell**	Auditorium

Save the Date!
Next WMed Research Day
Thursday April 2, 2026

ORAL PRESENTATIONS SESSIONS

SESSION A	**AUDITORIUM** **Moderator: Heidi Baker**
12:45 p.m. – 1:15 p.m.	**Featured Oral Presentation** *ADPKD and the PKD1 Gene Link* Erik Larson, PhD; Greg Vanden Heuvel, PhD
1:15 p.m. – 1:30 p.m.	**Abstract #91** *Topical Resveratrol Modulates Wound Closure in Older Rat Model* Megan Moore; Sheridan Hayes; Jennifer Ku; David Richter; Kristi Bailey; Yong Li, MD, PhD
1:30 p.m. – 1:45 p.m.	**Abstract #92** *Targeting guanine quadruplex DNA in PKD1 to alter expression and influence cystogenesis in ADPKD* Jackson Goudreau, BS; Agata Parsons, DVM; Seth Byr, BS; Jerry Bouma, PhD; Gregory Vanden Heuval, PhD; Erik Larson, PhD
1:45 p.m. – 2:00 p.m.	**Abstract #93** *Optimizing PEDOT-PCL 3D Scaffolds for Controlled Degradation and Enhanced Bone Regeneration* Mitchell Kenter, MS; Kunal Ranat, BS; Adil Akkouch, PhD
2:00 p.m. – 2:15 p.m.	**Abstract #94** *The Effects of Acarbose on Osteoblast Proliferation and Differentiation Under Chronic Hyperglycemia* Kyra Grove, BS; Mitchell Kenter, MS; Adil Akkouch, PhD

SESSION B	**TBL 1** **Moderator: David Overton, MD**
12:45 p.m. – 1:15 p.m.	**Featured Oral Presentation** *Creating clinical outcomes databases – Impacting clinical care from observational studies* Laurence McCahill, MD
1:15 p.m. – 1:30 p.m.	**Abstract #95** *Cradle Kalamazoo Community Needs Assessment Reveals Multiple Gaps in Services* Vaishali Patil, PhD; Ruth Butters, BA; Cynthia Bane, PhD; Fernando Ospina, PhD candidate; Nia Evans, MPH
1:30 p.m. – 1:45 p.m.	**Abstract #96** *Examining the Relationship Between Race and Trauma Mortality in a National Sample of Inpatient Hospitalizations* Nicholas Bovio, BA; Kirsten Hickok, MS; Jon Walsh, MD, MPH; Shamsi Berry, PhD; Theresa McGoff, MBA, RN
1:45 p.m. – 2:00 p.m.	**Abstract #97** *Exploring Factors Influencing Surgical Delays in Pancreatic Adenocarcinoma: A Retrospective Cohort Study* Madani Rami, BS; Mahmoud Ajine, BS; John Henriquez, MD; Talal Al-Assil, BS; Gitonga Munene, MD
2:00 p.m. – 2:15 p.m.	**Abstract #98** *Linking Socioeconomic Factors to Intraoperative Outcomes in Pancreatic Adenocarcinoma* Mahmoud Ajine, BS; Rami Madani, BS; John Henriquez, MD; Talal Al-Assil, BS; Gitonga Munene, MD

SESSION C	**TBL 2** **Moderator: Maureen Owens**
12:45 p.m. – 1:15 p.m.	**Featured Oral Presentation** *Better-Defined Morbidity of Sentinel Lymph Node Biopsy in Patients with Melanoma* Mason Gonzales; Austin Brubaker
1:15 p.m. – 1:30 p.m.	**Abstract #99** *A Novel Mechanism for Eradication of Staphylococcal Biofilms Using Blood Clots* Kayla Grooters, BS; Sheridan Hayes, BS; David Richter, BS; Jennifer Ku, BS; Yong Li, MD, PhD
1:30 p.m. – 1:45 p.m.	**Abstract #100** *Current Urgent & Emergent Management of Acute Sigmoid Diverticulitis... Has the LADIES Trial Impacted Change in Surgical Management at Single Institution?* Nicholas Stevens, DO; Raisa Gao, DO; Clayton Wyland, DO; Kayla Flewelling, MD; Theresa McGoff; Austin Brubaker; Laurence McCahill, MD
1:45 p.m. – 2:00 p.m.	**Abstract #101** *Furosemide use in Patent Ductus Arteriosus: A Literature Review Navigating Current Evidence and Clinical Implications* Asra Usmani, MD; Farah Al-Bitar, MD; Robin Murphy, MD
2:00 p.m. – 2:15 p.m.	**Abstract #102** *Initial non-diagnostic treatment of melanoma* Christine Schmitt, MD; Megan Baxter; Austin Brubaker, MS; Samuel Coster, DO; Kent Grosh, MD; Mason Gonzales; Amanda Hunt; Laurence McCahill, MD

SESSION D	**AUDITORIUM** **Moderator: Kathryn Li**
2:30 p.m. – 3:00 p.m.	**Featured Oral Presentation** *Resolving protein aggregation that typifies neurodegenerative disease* Hiroaki Kaku, PhD
3:00 p.m. – 3:15 p.m.	**Abstract #103** *Intermittent Fasting Temporally Modulates B cells in Biological Females* Sarah Webster, PhD; Nico Deleon; Michael Clemente, MS; Kelly Becker MSN, FNP-C; Melissa Olken, MD, PhD; Nichol Holodick, PhD
3:15 p.m. – 3:30 p.m.	**Abstract #104** *IL-7 Receptor Marks Entire Embryo-derived Mast Cells* Michihiro Kobayashi MD, PhD; Samuel Cornelius MS; Hitomi Ura MD; Chika Nishida MD; Momoko Yoshimoto MD, PhD
3:30 p.m. – 3:45 p.m.	**Abstract #105** *Intermittent Fasting Alters the Antigen-Specific B1a Cell Repertoire in Males and Females* Jordan Terry, BS; Sarah Webster, PhD; Naomi Tsuji, BA; Daken Heck, MFA; Nichol Holodick, PhD
3:45 p.m. – 4:00 p.m.	**Abstract #106** *DAT-Negative Hemolytic Anemia: Investigating Complement-Mediated Destruction Without Antibodies* Isaac Pingree, BA; Rami Madani, BS, Talal Al Assil, BS, Steve Stone, PA-C; Mohammed Omaira, MD

SESSION E	**TBL 1** **Moderator: Taylor Schupan**
2:30 p.m. – 3:00 p.m.	**Featured Oral Presentation** *Inpatient Complication Rates of Bronchoscopic Lung Volume Reduction in the United States* Costa Filho Flavio, MD; Kirsten Hickok, MS
3:00 p.m. – 3:15 p.m.	**Abstract #107** *Rethinking Obesity Treatment: The Role of Semaglutide in Adolescent Care* Ilham Osman, Dhruthi Reddy, MPH; Nuha Mahmood, MS
3:15 p.m. – 3:30 p.m.	**Abstract #108** *Influence of Low-Dose Triamcinolone Acetonide on Early Postoperative Intraocular Pressure Following Ahmed Glaucoma Valve Surgery* Adam Ayoub, BS; Rami Madani, BS; Yaqub Ahmedfiqi, BS; Eiyass Albeiruti, MD
3:30 p.m. – 3:45 p.m.	**Abstract #109** *Comparison of Oral Montelukast and Intranasal Mometasone Furoate Spray in Children with Allergic Rhinitis in Tertiary Care Centre in India* Rashma Sadasivan, MD; Neethu Mohandas, MD; N Krishnan Namboothiri, MD; T U Sukumaran, MD
3:45 p.m. – 4:00 p.m.	**Abstract #110** *Re-evaluating GLP-1 Agonist Monotherapy for Weight Loss: A Comprehensive Review of Efficacy and Safety* Mahmoud Ajine, BS; Rami Madani, BS; Omar Sheikh, BS; Mohamed Said, BS; Jad Madani, BS; Adam Ayoub, BS; Ali Vural, PhD

SESSION F **TBL 2**
Moderator: Julie Hodge

2:30 p.m. – 3:00 p.m. **Featured Oral Presentation**
Re-operation following urgent and emergent colectomies: An investigation of indications and utility as a quality indicator

Raisa Gao-Gibbons, DO; Austin Brubaker

3:00 p.m. – 3:15 p.m. **Abstract #111**
The Role of Educational Strategies in Psychiatry In-Training Exam (PRITE) performance: A Quality Improvement Project

Aiswarya Lakshmi Nandakumar, MBBS; Rajasumi Rajalingam, MD, MSc; Madhavi-Latha Nagalla, MBBS

3:15 p.m. – 3:30 p.m. **Abstract #112**
Annual Research Day Abstract Publication Rate as an Opportunity for Continued Growth at a Newer Medical School

Matthew Cohen; Audrey Kim; Karen Bovid, MD, FAOA, FAAOS; Adil Akkouch, PhD

3:30 p.m. – 3:45 p.m. **Abstract #113**
COVID-19 in Acute Myeloid Leukemia: A Propensity-Matched Analysis (2020-2021)

Shashvat Joshi, MD; Barath Prashanth Sivasubramanian, MD; Raghavendra Tirupathi, MD; Madhumithaa Jagannathan, MBBS; Akhila Vala, MBBS; Samhitha Mudumalagurthy, MBBS; Devi Meghana Kotharu MBBS; Aneela Satya Ravanam, MBBS; Jay Patel, MBBS; Ajay Sriram, MBBS; Rutvi Balkrishna Patel, MBBS; Manisha Chavan, MBBS; Mohd. Zeeshan MBBS

3:45 p.m. – 4:00 p.m. **Abstract #114**
Peripartum & Postpartum Manners of Death in Western Michigan, 2016 – 2024

Nicolas A. Kostelecky, MD; Hunter N. Berger, BS; Abigail J. Grande, MPH; Amanda O. Fisher-Hubbard, MD

ORAL PRESENTATIONS LIST OF ABSTRACTS

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Topical Resveratrol Modulates Wound Closure in Older Rat Model

Megan Moore, Sheridan Hayes, Jennifer Ku, David Richter, Kristi Bailey, Yong Li MD, PhD
Department of Surgical Sciences, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI

Abstract

Introduction: Delayed wound healing in individuals as they age poses a significant clinical challenge, often leading to chronic wounds and poor outcomes. Wound environments feature enhanced inflammation and reduced reepithelialization as individuals age, resulting in poor wound closure. Blood clots naturally facilitate the wound healing process by forming a scaffold and releasing tissue repair factors. Resveratrol, a polyphenol with anti-inflammatory, antioxidant, and anti-fibrotic properties, has also demonstrated potential in enhancing skin repair by modulating inflammatory pathways and reducing scar formation. Previous studies have shown that resveratrol promotes a Th2 immune response, inhibits collagen deposition, and upregulates SIRT1, contributing to improved skin regeneration. We hypothesize that resveratrol will act synergistically with blood clots to improve tissue regeneration and accelerate wound closure.

Methods: Six 5mm full-thickness skin wounds were created on dorsal skin of three aged (300+/- 3 day) male rats (SAS Sprague Dawley) under appropriate anesthesia. Treatments of blood clot (BC), resveratrol + BC, pirfenidone (PFD) + BC, and nontreated control were applied to respective skin wounds. For the resveratrol group, blood was mixed with 0.5% resveratrol cream, allowed to clot, and subsequently applied to designated skin wounds. Wound healing was evaluated at 5, 10, and 14 days with wound closure measurement, qPCR of healing markers, and H&E staining.

Results: Wounds treated with resveratrol in combination with BCs exhibited more complete reepithelialization compared to control at 10 and 14 days. Skin thickness in the center of biopsy locations for wounds treated with resveratrol reached a thickness of 75.2 uM compared to 46.9 uM for control wounds at 14 days. Wounds treated with resveratrol showed improved restoration of papillary architecture compared to the control group, demonstrating improved functional restoration of the epidermis.

Conclusions: The use of topical resveratrol-conjugated blood clots might accelerate wound closure, even in aged rats. This may offer a therapeutic approach to address the increasing challenge of chronic wounds and impaired wound healing in older skin. More studies are needed to explore resveratrol's influence on the remodeling and resolution stages of wound repair.

IRB WMed-2023-0027.

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Targeting guanine quadruplex DNA in PKD1 to alter expression and influence cystogenesis in ADPKD

Jackson Goudreau BS Molecular, Cell & Developmental Biology[1], Agata Parsons Doctor of Veterinary Medicine[2], Seth Byr, BS Biochemistry[3], Jerry Bouma PhD in Reproductive Physiology[1], Gregory Vanden Heuval PhD, Cell Biology[1], Erik Larson PhD, Molecular, Cellular and Developmental Biology[1]
[1]Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, Michigan. [2]Western Michigan University Homer Styker M.D. School of Medicine, Kalamazoo, Michigan. [3]Proteos, Kalamazoo, Michigan

Abstract

Introduction: Disruption of the human PKD1 gene results the cysts characteristic of Autosomal Dominant Polycystic Kidney Disease. This can happen by second hit mutagenesis in individuals who have inherited one pathogenic PKD1 allele, or by low PKD1 expression. We have discovered that guanine quadruplex DNAs within human PKD1 influence mutagenesis, which also suggests roles for the structure in PKD1 gene regulation. However, the mechanisms are unknown.

Methods: We used RT-qPCR to directly test the model that guanine quadruplex formation within PKD1 regulates the abundance of polycystin-1 protein.

Results: Comparing to expression controls in HEK293T, PKD1 mRNA levels were altered upon formation of guanine quadruplex within the gene, connecting alternative structure formation with the transcriptional regulation of the gene.

Conclusions: Proper regulation of PKD1 mRNA and polycystin-1 activity is required to prevent cyst formation and our results identify a targetable structure within the gene capable of modulating polycystic-1 abundance. This is important because it identifies a previously unknown therapeutic strategy for treating at risk individuals.

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Optimizing PEDOT-PCL 3D Scaffolds for Controlled Degradation and Enhanced Bone Regeneration

Mitchell Kenter MS[1], Kunal Ranat BS[2], Adil Akkouch PhD[1]
[1]Department of Surgical Sciences, Division of Orthopaedic Surgery & Division of Medical Engineering. Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI. [2]Medical Student, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI

Abstract

Introduction: Bone is known to have a remarkable regenerative capacity when damaged or fractured. However, significant trauma, infection, and patient-specific risk factors can lead to poor healing. To remedy this problem, we propose fabricating 3D biodegradable scaffolds to promote bone regeneration. To ensure our scaffolds are suitable for bone formation, it is important to analyze structural features such as pore size and porosity. The degradation rate of the scaffolds is also crucial, as it needs to match the rate of new bone growth during the regeneration process. Our objective in this study is to evaluate the effect of different ratios of PEDOT on the degradation rate of these scaffolds.

Methods: PEDOT nanoparticles were synthesized and mixed with PCL to create mixtures of 0%, 0.5%, 1%, and 1.5% PEDOT composites. Scaffolds were printed using an electrical field of 3 kV. The fiber diameter and pore size were measured using ImageJ software. The swelling ratio, density, and porosity were calculated for each scaffold. Degradation testing was performed using enzymatic lipase at 300 units/mL for up to 26 hours, mass loss and pH changes were recorded.

Results: Our results demonstrated that increasing the ratio of PEDOT to PCL increases the fiber diameter and decreases the porosity of the scaffolds. In terms of mass loss, PCL-only scaffolds exhibited the fastest degradation. Scaffolds containing PEDOT showed slower degradation rates as the PEDOT concentration increased. This indicates that PEDOT enhances the structural stability of the scaffolds, reducing their susceptibility to enzymatic breakdown. The pH analysis revealed an initial sharp drop during the first 3 hours for all scaffolds, attributed to the release of acidic degradation byproducts. However, scaffolds with higher PEDOT concentrations exhibited a less pronounced pH decrease, indicating more controlled degradation. By approximately 5 hours, the pH stabilized across all groups, suggesting a slowdown in the degradation process.

Conclusion/Clinical significance: Our study demonstrates the ability to fine-tune the properties of 3D scaffolds by adjusting the PEDOT ratio in the composite mixture. This customization enables precise control over degradation rates, allowing the scaffolds to align more effectively with specific healing timelines and clinical requirements.

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The Effects of Acarbose on Osteoblast Proliferation and Differentiation Under Chronic Hyperglycemia

Kyra Grove BS[1], Mitchell Kenter MS[2], Adil Akkouch PhD[2]
[1]Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI. [2]Department of Surgical Services, Division of Orthopaedic Surgery, Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI

Abstract

Introduction: Diabetes mellitus (DM) is a growing pandemic affecting 10% of the population. Patients with DM, particularly type 1, have increased fracture risk and decreased bone mineral density. Chronic hyperglycemia may inhibit the osteogenic potential of osteoblasts, contributing to adverse effects of bone health. Acarbose, an anti-diabetic drug that works by inhibiting enzymes involved in carbohydrate digestion, has not been extensively studied for its effects on osteoblasts under hyperglycemic conditions. This study investigates Acarbose's effects on hyperglycemia-associated inhibition of proliferation and osteogenic differentiation of osteoblasts.

Methods: Human osteosarcoma cells (SAOS-2) were cultured in low (0.9 mg/mL), medium (2 mg/mL), or high (28 mg/mL) glucose concentrations in either normal completed growth medium (GM) or osteogenic differentiation medium (DM). The DM contained dexamethasone, ascorbic acid, and β-glycerol-phosphate. A standardized amount of Acarbose was added to each condition. Cytotoxicity was measured using LDH assay. AlamarBlue assay was used to assess cellular proliferation. Osteogenic differentiation was assessed via Alkaline Phosphatase Activity (ALP) assay, and Alizarin Red S (ARS) staining.

Results: AlamarBlue results demonstrated that osteoblasts cultured in high glucose concentrations showed decreased cell proliferation when compared to low and medium glucose concentrations. However, the glucose-dependent suppression was more pronounced in cells cultured with Acarbose when compared to those without Acarbose. The decrease in osteoblast ALP activity and mineralization in high glucose concentrations was similarly lessened by the addition of Acarbose when compared to cells cultured without Acarbose. In the cells cultured with Acarbose, the effects of glucose concentration on LDH release were also decreased when compared to cells cultured without Acarbose.

Conclusion: These findings suggest that Acarbose may mitigate the effects of chronic hyperglycemia on osteoblast proliferation and differentiation. Clinically these data may have a significance in improving the treatment of diabetic patients and preventing the deleterious effects of chronic hyperglycemia on bone health. Further research is necessary to elucidate the specific mechanism of Acarbose on osteogenic differentiation and bone healing.

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Cradle Kalamazoo Community Needs Assessment Reveals Multiple Gaps in Services

Vaishali Patil PhD, Ruth Butters BA, Cynthia Bane PhD, Fernando Ospina PhD candidate, Nia Evan MPH
Biomedical Sciences, Kalamazoo, MI

Abstract

Introduction: Since its inception in 2014, Cradle Kalamazoo and stakeholder organizations have implemented programs to address health-related needs of the community by centering priorities of community members. WMed's Population Health Team (Cradle Data Backbone) conducted a survey in Kalamazoo County to collect data regarding community members' perceptions of community needs and services and their experiences, needs, and gaps regarding their social and healthcare needs. This survey intended to assess Cradle's impact to inform Cradle's ongoing and future strategies.

Methods: An online survey was conducted between August to October 2024. Inclusion criteria were residence in Kalamazoo County and being at least 18 years of age. Non-English speakers were excluded from participation. The final sample included 156 participants after excluding incomplete records. Participants received compensation of $45. The survey included questions on demography and needs related to maternal and child health, substance use, education, employment, health insurance, transportation, and disability services. Respondents rated three attributes of each need: cost, quality, and access. The survey collected quantitative and qualitative data.

Results: Nine in ten participants were female; 48.1% were between 25-34 years; about 46% were African Americans, 38% White, and 16% belonged to other race and ethnicity. About 33% earned less than $25K annually. About 42% participants had little or no information about Cradle Kalamazoo or its work. Participants who used particular services in the past 12 months quantified their social needs (health insurance (61.6%), disability services (61.5%), baby supplies (59.5%), transportation (59.4%), child development (51.5%), employment (48.1%), and educational support (44.8%)), and health needs (perinatal (53.6%), family planning (37.5%), breastfeeding (27.2%), and substance use). The top three needs participants selected were housing (51%), childcare (48%), and mental health (42%).

Clinical Significance: Survey results were surprising and concerning. The findings point to discrepancies between claims of programs and systems of care regarding provision of services and community members' perceptions regarding the cost, quality, and/or access to these services. Cradle Kalamazoo's vision and mission is to create zero disparities in access to care through cross-sector coordination of services. These findings will help Cradle re-evaluate and reorganize its strategies for improved coordination of care.

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Examining the Relationship Between Race and Trauma Mortality in a National Sample of Inpatient Hospitalizations

Nicholas Bovio BA[1], Kirsten Hickok MS[2], Jon Walsh MD MPH[2,3], Shamsi Berry PhD[2], Theresa McGoff MBA, RN[2]
[1]Western Michigan University Homer Stryker M.D. School of Medicine, Kalamazoo, MI. [2]Western Michigan University Homer Stryker M.D. School of Medicine Department of Bioinformatics, Kalamazoo, MI. [3]Western Michigan University Homer Stryker M.D. School of Medicine Department of Surgery, Kalamazoo, MI

Abstract

Introduction Trauma is a leading global cause of mortality, with millions of deaths occurring annually. Research has shown that trauma-related mortality is higher in African-American and Hispanic patient populations, however it is unclear whether this is also true in Asian patient populations. Some studies suggest higher mortality rates among Asian patients compared to white patients, however others have found no significant difference in mortality. This study examines Asian trauma-related mortality and morbidity utilizing nationwide hospitalization data.

Methods: This retrospective cross-sectional study utilized the National Inpatient Sample (NIS) database as part of the Healthcare Cost and Utilization Project (HCUP), which includes a 20% stratified sample of hospital admissions across participating U.S. states. Trauma cases between the years 2016-2021 were identified using ICD-10 procedure codes, focusing on adult patients aged 18 and older. Outcomes assessed included in-hospital mortality, hospital length of stay, and need for mechanical ventilation, blood transfusion, and or supplemental nutrition. Patients without trauma-related diagnoses or with incomplete demographic data were excluded. Data were analyzed using SAS v9.4 with appropriate survey-specific procedures.

Results: Data from 1,688,421 trauma-related hospitalizations were analyzed. There was a significant association between race and mortality ($p<.0001$). Notably, Asian patients were 13.61% more likely to die during hospitalization ($p<.0033$) compared to white patients. Asian patients were also more likely to require a blood transfusion ($p<.0001$), mechanical ventilation ($p<.0001$), and nutritional supplementation through a PEG tube or TPN ($p<.0001$) compared to white patients. The difference in mortality was most pronounced in the 65+ age bracket. Differences in outcomes between Asian and white patients was not secondary to insurance coverage ($p<.0001$) or injury severity ($p=.0019$)

Conclusion: This study demonstrates an association between race and trauma-related morbidity and mortality. Additional research is warranted to identify the etiologies underlying this association.

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The Impact of Leukemia in the United States: Trends from 1990 to 2021

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Abstract

Introduction: Leukemia remains a significant cause of cancer-related morbidity and mortality in the U.S. Despite advances in treatment and diagnosis, its burden persists. Our study analyzes leukemia trends over the past three decades, focusing on subtype variations and state-specific differences, using data from the Global Burden of Disease (GBD) database to guide targeted healthcare efforts.

Methods: Data from 1990 to 2021 on annual leukemia cases, deaths, disability-adjusted life years, age-standardized incidence rates, age-standardized mortality rates, and age-standardized disability-adjusted life year rates were analyzed. Percentage changes and estimated annual percentage changes in these rates were calculated using linear regression. Correlations with the Socio-demographic Index were assessed using Pearson correlation. All analyses were performed using R programming version 4.3.3. Results: In 1990, leukemia caused 21,859 deaths, increasing to 29,786 in 2021, a 36.3% rise. Despite this, the ASMR dropped from 6.97 to 5.17 per 100,000 (25.82% decrease, EAPC -1.04%). The ASIR fell from 13.50 to 9.81 per 100,000 (27.33% drop), and the ASDR declined from 210.71 to 132.89 per 100,000 (36.93% decrease). While most subtypes showed reduced ASIR and ASMR, AML saw increases of 11.27% and 1.75%, respectively. Hawaii had the lowest ASDR in 1990 (163.4) and 2021 (105.2), while the highest shifted from D.C. (300.9) to Mississippi (181.6). DALYs showed a significant negative correlation with SDI in 2021 ($r = -0.78$, $p < 0.001$).

Conclusion: Our analysis shows a significant decline in leukemia mortality and incidence rates in the U.S. over the past three decades, reflecting advancements in treatment and diagnosis. However, acute myeloid leukemia (AML) stands out with rising incidence and mortality, highlighting ongoing challenges. The inverse correlation between DALYs and the Socio-demographic Index (SDI) highlights the impact of socio-economic factors on outcomes, emphasizing the need for targeted strategies to address disparities. These findings highlight the importance of advancing leukemia care and reducing healthcare inequities.

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Linking Socioeconomic Factors to Intraoperative Outcomes in Pancreatic Adenocarcinoma

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Abstract

Background: Pancreatic adenocarcinoma is an aggressive malignancy with limited survival outcomes, and surgical resection remains the primary treatment for eligible patients. Socioeconomic factors, such as employment status, can affect healthcare access and quality. However, the effect of employment status on perioperative outcomes in pancreatic surgery remains unclear. This study examines the relationship between employment status and key surgical outcomes in patients with pancreatic adenocarcinoma.

Method: This retrospective cohort study analyzed data from patients with newly diagnosed pancreatic adenocarcinoma in Kalamazoo between 2017 and 2023. Patients were divided into four groups based on employment status: Disabled, Employed, Retired, and Unemployed. Data collected encompassed estimated blood loss during the procedure (EBL), length of procedure, Charlson Comorbidity Index (CCI), Clavien-Dindo complication grade, textbook outcomes (a composite measure of optimal surgical recovery), and pathological TN staging. Categorical variables were assessed using the chi-square test of independence, while continuous variables were analyzed with one-way ANOVA for normally distributed data and Kruskal-Wallis tests for non-normally distributed data. Pairwise comparisons utilized parametric t-tests for normally distributed variables and Mann-Whitney U tests for those that were not normally distributed.

Results: A total of 84 patients were included, with 7 (8%) categorized as Disabled, 26 (31%) as Employed, 27 (32%) as Retired, and 24 (28%) as Unemployed. Significant differences were observed in EBL across the four groups ($p=0.0038$), with further pairwise analysis indicating that unemployed patients experienced higher blood loss compared to employed patients (median EBL of 725 mL versus 250 mL, respectively; $p=0.0073$). Significant differences were also observed in Clavien-Dindo complication grades ($p=0.0032$). In contrast, the length of the procedure ($p=0.214$), CCI ($p=0.112$), textbook outcomes ($p=0.328$), and pathological T ($p=0.691$) and N ($p=0.867$) staging did not vary significantly among groups.

Conclusion: Our study suggests that employment status is associated with certain surgical outcomes in patients with pancreatic adenocarcinoma. Unemployed patients had increased intraoperative blood loss and higher postoperative complication severity, while other outcomes remained similar across groups. Further research with larger sample sizes and additional variables is needed to clarify how socioeconomic factors impact surgical care and recovery in pancreatic cancer.

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A Novel Mechanism for Eradication of Staphylococcal Biofilms Using Blood Clots

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Abstract

Biofilm-associated infections caused by Staphylococcus epidermidis, especially in prosthetic implants, pose a major clinical challenge. The physical barrier of the extracellular matrix (ECM) and stratified metabolic activity within biofilms hinder effective antibiotic penetration. This study explores a novel antibiotic delivery system using blood clots impregnated with antibiotics to enhance biofilm penetration and clearance. We hypothesized that this "Trojan horse" model would facilitate improved biofilm eradication compared to conventional antibiotic delivery. To test this hypothesis, biofilms were cultured on micro-titer plates and treated with blood clots, gentamicin, vancomycin, or a combination of blood clots and antibiotics for 24 hours. Biofilm density was assessed using Crystal Violet and TTC assays, and architectural changes were visualized via confocal microscopy. The Crystal Violet assay revealed a significant reduction in biofilm density when treated with blood clots (55% reduction) and a synergistic effect when blood clots were impregnated with antibiotics (40-55% reduction). Similarly, the TTC assay showed a notable decrease in metabolic activity, with blood clot treatments resulting in up to a 55% reduction in metabolic activity compared to controls. Confocal microscopy demonstrated that blood clot treatments disrupted biofilm cohesion, with fewer bacteria and greater separation between bacterial clusters. The addition of antibiotics further enhanced these effects, suggesting a synergistic disruption of biofilm architecture. Quantification of biofilm viability revealed an increase in dead cells, particularly in biofilms treated with blood clots and antibiotics. While statistical analysis indicated no significant differences in total biofilm coverage, there were significant reductions in the percentage of live cells in the blood clot and antibiotic-treated biofilms. These findings suggest that fresh fibrin blood clots could serve as a viable, cost-effective option for improving the treatment of S. epidermidis biofilms. Further research is necessary to understand the underlying mechanisms and its potential for clinical application in prosthetic implant infections. Figure 1: Confocal microscopy of 24 h old S. epidermidis biofilms when either left untreated (A), or treated with vancomycin (20 μg/mL) (B), gentamicin (10 μg/mL) (C), blood clot (D), blood clot impregnated with vancomycin (20 μg/mL) (E), or blood clot impregnated with gentamicin (10 μg/mL) (F

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Current Urgent & Emergent Management of Acute Sigmoid Diverticulitis... Has the LADIES Trial Impacted Change in Surgical Management at Single Institution?

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Abstract

Introduction: Diverticulitis is a common disease typically involving the sigmoid colon that affects millions of Americans annually. In patients with perforated sigmoid diverticulitis, the "gold standard" of surgical care has previously been a sigmoid colectomy with end colostomy, otherwise known as the Hartmann's Procedure (HP). Several clinical trials suggested that primary anastomosis with or without a diverting ileostomy is safe, most notably the LADIES Trial in 2019. This randomized control trial showed no difference in short term morbidity or mortality with primary anastomosis, as well as higher rate of 12-month stoma-free survival. Our study aims to evaluate whether the LADIES Trial has impacted the surgical management of Hinchey III/IV sigmoid diverticulitis at a single institution.

Methods: Retrospective cohort study of all patients undergoing urgent and emergent colectomy for perforated diverticulitis at a single institution, broken up into two timeframes; Groups 1 (2013-2019) and Group 2 (post LADIES Trial, 2020-2024). Hinchey classification, procedure, and outcomes were indexed. Inclusion criteria included patients 85 years or younger, not immunocompromised, and those not requiring vasopressors pre-operatively, similar to the LADIES Trial.

Results: Of the 88 patients, 41 patients were in Group 1 and 47 were in Group 2. No significant differences were noted in age, sex, and most demographic categories. Group 1 presented with a higher rate of pre-operative acute kidney injury (AKI) (34.2% vs 8.5%, p=0.003) and a lower mean pre-operative albumin (3.16 vs 3.85, p=0.015). There was no significant difference between the groups in patients receiving an anastomosis (24.4% vs 36.2%, p=0.232), and no significant difference in patients receiving a protective ileostomy (12.2% vs 19.2%, p=0.208). Mean CCI (34.77 vs 25.19, p=0.191), mean hospital length of stay (14 d vs 10.1 d, p=0.666), 30-day readmission rate (19.5% vs 14.9%, p=0.566), and 30-day mortality rate (9.8% vs 6.4%, p=0.701) were all similar between the groups.

Conclusion: After publication of the LADIES Trial, our institution demonstrated no change in surgical decision making for patients presenting with perforated diverticulitis, despite patients in Group 2 presenting in better pre-operative condition. Further exploration into reluctance to performing primary anastomosis in Hinchey III/IV diverticulitis is warranted.

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Furosemide use in Patent Ductus Arteriosus: A Literature Review Navigating Current Evidence and Clinical Implications

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Abstract

Introduction: Patent ductus arteriosus (PDA) is a common complication in preterm infants, associated with significant morbidity, including bronchopulmonary dysplasia (BPD). Furosemide, a loop diuretic widely used in neonatal care to manage fluid overload and improve pulmonary function, may have unintended effects on PDA due to its stimulation of renal prostaglandin E2 (PGE2) production, which can inhibit ductal closure. Despite extensive use, the role of furosemide in PDA management remains controversial, with concerns about its potential to delay ductal closure.

Methods: A comprehensive literature search was conducted using the PubMed database to identify studies published between 1978 and 2024 that examined furosemide use in relation to PDA outcomes in neonates. Two searches using Medical Subject Headings (MeSH) terms "furosemide" AND "congenital heart diseases" and "furosemide" AND "patent ductus arteriosus" yielded 135 and 47 results, respectively. After applying inclusion and exclusion criteria as well as omitting duplicates, 22 unique studies were included in the analysis.

Results: The findings reveal conflicting evidence regarding furosemide's impact on PDA. Green et al. (1983) reported a 38% increase in urinary PGE2 excretion, contributing to delayed ductal closure and Cohen (1983) observed ductal reopening in 5 of 12 preterm infants after furosemide use. In contrast, Andriessen et al. (2009) found no significant difference in closure rates with indomethacin (74% vs. 72%). Combination therapy studies highlighted a dose-dependent relationship and suggested potential protective effects against nephrotoxicity, though this remains debated, for instance, Romagnoli et al. (1997) reported 30% nephrotoxicity despite furosemide use. Adverse effects, including nephrocalcinosis (21%) and ototoxicity (10%), were reported, particularly with prolonged or high-dose use. Animal studies further supported the mechanistic link between furosemide and prostaglandin-mediated ductal patency, though human clinical trials remain limited.

Conclusion: Furosemide's role in PDA management is complex, with evidence supporting both its benefits for fluid management and its risks of delayed ductal closure. The heterogeneity in study designs and dosing protocols underscores the need for standardized guidelines and further large-scale RCTs to elucidate optimal furosemide use in preterm infants. Future research should prioritize long-term studies assessing renal and neurodevelopmental outcomes, alongside strategies for safe post-discharge diuretic weaning.

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Initial non-diagnostic treatment of melanoma

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Abstract

Introduction: Prior studies have indicated delay in melanoma diagnoses may be from patient factors and limitations in patient education surrounding melanoma (1). Previous research describes more commonly misdiagnosed subsets of melanoma, particularly subungual and plantar melanomas (2-3), however there is a paucity of data regarding effects of delayed diagnosis on cancer stage and surgical treatment. This study looked at patients in our melanoma treatment registry that had initial treatment, prior to biopsy, for what eventually proved to be melanoma.

Methods: A retrospective analysis was performed on patients referred for surgical evaluation of melanoma. We included adult patients with biopsy proven melanoma referred for surgical consultation. Study patients had invasive melanomas initially treated non-operatively prior to any biopsy. Primary outcomes include Breslow depth, pathologic stage, time from initial recognition of the lesion to surgical consultation, and eventual surgical treatment received. Mann-Whitney U test and Fischer's Exact test were used for statistical analysis.

Results: There were 268 patients with invasive melanoma of which 10 had initial non-diagnostic treatment, 3 receiving antibiotics and 7 receiving cryotherapy. Time from initial treatment to surgical consultation for the non-diagnostic group was 194 days compared to 37.5 days for the comparison group, (n=258) ($p = 0.01$). Breslow depth was deeper at 2.82mm for the group treated with alternative therapies versus 1.77mm ($p = 0.0248$) for the comparison group. The non-diagnostic treatment group had a higher pathologic stage, 44.4% stage 3/4 vs only 15.3% of the comparison group ($p=0.0117$). The groups had no difference in sentinel lymph node biopsy rate ($p=0.787$), however the non-diagnostic treatment group required wider surgical margins, 1.48 cm vs 1.16 cm ($p = 0.0325$).

Conclusion: There continue to be patients with treatment initiated prior to biopsy for lesions that prove to be melanoma. This results in treatment delays and patients presenting with more advanced disease. This study highlights the challenges of initial diagnosis of melanoma and the importance of biopsy prior to treatment initiation.

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Intermittent Fasting Temporally Modulates B cells in Biological Females

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Abstract

Introduction: Intermittent fasting has gained attention for its potential health benefits, including its effects on immune function. However, the impact of intermittent fasting on B lymphocytes, the key cells responsible for antibody production, remains poorly understood. Notably, research focusing on biological women is limited within the field of intermittent fasting regarding immunological outcomes, despite their stronger adaptive immune responses and heightened susceptibility to autoimmune diseases. In this study, we investigated how intermittent fasting affects metabolic and immunological measures, specifically in women.

Methods: We conducted a six-week pilot study on biological females randomly assigned to one of two fixed eating windows: early (7 AM to 3 PM) or late (3 PM to 8 PM). Participants maintained their usual dietary choices during their assigned eating periods. Baseline and post-six-week measurements included complete blood counts, serum metabolic and cytokine profiles, and B cell phenotyping.

Results: Our findings demonstrate that intermittent fasting alters several B cell subsets in biological females. Furthermore, intermittent fasting resulted in significant changes in serum cytokine and hormone levels, which are linked to metabolism and inflammation. These changes were influenced by the timing of the eating window, highlighting temporal regulation of both metabolic and immunological responses in biological women.

Conclusions: This study provides evidence that intermittent fasting induces beneficial time-dependent effects on immune function and metabolism in biological women. Specifically, intermittent fasting alters B cell populations and metabolic markers, contributing to our understanding of how fasting influences immune responses in females. These findings add to the growing body of literature that support the role of intermittent fasting in promoting immune health. All research was approved by the Western Michigan University Homer Stryker M.D. School of Medicine Institutional Review Board and was performed in accordance with all relevant guidelines and regulations.

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IL-7 Receptor Marks Entire Embryo-derived Mast Cells

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Abstract

IL-7 receptor (IL-7R) is one of the most critical molecules in the early lymphoid progenitors. Indeed, the IL-7R knockout mouse shows no lymphocytes. On the other hand, it has been considered that the minimum impact on myeloid development. Mast cells (MCs) are unique myeloid cell lineage, distributing to the entire body with involvement in multiple functions including allergy, inflammation, and tumor microenvironment. Recent studies concluded that the majority of MCs are produced in the early embryonic period only and maintained long without replenishment by post-natal bone marrow (BM) hematopoietic stem cells (HSCs). To test whether MCs are labeled by IL-7R, we collected Peritoneal Cavity (PerC), lung, and skin MCs from the IL-7RCreRosaflox-dTom lineage tracing animal model and measured %dTom positivity. Surprisingly, we discovered that more than 90% (91.3 ± 3.5) of MCs are positively marked by the IL-7R. IL-7R was not expressed in these MCs and E15.5 Fetal Liver (FL) MC Progenitors (MCp). To confirm functional IL-7R involvement in MC development, we measured MCs in IL-7Rcre/+ (Het) and IL-7Rcre/cre (KO) mice. Despite marked reductions of T/B cell counts in the KO, PerC MC count was comparable (WT: 2.4 ± 1.6 vs KO: 4.1 ± 2.3 x 10e4), suggesting IL-7R is temporarily expressed in the early fetal stage shortly without affecting development. We also tested MC differentiation from the adult BM dTom(-) Lin-Sca+Kit+ (LSK) cells. MC production was comparable between Het and KO and interestingly enough, both WT/KO LSK-derived MCs showed the least dTom positivity (3.4± 2.5 vs 4.7 ± 3.1 %) whereas more than 70% of macrophages turned dTom positive. MC colony assay from the BM dTom(-) MCp showed almost no dTom MC colony (2.9 ± 1.2%) whereas that from E12.5 FL MCp produced dTom positive MC colonies, suggesting embryonic and adult MC differentiation used different IL-7R programs. We also explored sc-RNA sequencing for E12.5 FL LSK cells and identified/ characterized FL-MCp in detail. Further, the analysis of E10.5/11.5 ATAC-sequencing suggested the unique IL-7R enhancer utilized in the embryonic hemogenic endothelial cells. Taken together, IL-7R is dynamically regulated in the developmental period that makes embryo-derived myeloid cells dTom positive.

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Intermittent Fasting Alters the Antigen-Specific B1a Cell Repertoire in Males and Females

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Abstract

Introduction: The incidence and mortality rate of pneumococcal infection increase dramatically after age 65. Natural antibodies (NAbs) provide essential protection against pneumococcal infection and are produced by B1a cells. The effectiveness of NAbs is attributed to their distinct characteristics (germline-like antibodies) resulting from the unique development of B1a cells. B1a cells arise mainly during fetal life and persist throughout adult life by their ability to self-renew. NAbs are less effective at providing protection in aged males, yet protection is maintained in aged females. It's unknown why the protective capacity of young male B1 cells is not retained in aged males. Metabolic interventions, such as intermittent fasting, rapamycin, and metformin, have been shown to improve lifespan and age-related diseases. B1a cells require autophagy for their ability to self-renew, and the metabolic intervention of intermittent fasting has been shown to contribute to the activation of autophagy and increase self-renewal in stem cells. We hypothesized that fasting alters cellular mechanisms regulating B1 cell self-renewal and/or repertoire selection over time.

Methods: Young (2-month) male and female mice were placed on a fasting diet (no food for 24hrs/week) for 12-weeks or fed ad libitum for 12-weeks. B1a cells that recognize phosphatidylcholine (PtC) were single cell sorted from the spleen of the mice, and then BCR repertoire analysis was performed.

Results: After fasting, we observed a significant decrease in the number of splenic B1a cells and an increase in the frequency of splenic PtC-specific B1a cells. Furthermore, we found a significant increase in the number of BCR sequences lacking N-additions (germline-like antibodies) in both male and female PtC-specific B1a cells (males: 50% to 64%; females: 46% to 58%). Both males and females significantly increased the use of VH11 (males: 31% to 42%; females: 26% to 43%), which is a variable gene utilized mainly during fetal life.

Conclusions: Our results indicate that fasting young mice can alter the B1a cell repertoire in favor of protective attributes (e.g., retaining germline status). These results suggest fasting may provide an avenue for preserving or restoring protective natural antibodies in old age; however, further studies in the aged are necessary.

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DAT-Negative Hemolytic Anemia: Investigating Complement-Mediated Destruction Without Antibodies

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Abstract

Hemolytic anemia, or the premature destruction of red blood cells, leads to anemia along with fatigue, jaundice, and pallor that is diagnosed through the direct antiglobulin test (DAT). This test detects antibodies or complement bound to the surface of red blood cells. In some rare instances, hemolytic anemia results in a negative DAT which creates a diagnostic challenge. We report a complex case of DAT-negative hemolytic anemia that does not conform to any other diagnosis. Initial hematologic work up was unrevealing except for an elevated LDH of 315 U/L (RR: 120–240 U/L), low haptoglobin of <10 mg/dL (RR: 30–200 mg/dL), and elevated reticulocyte count of 130 (RR: 25–75 x10^3/µL) with negative DAT, all suggesting hemolysis. A high-sensitivity DAT, performed later, showed complement positivity without antibody, raising suspicion for paroxysmal cold hemoglobinuria (PCH) or drug-induced hemolysis. A comprehensive workup, including flow cytometry, hemolysis cascade, and autoimmune testing, failed to identify a definitive cause, suggesting a rare DAT-negative hemolytic anemia of unknown origin. Patient is currently well-controlled on Rituximab with regular follow-up. Current literature supports that DAT is the cornerstone for diagnosis of autoimmune hemolytic anemia. An estimated 3-11% of patients may experience a negative DAT, despite clinical manifestations consistent with autoimmune hemolytic anemia (AHA); this discordance often contributes to physicians dismissing a diagnosis of AHA. The most common causes of a false negative DAT are technical processing errors with approximately half of DAT-negative cases converting positive upon repeat testing. This is a unique scenario in which our patient remained DAT-negative with subsequent tests. In this case, it is essential to rule out chronic causes of DAT-negative hemolytic anemia including PCH with flow cytometry and acute drug-induced hemolytic anemia with drugs such as Dapsone which has been commonly implicated in DAT-negative hemolytic anemia. When diagnostic testing via flow cytometry, blood smears, medication checks, hemolysis cascades, and autoimmune workup have been exhausted such as in our patient, a categorization of unknown origin may be established. Studies have recommended treatment of such hemolytic anemia with Rituximab monotherapy due to its immunomodulatory activity on Th1/Th2 balance.

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Rethinking Obesity Treatment: The Role of Semaglutide in Adolescent Care

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Abstract

A staggering increase in utilizing semaglutide for treatment of adolescent obesity has occurred in the past several years, but there are limited studies on its safety and effectiveness in this age group. Key gaps remain in understanding contraindications, side effects, and long-term health outcomes. As adolescents transition from pediatric to adult care, evidence-based guidelines are needed to manage semaglutide effectively in this unique population. A PubMed search identified 30 results, with 12 relevant studies included in this review. We aim to identify research gaps in semaglutide usage for adolescents and highlight what is needed for a cohesive transition from pediatric to adult care. Currently, best practices for these transitions are not yet standardized. A national study from 2020-2023 found that 33% of semaglutide prescriptions for adolescents (12-17) were written by endocrinologists, while 33% of prescriptions for young adults (18-25) were written by nurse practitioners. As adolescents age, those previously managed by specialists must be transitioned appropriately to adult care to avoid complications like hyperglycemia, rebound weight gain, and potential side effects such as pancreatitis and gallbladder disease. One key issue is the lack of sex-based stratification in clinical trials, despite evidence showing more females are prescribed semaglutide than males. In the STEP TEENS study, 62% of participants were female, and while the difference in BMI reduction was not significant, it was greater in females (-20.4% vs. -15.8%). The reasons for this disparity, including whether it relates to higher obesity rates with diabetes or better glycemic response in females, require further investigation. Another gap is the lack of focus on racial/ethnic disparities. Adolescent obesity disproportionately affects minority populations, yet many studies fail to address access and efficacy of semaglutide in these groups. Research has shown that higher utilization in these populations could significantly reduce obesity prevalence and improve outcomes. Limitations in research include lack of long-term follow-up on effects of semaglutide in adolescents and efficacy with co-morbid congenital diseases or metabolic syndromes. While semaglutide can be a reliable treatment for adolescent obesity, pediatricians and IM physicians should work together to ensure long-term safety and efficacy for these patients.

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Influence of Low-Dose Triamcinolone Acetonide on Early Postoperative Intraocular Pressure Following Ahmed Glaucoma Valve Surgery

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Abstract

Ahmed Glaucoma Valve (AGV) implantation is a widely used surgical technique for reducing intraocular pressure (IOP) in glaucoma patients. A key postoperative challenge is the hypertensive phase (HP), defined by an early rise in IOP that may delay IOP control and impact surgical outcomes. This retrospective comparative case series evaluated whether low-dose triamcinolone acetonide (TA) injected near the implant's plate could reduce the incidence and severity of HP. Our study consisted of two groups: one group received 1–2 mg of subconjunctival TA (TA group) after AGV implantation, while the other group did not receive adjunctive TA (non-TA group). For the purpose of this study, HP was defined as an IOP greater than 21 mmHg at any time during the first 6 months after surgery. The primary objectives were to compare the incidence and severity (i.e., peak IOP) of the HP between the TA and non-TA groups and the incidence of complications such as choroidal effusion, reoperation, patch exposure, and flat anterior chamber (AC). Categorical and continuous variables were analyzed using the Chi-squared test and non-parametric tests, respectively. A total of 40 patients underwent AGV implantation, with 20 receiving adjunctive low-dose TA and 20 without TA. Patients who received adjunctive TA had a decreased incidence of HP (60% vs 90%, p=.0285). Although the median peak IOP was lower in the TA group compared to the non-TA, this difference was not statistically significant (24.5 mmHg vs 29 mmHg, p=0.1463). There were no significant differences noted between the TA group and the non-TA group regarding postoperative complications, including choroidal effusion (25% vs 10%, p=.4075), reoperation (10% vs 0%, p=.4872), new patch exposure (5% vs 10%, p=1.00), and flat AC (20% vs 5%, p=.3416). Low-dose TA was associated with a reduced incidence of HP compared to the non-TA group. Postoperative complication rates were comparable between the two groups, highlighting the potential safety and efficacy of adjunctive low-dose TA. Future studies should focus on expanding the sample size, as well as increasing the length of maximum follow-ups to further evaluate the benefits and long-term outcomes of adjunctive low-dose TA in AGV implantation.

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Comparison of Oral Montelukast and Intranasal Mometasone Furoate Spray in Children with Allergic Rhinitis in Tertiary Care Centre in India

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Abstract

Introduction: Allergic rhinitis is an inflammatory disorder of the nasal mucosa. ARIA update 2008 had recommended intranasal corticosteroid or leukotriene receptor antagonist in the treatment of mild persistent AR and moderate-severe intermittent AR. The objective of the study is to compare the efficacy of oral montelukast and intranasal mometasone furoate in alleviation of severity of symptoms by assessing the Score For Allergic Rhinitis (SFAR) and nasal eosinophilia and to compare adverse effects and rate of recurrence in children (2 -15 years).

Methods: The study was a prospective controlled, comparative, open labelled, non-interventional observational study among 126 patients with allergic rhinitis. It was conducted in the Pediatric outpatient department and wards of PIMS & RC for one year in 2019. SFAR was done for all patients using a questionnaire. Nasal smear for eosinophilia was also carried out. The patients were followed up at 4 to 8 weeks depending on the duration of treatment for complete symptom relief and 4 weeks after the treatment. The data was analyzed using SPSS software.

Results:126 cases were included in the study with 71 cases in the oral montelukast group and 55 cases in the other group. The socio-demographic factors, trigger factors, seasonality, family history of allergy, morbidities and comorbidities were comparable. There was no statistical significant difference of any of these parameters. The mean difference in SFAR score in the intranasal mometasone group was 2.7 as against 2.48 in the oral montelukast group. The mean difference in nasal smear cytology grading for eosinophilia was 0.92 in both the groups. The difference in SFAR score and nasal smear cytology grading was statistically significant.

Conclusion: Oral montelukast group and intranasal mometasone furoate spray group showed significant reduction in symptoms and nasal eosinophilia. Mometasone group was statistically significant in its efficacy in reducing symptoms and SFAR score compared to the other group. There was no statistically significant difference in the reduction of nasal eosinophilia between the groups. There were no statistically significant difference in adverse effects or recurrence of symptoms among the groups.

IRB PIMSRC/E1/388a/25/2018

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Re-evaluating GLP-1 Agonist Monotherapy for Weight Loss: A Comprehensive Review of Efficacy and Safety

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Abstract

INTRODUCTION: Glucagon-like peptide-1 (GLP-1) receptor agonists, initially designed for glycemic control in type 2 diabetes, have recently gained attention for their weight loss benefits. GLP-1 receptor agonists enhance insulin secretion, suppress glucagon release, and delay gastric emptying, thereby promoting satiety. FDA-approved GLP-1 agonists, including semaglutide, liraglutide, and tirzepatide, have shown significant promise in weight management; however, they exhibit varying efficacy and side effect profiles. This meta-analysis compares the efficacy and safety of FDA-approved GLP-1 agonist monotherapies and identifying the optimal drug that maximizes weight loss while minimizing adverse effects.

METHODS: The initial search identified 96 studies evaluating the administration of semaglutide, liraglutide, or tirzepatide. A meta-analysis was conducted using clinical outcomes data extracted from these RCTs, sourced from PubMed articles published within the last five years. Eligible studies included adults aged ≥21 years with a BMI ≥25 and receiving a maximum dose of the medication or a pharmacologically inactive placebo. Exclusion criteria included individuals who underwent bariatric surgery or those with diabetes unrelated to type 2.

RESULTS: The meta-analysis included 12 randomized controlled trials with a total of 11,552 participants. Semaglutide demonstrated the greatest impact on weight loss, with an average standardized mean difference (SMD) of 20.02 outperforming liraglutide and tirzepatide. While semaglutide shows the strongest weight loss effects, tirzepatide and liraglutide also demonstrate efficacy but to a lesser extent. Despite these findings, significant heterogeneity was observed among the studies ($Tau^2 = 69.73$, $I^2 = 100\%$, $P < 0.01$), reflecting substantial variability in patient populations, dosing regimens, and study designs, which posed challenges to standardizing the results. The total standardized mean difference is -7.68 (95% CI: -12.41, -2.95), with a significant overall effect ($P < 0.01$).

CONCLUSION: Semaglutide appears to be the most effective GLP-1 receptor agonist for weight loss among the three FDA-approved agents analyzed. However, the considerable heterogeneity across studies limits the ability to draw definitive conclusions regarding optimal dosing and patient selection. Overall, our study confirms that GLP-1 agonists as a class are effective for weight loss compared to control. Future research should focus on addressing these inconsistencies to better inform clinical practice.

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The Role of Educational Strategies in Psychiatry In-Training Exam (PRITE) performance: A Quality Improvement Project

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Abstract

Introduction: The Psychiatry Resident In-Training exam (PRITE) is a Multiple-choice test designed by The American College of Psychiatrists and taken annually by nearly all US and Canadian psychiatry residents. It is regarded as a benchmark measure to assess the competence of residents and the effectiveness of their educational program, tracking individual progress throughout residency training. Studies have demonstrated a moderate to significant correlation between PRITE performance and ABPN Psychiatry initial board certification results. The goal of our quality improvement (QI) project is to highlight the role of peer-led educational methods in improving PRITE performance.

Methods: Peer-led educational sessions were incorporated into the didactic activity schedule for the current academic year. 25 Psychiatry residents completed the 2024 PRITE assessment and detailed performance results were released. We performed a retrospective review of PRITE performance class averages. We compared the average PRITE performances of the current PGY2 to PGY4 class cohort to their performance in 2023 and also compared the difference in the average performance of graduating classes.

Results: We observed a significant improvement in the overall PRITE performance with the average scores for all residents at PGY1 to PGY4 levels above the national average for US Psychiatry residents. Compared to the 2023 PRITE results, Clinical Psychiatry sub scores were above the national average for the PGY2, PGY3, and PGY4 class cohorts. Similarly, graduating resident cohort's Clinical Psychiatry sub scores were also above the national average in comparison to the prior year.

Conclusion: We concluded that there is an improvement in the average PRITE performance with peer-led educational activities, with an incentive for moonlighting being the fixed variable. In the future, we plan to explore resident learning styles and preferred educational methods. Further research is warranted in this area because residency training can be rigorous and identifying education strategies that are both effective and efficient helps to improve performance on an individual level. This may be beneficial to customize learning experiences for trainees during residency.

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Annual Research Day Abstract Publication Rate as an Opportunity for Continued Growth at a Newer Medical School

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Abstract

PURPOSE: As a young medical school, Western Michigan University Homer Stryker M.D. School of Medicine (WMed) hosts an annual Research Day to showcase scholarly work across six categories: basic science, case reports, clinical research, medical education, medical ethics, and public health. Publication of scholarly work supports WMed's research mission and enhances student, resident, and faculty applications for further training and promotion. This study evaluates the publication rates of Research Day abstracts and trends over time.

METHODS: Abstracts from WMed Research Days (2017–2024) and Scopus-indexed WMed publications (2017–2023) were collected. Titles were compared using Fuzzy Lookup, which assigns similarity scores to identify matches. Matches scoring ≥0.7 were included automatically; those scoring 0.5–0.7 were reviewed manually. Matched entries were categorized by year and research category. Statistical analyses were performed using a Chi-squared test ($p<0.05$).

RESULTS: Of 581 abstracts, 71 (12.22%) were published. Clinical research had the highest publication rate (18.18%), followed by case reports (12.87%), medical education (12.50%), basic science (9.35%), and public health (5.41%). No medical ethics publications were identified, reflecting the fewer number of submissions. Publication rates peaked in 2018 (20.45%) and 2019 (23.08%) but declined in later years. Peaks occurred in 2018 for case reports, and in 2019 for basic science and medical education. Clinical and public health showed no clear peaks. A significant difference in publication rates over time was observed ($\chi 2=14.83$, $p=0.01$).

CONCLUSION: Publication trends reflect WMed's development as a young institution, with initial growth followed by variability in recent years. Peaks in 2018 and 2019 indicate strong engagement in basic science, case reports, and medical education. Barriers include the lag between presentation and publication and the COVID-19 pandemic. These findings underscore the importance of longitudinal monitoring to assess poster-to-publication trajectories and guide strategies that promote research growth and academic success in young institutions.

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COVID-19 in Acute Myeloid Leukemia: A Propensity-Matched Analysis (2020-2021)

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Abstract

Introduction: As of October 2023, COVID-19 has caused 6.8 million deaths in the U.S., with hematological malignancies, especially leukemia, associated with worse outcomes compared to solid tumors. Acute Myeloid Leukemia (AML), the most common acute leukemia, has a U.S. incidence of 4.3 per 100,000 annually. Risk factors for in-hospital mortality in AML include age ≥60 years, pneumonia, and sepsis. However, little is known about the causes of mortality in AML patients with COVID-19. This study compares mortality rates between AML patients admitted with COVID-19 and those with other causes.

Methods: We conducted a cross-sectional analysis using the NIS HCUP database (2020-2021) to identify adult AML patients primarily admitted for COVID-19 (AMLCov) using ICD-10 codes. Propensity matching and multivariate regression analyses were performed to assess mortality rates, risk factors, and the impact of Hematopoietic Stem Cell Transplantation (HSCT) on AMLCov outcomes. A significance level of $p \leq 0.05$ was set.

Results: Of 28,028 AML admissions, 336 (1.2%) were COVID-19-related, and 27,692 (98.8%) were for other reasons. The mortality rate for AMLCov was significantly higher (21.7%) compared to non-COVID-19 admissions (8.7%, aOR 1.6, $p<0.05$). Mortality risk factors included age ≥65 years (aOR 2.8), severe sepsis (aOR 6.7), acute respiratory distress syndrome (aOR 17), acute respiratory failure (aOR 4.5), myocardial infarction (aOR 8.4), and invasive ventilation (aOR 9.8). No gender-based mortality differences were observed ($p>0.05$). AML patients who underwent HSCT had a higher risk of both COVID-19 hospitalization (aOR 2.6) and mortality (aOR 4.1).

Conclusion: AML patients admitted with COVID-19 had a lower hospitalization rate but significantly higher mortality. Risk factors such as age and severe comorbidities contributed to these outcomes. No gender disparity in mortality was observed, contrary to earlier studies. HSCT recipients were at higher risk, due to impaired immunity post-transplant. Further research is needed to explore mortality risk factors in HSCT recipients.

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Peripartum & Postpartum Manners of Death in Western Michigan, 2016 – 2024

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Abstract

Introduction: In 2003, the Center for Disease Control and Prevention (CDC) National Center for Health Statistics revised the standard death certificate to include the decedent's pregnancy status within the past year to more effectively track maternal mortality. Check boxes on death certificates are effective in identifying pregnancy-associated deaths resulting from maternal causes but are less effective in identifying deaths from nonmaternal causes, such as those related to injury. This study aimed to evaluate the distribution of manners of deaths among individuals who were pregnant within the year prior to death as compared to a similar-aged group of decedents who were not recently pregnant.

Methods: The electronic death investigation database was queried for all cases reported to the Medical Examiner's Office between January 2016 and July 2024 in which "Pregnant at the time of death," "Pregnant within 42 days of death," or "Pregnant 43 days to 1 year before death" was selected on the Death Certificate. Decedents categorized as "Not pregnant within the last year" of a similar age range during the same reporting period was used as a control group.

Results: The review revealed 62 individuals who were pregnant within a year of death. The decedents ranged in age from 19 to 43 years. Twenty-one were certified as natural (33.9%), 30 as accident (48.4%), 3 as suicide (4.8%), 6 as homicide (9.7%), and 2 as indeterminate (3.2%). The control group had 632 deaths. Two hundred seventy were certified as natural (42.7%), 248 as accident (39.2%), 73 as suicide (11.6%), 23 as homicide (3.6%), and 16 as indeterminate (2.5%). Two cases (0.3%) were pending further information at the time of writing. A z-test revealed more homicides in the study population than the control group ($p < 0.05$).

Conclusion: This review demonstrates that homicides occur more often in the "Pregnant within one year of death" cohort than those who were not pregnant in the year prior to death. Pregnancy-associated deaths are preventable, and the advocacy of the Medical Examiner's Office in collaboration with Maternal Mortality Review Committees, Public Health Departments, and the Center for Disease Control and Prevention are vital.

POSTER PRESENTATIONS SESSIONS

1	**ePoster**	**Classroom 111**	**8:30 - 9:30 a.m.**	**Basic and Translational Science**
2	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
3	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
4	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
5	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
6	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
7	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
8	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
9	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
10	ePoster	Classroom 111	8:30 - 9:30 a.m.	Basic and Translational Science
11	ePoster	Classroom 211	8:30 - 9:30 a.m.	Basic and Translational Science
12	ePoster	Classroom 211	8:30 - 9:30 a.m.	Basic and Translational Science
14	ePoster	Classroom 211	8:30 - 9:30 a.m.	Basic and Translational Science
15	ePoster	Classroom 211	8:30 - 9:30 a.m.	Clinical
16	ePoster	Classroom 211	8:30 - 9:30 a.m.	Clinical
17	ePoster	Classroom 211	8:30 - 9:30 a.m.	Clinical
18	ePoster	Classroom 211	8:30 - 9:30 a.m.	Clinical
19	ePoster	Classroom 211	8:30 - 9:30 a.m.	Clinical
20	ePoster	Classroom 211	8:30 - 9:30 a.m.	Social and Behavioral
21	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
22	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
23	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
24	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
25	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
26	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
27	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
28	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
29	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
30	ePoster	Classroom 111	9:30 - 10:30 am	Medical Education
31	ePoster	Classroom 211	9:30 - 10:30 am	Medical Education

32	ePoster*	Classroom 211	9:30 - 10:30 am	Medical Education
33	ePoster	Classroom 211	9:30 - 10:30 am	Medical Education
34	ePoster	Classroom 211	9:30 - 10:30 am	Medical Education
35	ePoster	Classroom 211	9:30 - 10:30 am	Medical Education
36	ePoster	Classroom 211	9:30 - 10:30 am	Public Health
37	ePoster	Classroom 211	9:30 - 10:30 am	Public Health
38	ePoster	Classroom 211	9:30 - 10:30 am	Public Health
39	ePoster	Classroom 211	9:30 - 10:30 am	Public Health
40	ePoster	Classroom 211	9:30 - 10:30 am	Medical Education
41	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
42	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
43	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
44	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
45	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
46	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
47	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
48	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
49	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
50	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
51	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
52	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
53	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
54	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
55	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
56	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
57	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
58	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
59	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
60	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
61	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series

62	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
63	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
64	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
65	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
66	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
67	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
68	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Case Report/Series
69	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Case Report/Series
70	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Clinical
71	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Medical Education
72	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Medical Education
73	Printed Poster	Level 1 Hallway	8:30 - 9:30 a.m.	Meta-analysis / Lit Review
74	Printed Poster	Level 1 Hallway	9:30 - 10:30 am	Meta-analysis / Lit Review
75	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Public Health
76	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
77	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
78	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
79	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
80	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
81	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
82	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
83	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
84	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
85	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
86	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Quality Improvement/Program Evaluation
87	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Quality Improvement/Program Evaluation
88	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Service Project
89	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Social and Behavioral
90	Printed Poster	Level 2 Hallway	9:30 - 10:30 am	Basic and Translational Science
91	Printed Poster	Level 2 Hallway	8:30 - 9:30 a.m.	Basic and Translational Science

POSTER PRESENTATIONS LIST OF ABSTRACTS

1 (ePoster)

Synthesis and Antibacterial Activity of Silver Graphene Oxide Nanocomposites

Grace Manske BS, Mitchell Kenter MS[1], Robert Sawyer MD[2], Adil Akkouch PhD[3]
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Abstract

Introduction: Escherichia coli (E. coli) is a significant contributor to chronic wound infections, such as post-surgical wounds and diabetic ulcers, complicating recovery and straining healthcare resources. Furthermore, the rise of antibiotic resistance has intensified the search for alternative treatments. Silver-graphene oxide (AgGO) nanocomposites emerge as a promising solution, offering antimicrobial benefits while limiting systemic side effects. This study focuses on the potential of AgGO nanoparticles to eradicate E. coli infections, presenting an innovative approach to wound healing.

Methods: We synthesized Ag-doped GO via solution synthesis using GO, AgNO3, and NaBH4 precursor. The synthesized Ag-doped GO nanocomposites were washed and dried at 90°C. Transmission electron microscopy (TEM) combined energy dispersive x-ray spectroscopy (EDS) was used to characterize the size and chemical composition of nanocomposites. To determine the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of AgGO, we prepared E. coli suspension at 106 CFU/mL in LB broth, along with serial dilutions of AgGO ranging from 0.66 mg to 3.3 mg. Next, we inoculated a petri dish with E. coli suspension diluted at 1,000x, 10,000x, 50,000x, and 100,000x, 50 µL of each AgGO concentration along with LB broth alone (negative control), and 1 µL of 100 ng/µL Kanamycin (positive control). After incubation at 37°C for 24 hours, we measured optical density at 600 nm to identify the MIC. For MBC, we subcultured E.coli from MIC wells onto agar plates for 24 hours and determined the MBC as the lowest AgGO concentration with no colony growth, indicating 99.9% bacterial death.

Results: TEM/EDS analysis showed the successful nucleation of AgNPs on the GO nanosheets. 3.3 mg of AgGO nanocomposites were shown to effectively inhibit E. coli growth at 24 hours. 3.3 mg of AgGO inhibited E. coli growth at a higher efficacy than 0.66 mg of AgGO across all four E. coli concentrations.

Conclusion/Clinical significance: This study demonstrates the ability of AgGO nanocomposites to effectively inhibit E. coli growth, supporting their potential use in the treatment of wound infections.

Acknowledgments: This work was supported by the Surgical Infection Society, and WMed Pilot grant program.

2 (ePoster)

A Cost-Effective Approach to Enhance PEEK Roughness and Osteoblast Adhesion Using Sodium Chloride as a Pore-Forming Agent

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Abstract

Introduction: Polyether ether ketone (PEEK) is a thermoplastic polymer that mimics bone biomechanically and is, therefore, commonly used in orthopedic implants. However, applications of PEEK are limited by its bio-inert nature, which limits osteoblast adhesion and differentiation into bone which compromises osseointegration. Surface functionalization, plasma treatments, laser etching, and sand blasting have been tested to improve cell adhesion, but these methods require costly, specialized equipment. In this study, we propose to use a cost-effective method to enhance roughness and cell adhesion on PEEK by adding sodium chloride (NaCl) as a pore-forming agent. By incorporating NaCl crystals into PEEK powder, pores are created in the prepared discs when the salt is dissolved in water, mimicking osteoclast resorption pits. Pore size and percentage can be controlled by adjusting the size and the amount of NaCl added to the PEEK powders.

Methods: Pellets were made of PEEK granules mixed with NaCl as porogen. This mixture included 1%, 2.5%, 5%, 10%, 25%, 50% NaCl by mass, with the remainder consisting of PEEK. The NaCl crystal size was 30 μm, which was ground and collected using standardized sieves. The pellets were pressed using a manual press and sintered at 380°C for 8 minutes before the NaCl was dissolved in deionized water. Wettability was measured via water contact angle. Surface roughness was evaluated using a 3D optical profilometer. Cell adhesion, proliferation, and differentiation were assessed using human osteoblasts. Statistical analyses were performed using t-test, with statistical significance set at $P < 0.05$.

Results: The wettability of porous PEEK varied slightly with the mass percentage of added NaCl in the original mixture. Samples with 50% NaCl exhibited the highest contact angle, likely due to increased porosity percentage. The addition of NaCl particles resulted in increased roughness, higher porosity percentage, and improved osteoblast adhesion on the surface of PEEK discs. NaCl concentrations of 5% and higher showed significantly enhanced cellular adhesion at 16 hours compared to other porous and non-porous PEEK samples.

Conclusion/Clinical significance: Enhancing porosity and roughness of PEEK-based orthopedic implants can improve their integration with bone tissue, making them more effective for long-term orthopedic applications.

3 (ePoster)

Elucidating the Role of Osteosarcoma-Derived Exosomes and MicroRNAs in Reprogramming Dermal Fibroblasts into Cancer-Associated Fibroblasts

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Abstract

Cancer-associated fibroblasts (CAFs) play a crucial role in the tumor microenvironment, promoting cancer progression through complex signaling networks. Understanding how CAFs are formed and their contribution to tumorigenesis is essential for developing targeted therapies. This study investigates the tumorigenic effect of bone osteosarcoma cells (Saos-2) on the activation of normal human skin fibroblasts into CAFs, focusing on the roles of exosomes and microRNAs derived from Saos-2 cells.

Methods: Conditioned medium (CM) and exosomes were isolated from Saos-2 cultures and used to treat primary skin fibroblasts. Cell proliferation, cytotoxicity and morphology were assessed. Fibroblasts migration was tested using the scratch wound assay. Quantitative real-time PCR was performed to determine the levels of CAF related genes such as familial adenomatous polyposis (FAP), interleukin-6 (IL-6), and the vascular endothelial growth factor (VEGF). We also examined the expression of a panel of miRNAs previously associated with tumor progression including miR-200a, miR-301, miR-223, miR-203, and miR-218.

Results: Following treatment with Saos-2 conditioned medium, fibroblasts exhibited morphological changes characteristic of CAFs, such as elongated cell shape and increased proliferation. Molecular analyses revealed elevated expression of FAP, IL-6, and VEGF in fibroblasts exposed to Saos-2-derived conditioned medium, compared to untreated control (0% FBS). These molecules are known to be associated with EMT (epithelial-to-mesenchymal transition), angiogenesis, and tumor-promoting inflammation. MicroRNA profiling demonstrated activation of miR-200a, miR-301, miR-223, miR-203, and miR218. Mechanistic studies confirmed that these microRNAs target tumor-suppressive pathways, while VEGF promotes angiogenic signaling, collectively driving fibroblast reprogramming into CAF-like phenotype. Furthermore, proliferation assay demonstrated no difference in metabolic activity and migration of skin fibroblasts in the presence of exosomes derived from Saos-2 conditioned medium.

Conclusion/Clinical significance: Our findings highlight a novel mechanism by which osteosarcoma cells reprogram skin fibroblasts into cancer-associated fibroblasts through exosome-mediated delivery of oncogenic miRNAs and the activation of FAP, IL-6, and VEGF. Understanding this process could pave the way for innovative therapies to halt tumor progression and improve patient outcomes.

4 (ePoster)

Age-Related Decline of B1-Like Cells and Natural Antibodies: Implications for Pneumococcal Susceptibility

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Abstract

B1 cells, a distinct lineage of B cells originally identified in mice and subsequently in humans, produce natural antibodies in the absence of external stimulation such as infection or vaccination. However, with advancing age, B1 cells decline in number, reduce antibody secretion, and lose antigenic diversity. Phosphorylcholine (PC) is a ubiquitous antigen expressed on several microbial pathogens including Streptococcus pneumoniae and apoptotic cells. PC-specific natural antibodies are particularly important in providing protection against pathogens such as Streptococcus pneumoniae. While younger individuals (ages 5–49) typically maintain robust PC-specific natural antibody levels, older adults exhibit a marked reduction in these antibodies. In this study, we investigated the behavior of PC-specific human B1 cells. Initial attempts to identify PC-specific B1 cells using PC-BSA-FITC led to non-specific recruitment due to binding to the carrier protein or FITC fluorophore. To overcome this, we developed a dual-staining method using PC-BSA-FITC and PC-OVA-A647, gating cells based on diagonal staining. These cells were further validated using PC-KLH to confirm specificity. Analysis of B cells from the peripheral blood of young and older healthy volunteers revealed that PC-specific B1 cells decline with age, paralleling the overall decline in B1 cells. Our findings highlight that the age-related decline in B1 cells and B1 cell-derived natural antibodies contributes to the increased susceptibility of older adults to pneumococcal infections. These insights provide a foundation for developing strategies to restore natural antibody levels and improve immune defenses in aging populations.

5 (ePoster)

Alpha-SMA Expression in Wound Closure of Older Rats

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Abstract

Introduction: Dermal fibroblasts maintain collagen and extracellular matrix components in the skin. Following injury or the secretion of pro-fibrotic factors like transforming growth factor-beta (TGF-beta), fibroblasts can become activated and differentiate into myofibroblasts, which express alpha-smooth muscle actin (alpha-SMA). Alpha-SMA allows for contraction of granulation tissue and wound closure. Due to its vital role in wound closure, alpha-SMA presents as an effective marker to monitor differences in scarring between different anti-fibrotic treatments. However, in both human and rat skin, aging results in alterations in myofibroblasts, and the differences in healing markers in aged skin remain under-characterized. This study investigates alpha-SMA as a potential marker for comparing the effectiveness of antifibrotic treatments in aged skin.

Methods: Full-thickness skin wounds were created evenly across the dorsal skin of three female (285 +/- 12 day) aged rats (SAS Sprague Dawley). Antifibrotic treatments of resveratrol (RSV), pirfenidone (PFD), and blood clots were applied to respective wounds. Alpha-SMA expression was evaluated at 3, 5, and 7 days with rabbit-derived monoclonal antibody (Cell Signaling Technology, D4K9N). Samples of each wound were stained with H&E and trichrome for comparison.

Results: All treatment groups presented with reduced skin elasticity and flattened epidermal ridges, as expected with age. Alpha-SMA was expressed primarily in the dermis of rat skin following injury. Antifibrotic treatment groups showed significant staining in regenerative tissue overlying wound areas. Expression of alpha-SMA correlated with the location of the wound and areas of collagen production on trichrome-stained samples. Histological analysis confirmed progressive improvement in skin architecture, with collagen deposition playing a notable role in wound remodeling.

Conclusions: Despite the inherent challenges of delayed healing in aged skin, wound closure increased across all treatment conditions, demonstrating the resilience of epithelialization and collagen deposition processes in aged rats. Alpha-SMA was expressed differentially between control and treatment groups, suggesting this may be an effective marker for assessing antifibrotic treatment efficacy in aged rats.

IRB WMed 2023-0027.

6 (ePoster)

Autologous blood clots as a therapeutic vehicle for treatment of large subcritical-sized femoral defects

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Abstract

INTRODUCTION: Critical and large subcritical bone defects pose a therapeutic challenge, as they will become a nonunion. Current treatments are highly invasive, painful, and expensive; novel treatment alternatives are needed. Autologous blood clots (ABCs) have been suggested as a possible biomaterial for regenerative applications, as they contain numerous biologically active factors critical to the natural healing process [1]. This is especially the case for orthopedic defects, as clot formation is foundational to healing of bone lesions. In vitro studies suggest ABCs may be an effective vehicle for local delivery of stem cells and pharmaceuticals, such as antibiotics [1]. Therefore, this study investigated the ability of ABCs to serve as a therapeutic vehicle for enhanced resolution of large, subcritical-sized femoral defects in vivo.

METHODS: All procedures were approved by WMed's IACUC (IACUC-2023-0027). Animals were anesthetized with 2.5% isoflurane and provided buprenorphine for analgesia. 100 µL of blood was obtained from the lateral caudal vein and allowed to clot. After exposing the lateral femur, 2.0mm defects were created and subsequently filled with a control gel or ABC. Defects were left to heal for 14, 28, or 42 days, at which point animals were euthanized and bones were isolated for histology, microCT, and molecular analysis.

RESULTS: ABC-treated defects exhibited enhanced closure at 14-, 28-, and 42-days post-op, indicating superior bone formation. MicroCT showed complete resolution of ABC-treated lesions by 42-days post-op (Figure 1). The percent of defect volume remaining was significantly lower in the ABC-treated groups at all time points. Preliminary histological and molecular data support the microCT findings.

CONCLUSION: Application of ABCs resulted in accelerated defect closure at all time points, with complete resolution achieved by day 42. Although experiments are ongoing, these results suggest that ABCs may provide an effective vehicle to accelerate healing of large, subcritical femoral defects. Moving forward, we plan to conjugate ABCs with stem cells and pharmaceuticals to further accelerate fracture healing.

REFERENCES: 1. Richter DM, Ku JC, Keckler KE, Burke LR, Abd GM, Li Y. (2023). Autologous blood clots: a natural biomaterial for wound healing. Front Mater. 10.

7 (ePoster)

Effects of Moderate Versus Severe Hypoxic Exposure on Myoblast Autophagy

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Abstract

Introduction: Regional hypoxia is a technique used to induce muscle hypertrophy in blood flow restriction training. Moderate oxygen deprivation, defined as 5% to 20% oxygen, generally enhances muscle cell survival and differentiation. In contrast, severe oxygen deprivation of <3% oxygen induces muscle atrophy and reduced protein production. The mechanisms by which varying levels of oxygen deprivation influence intracellular pathways to alter cell growth remain poorly characterized. Autophagy, a cellular process of engulfing cellular contents to recycle proteins and organelles, offers a mechanistic explanation for muscle cell survival under hypoxia. We hypothesize that moderate hypoxia upregulates autophagy, supporting cell survival and differentiation, while severe hypoxia overwhelms autophagic flux, leading to apoptosis and muscle cell death.

Methods: Mouse myoblasts (C2C12 cells) were cultured for 24 and 48 hours under normoxic (21% oxygen), moderate hypoxic (5% oxygen), and severe hypoxic (1% oxygen) conditions. To evaluate the role of autophagy, cells exposed to hypoxia were treated with and without the autophagy inhibitor 3-methyladenine (3-MA). Apoptotic activity was assessed by measuring the expression of Bcl-2, Bax, and Caspase-9 via qPCR, while autophagic activity was evaluated using Beclin-1 expression. Cell survival was monitored with methylene blue assay, and differentiation into myotubules was monitored microscopically.

Results: C2C12 cells cultured under 5% oxygen exhibited significantly increased Beclin-1 expression compared to those grown in 21% oxygen at all time points. These cells also exhibited enhanced differentiation and formed myotubules in fewer days than cells cultured in normoxic conditions. In contrast, cells cultured in 1% oxygen showed reduced survival and differentiation. Cells treated with 3-MA under moderate or severe hypoxia failed to demonstrate the increased differentiation or survival observed in untreated cells, suggesting a critical role for autophagy in these processes.

Conclusions: Moderate hypoxia stimulates autophagic activity in C2C12 cells, promoting cell survival and differentiation while reducing apoptotic marker expression. These findings may explain the beneficial effect of moderate hypoxia in blood flow restriction training. In contrast to moderate hypoxia, severe hypoxia surpasses the protective capacity of autophagy, leading to apoptosis and muscle atrophy. Understanding these pathways provides valuable insights into muscle physiology and potential therapeutic strategies for muscle growth.

8 (ePoster)

Autologous blood clots improve healing and angiogenesis following cutaneous burns in a rat model

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Abstract (ePoster)

INTRODUCTION: Cutaneous burns are a source of significant morbidity and mortality worldwide. Current therapeutic options remain limited; accordingly, patients frequently experience sizable disability because of incomplete healing and hypertrophic scarring. Blood clots are a foundational component of the natural healing process; accordingly, we aimed to engineer autologous blood clots (ABCs) to accelerate and improve healing of cutaneous burn wounds in a rat model.

METHODS: After providing anesthesia (2.5% isoflurane) and analgesia (buprenorphine HCl), blood was obtained from the lateral caudal vein of 8-week-old Sprague Dawley rats and allowed to clot in the presence and absence of pirfenidone (PFD) and gentamicin (GEN). A modified soldering pen was used to create partial thickness burn wounds of 10mm in diameter on the animal's dorsum. Wounds were covered with either 1) a control gel, 2) ABC alone, 3) ABC + PFD, or 4) ABC + gentamicin. Wound healing and angiogenesis was assessed at 14-, 21-, and 28-days via histology, immunohistochemistry, and molecular analysis. Additionally, ABCs were cultured for 21 days, and ELISA was used to assess fluctuations in VEGF released by ABCs into the culture medium. All animal procedures were approved by WMed's IACUC (IACUC-2023-0027).

RESULTS: All ABC formulations appeared to confer enhanced wound closure at 21-days, with ABC+PFD resulting in the most complete healing (Fig 1a). Additionally, the ABC+GEN and ABC+PFD conditions exhibited notable subcutaneous angiogenesis (Fig 1b). Further, ABC treatments appeared to confer more complete healing on histological analysis. In vitro, ABCs conjugated with mesenchymal stem cells (MSCs) released significantly greater [VEGF] than controls, and such concentrations were sustained over 7 days. IHC of smooth muscle actin demonstrates enhanced angiogenesis in the ABC-treated defects, especially the ABC+PFD group.

CONCLUSION: These findings suggest that ABCs may serve as a novel therapeutic vehicle to hasten healing of cutaneous burn wounds. Additionally, ABC treatments appear to facilitate superior functional recovery, including improved angiogenesis and return of hair follicles. Although further investigation is required to assess conjugation of ABCs with other regenerative factors (e.g., MSCs, other antifibrotic agents, etc.), these results demonstrate ABCs may serve as an effective therapy for cutaneous burn wounds.

9 (ePoster)

3D printed Poly(glycerol-sebacate)/Polycaprolactone Scaffolds for Skin Tissue Engineering

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Abstract

Introduction: Skin tissue damage resulting from injuries such as trauma, burns, or chronic wounds presents a significant clinical challenge. These injuries often lead to pain, impaired functionality, reduced quality of life, and increased risk of infection. Examples include deep cuts, pressure ulcers, diabetic ulcers, and thermal injuries. Skin tissue engineering using scaffolds has emerged as a promising approach for skin regeneration, offering support for repair and integration of engineered tissue into the host while promoting natural healing processes. Poly(glycerol sebacate) (PGS) and polycaprolactone (PCL) are biodegradable polymers widely used in tissue engineering, due to their excellent biocompatibility. This research focuses on employing melt electrowriting (MEW) to create PGS-PCL scaffolds designed to guide skin regeneration. The primary objective is to investigate the effects of different printing parameters, such as pressure, speed, and voltage on the physical and mechanical properties of the resulting PGS-PCL scaffolds.

Methods: PGS was synthesized using a polycondensation reaction of glycerol and sebacic acid under nitrogen at 120 °C. PGS was then mixed with PCL at 0.5% and 10% weight ratios and printed using the Axo-A3 3D bioprinter. The degradation rate, density, mechanical properties, and wettability of the 3D-printed composites were analyzed. Scaffolds were observed under a stereomicroscope, and filament size, distribution, and shape were recorded. Skin fibroblasts were used to assess cell adhesion, proliferation, and cytotoxicity.

Results: Across multiple prints, the key findings revealed that lower speeds and pressures, coupled with higher voltages, resulted in the formation of curly filaments. Conversely, higher pressures and speeds, combined with lower voltages, produced straight filaments. Notably, a combination of low pressures and high speeds generated a mixture of both filament types. Additionally, higher concentrations of PGS-PCL exhibited superior mechanical properties, increased hydrophilicity, and faster degradation rates. Lastly, it was observed that straight filaments demonstrated significantly enhanced fibroblast adhesion compared to curly filaments.

Conclusion: This study highlights the critical influence of fabrication parameters and material composition on the physical, mechanical, and biological properties of PGS-PCL scaffolds for skin regeneration. Specifically, the ability to modulate filament morphology through variations in speed, pressure, and voltage provides a tunable approach to scaffold design.

10 (ePoster)

Effect of mTOR on Hematopoietic Differentiation of hESC

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Abstract

Introduction: mTOR is an important factor in hematopoietic differentiation. Hematopoietic stem cells are produced from endothelial cells of the aorta-gonad-mesonephros region. We hypothesized that mTOR plays a role in endothelial to hematopoietic cell transition. In this study we investigated the effects of mTOR agonist and antagonist drugs on hematopoietic development from human embryonic stem cells (hESCs) in vitro. Yap and Taz are important factors for cell growth and development. We also examined the expression of mTOR and YapTaz during development.

Methods: hESCs were differentiated into hematopoietic lineages. This was done by inducing mesoderm, then endothelial, and then hematopoietic expression was expected. Some of the stem cells were inducted with venus mTOR reciprocal reporter and YapTaz reporter to see their expressions. The cells were then treated with mTOR agonist or antagonist after CD34+ hemogenic endothelial sorting and then analyzed for the effects on hematopoietic surface markers, gene expressions, and colony-forming abilities. Cells were also analyzed by surface marker flow cytometry over the differentiation period.

Results: Treatment with mTOR agonist increased CD34+CD43+ hemogenic progenitors (HPCs) and CD34+CD43-CD45+ high potential HPCs with 0.1 uM, though this result was not consistent in each experiment. mTOR antagonist did not significantly change hematopoietic potential overall. HB-alpha2 gene expression, which is expressed in adult erythrocytes, varied by dose, but these results were not consistent between trials. During surface marker analysis over time, two distinct Venus-positive populations were observed on day four that changed to one population by day 10.

Conclusion/Clinical significance: mTOR signaling is activated during hematopoietic cell production from human embryonic stem cells. mTOR agonist and mTOR antagonist showed some effects on hematopoiesis with variations among cell lines, but these effects require further investigation into culture optimization and mTOR compound dosage. The two distinct Venus-positive populations seen in the surface marker analysis represents two populations with differing low-mTOR activity that may differentiate differently.

Figure: Venus expression over time in reporter embryonic stem cells.

Acknowledgments: Thank you to Dr. Vollbrecht and the peer review group at Kalamazoo College for valuable feedback on this project.

11 (ePoster)

Complete primer set for amplification and expression of full-length recombinant human monoclonal antibodies from single human B cells

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Abstract

Human monoclonal antibodies (mAbs) are an important segment in precision therapeutics. Various methodologies are available for generating them. Expression of human recombinant mAbs from sorted single B cells is preferred for its rapid expression using mammalian vectors while maintaining in vivo immunoglobulin pairing. The success rate of generating recombinant mAbs from single sorted B cells heavily relies heavily on the PCR primers' ability to amplify immunoglobulin heavy and light chain transcripts. Existing primer sets fail to cover all functional human Ig gene rearrangements, exhibit high degeneracy leading to non-specific amplifications and mutations arising from primer mis-match/degeneracy, and require numerous amplification cycles. Some primer sets have high-coverage and specific primers are not designed for expression as recombinant mAbs. Here we have designed a primer set to amplify all functional V(D)J transcripts in human B cell repertoire using a nested RT-PCR approach. These resultant amplicons can be cloned into mammalian expression vectors for recombinant mAb expression. Non-specific amplifications were minimized by using isotype-specific primers for cDNA synthesis and limiting primer degeneracy. Testing on bulk sorted B cells showed subgroup-specific amplification of Ig heavy and light chains. In naive, memory, and B1 B cell subsets sorted as single cells from PBMCs, 38.46% (80/208) successfully amplified paired heavy and light chain transcripts in a 96-well plate setup. Sequence analysis of amplified transcripts revealed coverage of 30 (55.55%) VH genes, 22 (53.65%) Vk genes, and 21 (63.63%) Vλ gene segments. Paired Ig transcripts from five single B cells were cloned into expression vectors and successful recombinant mAb expression was confirmed by SDS-PAGE analysis. Thus, our new primer set offers significant advantages over existing primers by amplifying all functional V(D)J rearrangements, facilitating rapid acquisition of antigen-specific recombinant antibodies from diverse human B cell repertoires previously inaccessible due to primer limitations.

12 (ePoster)

Developmental composition and function of IgA-secreting cells in the lamina propria

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Abstract

Introduction: While recent progress in developmental immunology has updated our understanding of the in vivo differentiation pathways of tissue resident immune cells, the developmental composition of IgA-secreting cells remains unclear. Poly-reactive IgA is a subset of gut IgA that preferentially coats microbiota and prevents their invasion. Although it has recently been reported that IgA+ B-cells are derived from B-1b and B-2 cells, their ultimate origin has not been clarified because our lineage tracing data showed that B-1b and B-2 cells are derived from both endothelial progenitors and hematopoietic stem cells (HSCs). Our lineage tracing data also demonstrated that lamina propria (LP) IgA-secreting cells are mostly derived from endothelial cells. Our aim is to elucidate the origins of IgA secreting cells and their functional differences based on their origins.

Methods: To investigate the progenitor cells of IgA-secreting cells in the LP, we compared the IgA engraftment capacity of fetal and adult B-progenitors. We transplanted pro-B cells and multipotent progenitor cells (MPPs), derived from fetal liver (FL) or adult bone marrow (BM), into sublethally irradiated immunodeficient NOD/SCID/IL2rγ-/- mice.

Results: We examined IgA repopulation at 8 and 14 weeks after transplantation. FL pro-B cells repopulated IgA+ cells at 7.0% and 55.5%, while BM pro-B cells repopulated at 6.7% and 39.2% at 8 weeks and 14 weeks, respectively, showing increased engraftment of IgA+ cells over time. Transplantation of FL MPPs showed a lower engraftment of B220+IgA+ cells in the LP but similar engraftment of B220-IgA+ cells and higher CD45.2+ cells compared to pro-B cells.

Conclusion: Although our lineage tracing data indicated a longer contribution of fetal-derived IgA+ cells, the IgA engraftment capacity of fetal and adult pro-B cells showed no significant difference. MPPs have a higher potential for CD45+ engraftment in the gut, but lower IgA engraftment. They may require time to develop into IgA+ cells.

Future study: We will analyze MPP transplanted mice at later stages after transplantation (12 and 16 weeks) to investigate differences in the engraftment potential of IgA+ cells. Additionally, we plan to introduce C. rodentium infection in mice reconstituted with two distinct origins of progenitors to evaluate functional differences.

14 (ePoster)

Use of Formulated Thymoquinone as a Novel Adjuvant Antineoplastic for the Treatment of Follicular Lymphoma

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Abstract

Introduction: Follicular lymphoma is the second most common form of Non-Hodgkin's lymphoma in the United States. As many patients are diagnosed late in disease course with widespread involvement to multiple lymph nodes and organs, ongoing research focuses on finding drugs with fewer side effects and minimal long-term risk. Thymoquinone is a natural compound derived from Nigella sativa (fennel flower) that has demonstrated strong apoptotic effects against lymphoma models in culture as well as in vivo. However, thymoquinone's poor solubility and low bioavailability hinders its use as a chemotherapeutic. In this study we aimed to circumvent this difficulty by utilizing a novel nano-encapsulation technique to improve bioavailability and overall efficacy of the drug. IC50's of nano-encapsulated thymoquinone, standard therapy chemotherapeutics, and parent thymoquinone were determined in WSU-FSCCL lymphoma cell lines to compare the efficacy of nano-encapsulation.

Methods: Cancer cells (10,000/well) were seeded three replicates per arm in 50uL of complete media. For the cyclophosphamide, doxorubicin, and vincristine sulfate groups, 12-point 1:2 serial dilutions were then performed per arm and 50uL of diluted drug was transferred for a total working volume of 100uL. Four replicates were performed for the thymoquinone, nanothymoquinone, and vehicle and the dilutions were 12-point 1:1.5 serial dilutions per arm. Cellular proliferation and viability were determined 72 hours later by adding 10uL of 12mM MTT and incubating for 4hrs at 37℃, followed by 100uL of 0.1M HCL 0.35M SDS incubated for 4hrs at 37℃, and read using SpectraMax plate reader.

Results: Preliminary data generated characterizes IC50s for three standard chemotherapeutics and initial testing of Thymoquinone formulations. Figure 1 includes the completed IC50 characterization for standard chemotherapeutics and thymoquinone derivatives for the FSCCL line. We plan to run combination studies in the coming weeks.

Conclusion/Clinical significance: With the long-term disease course for patients with follicular lymphoma, exploration of therapeutics with fewer side effects and safe long-term use has been increasing. This assay will allow us to characterize the anti-proliferative effects of nano-encapsulated thymoquinone on the FSCCL lymphoma cell line compared to parent thymoquinone, ultimately addressing the bioavailability obstacle which currently hinders the use of thymoquinone as an antineoplastic.

15 (ePoster)

Evaluation of Therapy for Hepatorenal Syndrome in Non-Intensive Care Unit Patients: A single-center retrospective chart review

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Abstract

Introduction: Hepatorenal syndrome (HRS) is a severe complication of advanced liver disease characterized by renal failure. Current guidelines recommend vasopressors like terlipressin and norepinephrine with albumin as primary therapies; however, terlipressin's unavailability at this site and norepinephrine's ICU monitoring requirement pose challenges to guideline-congruent treatment. In non-intensive care unit (non-ICU) settings, midodrine and octreotide with albumin serve as alternative treatments. This study examines treatment patterns for HRS in non-ICU settings and evaluates their outcomes, including mortality and readmission rates.

Methods: A retrospective chart review was conducted on 80 encounters involving 66 patients diagnosed with HRS (ICD-10 code K76.7) at a single center between August 1, 2019, and August 1, 2024. Inclusion criteria were age ≥18, HRS diagnosis, and evidence of ascites. Data

collected included demographic, clinical, and therapeutic information, alongside outcomes such as length of stay, 30-day readmission, and 90-day mortality.

Results: Of the cohort, 32% received the guideline-recommended combination of midodrine, octreotide, and albumin. Approximately 19% received no guideline-recommended therapy. The confirmed 90-day mortality was 41.3%, exceeding the estimated 27-32% based on Model for End-Stage Liver Disease-Sodium (MELD-Na) scores. Readmission within 30 days occurred in 36.3% of cases. An increasing number of therapies were associated with higher length-of-stay and mortality. Albumin dosing revealed no clear dose-response relationship; however, cumulative doses >600 g correlated with higher mortality.

Conclusions: Despite guideline recommendations, treatment variability persists in non-ICU settings for HRS. Many patients did not receive optimal therapy, reflecting the challenges posed by limited formulary access and the complex nature of HRS management. These findings underscore the need for increased adherence to guidelines and further evaluation of therapies like terlipressin to improve outcomes.

16 (ePoster)

Hartmann Procedure or Anastomosis With Diversion For Sigmoid Colon Volvulus?

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Abstract

BACKGROUND: Sigmoid volvulus is a significant cause of large bowel obstruction and is associated with increased morbidity and mortality if not treated urgently. Based on clinical conditions, three operative approaches are available: resection and anastomosis (RS-PA), resection and anastomosis with diverting ileostomy (RS-PADI), and resection with end-colostomy (Hartmann procedure, HP). The study aims to compare the 30-day postoperative outcomes of RS-PADI and HP.

METHODS: We retrospectively analyzed 12 years of data from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) from 2005 to 2017. Patients with an ICD-9/ICD-10 diagnosis of sigmoid volvulus who underwent RS-PADI and HP were divided into two groups. We used propensity score matching (PSM) to balance the sample size and to ensure similar distributions of observed baseline covariates (patients' demographic characteristics, comorbidities, and preoperative data) between the two groups (RS-PADI and HP). Thirty-day postoperative morbidity and mortality, operative time, length of hospital stay, reoperation, and readmission rates were analyzed. Data analysis was conducted using SPSS. A two-sided p-value <.05 was considered statistically significant.

RESULTS: Of total 1,511 patients (1,454 [96.2%] in the HP group and 57 [3.8%] in the RS-PADI group), 110 were eligible for PSM for statistically significant variables (standardized mean differences (SMD)> 0.10), resulting in 55 patients per group. No difference in 30-day mortality between RS-PADI and HP (5.3% vs. 3.8%, p=.708) was noted. The 30-day postoperative complications were similar between the two groups including minor (29.8% vs. 30.2, p=.967), serious (29.8% vs. 28.3%, p=0.861), and overall (47.4% vs 45.3%, p=.827) postoperative complications. Operative time was similar between the two groups (111 vs. 116 minutes, p=.680). Although not statistically significant, RS-PADI was associated with increased readmission rates (14.0% vs. 11.3%, p = .670). The median (IQR) hospital length of stay was similar between RS-PADI and HP (11 [8, 22] vs. 11 [8,16] days, p=.563).

CONCLUSION: In this study, RS-PADI has similar 30-day postoperative outcomes compared to HP. In the appropriate setting, patients eligible for revision in the future should be considered for RS-PADI at initial surgery for sigmoid volvulus.

17 (ePoster)

Prophylactic Dexamethasone Dosing and incidence of hypersensitivity reactions in the setting of Paclitaxel/Carboplatin chemotherapy regimens

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Abstract

Purpose: NCCN guidelines currently state that patients receiving paclitaxel should be given hypersensitivity reaction prophylaxis to prevent infusion related reactions before, during, and after the appointment. In the setting of paclitaxel regimens that include carboplatin infusions and require anti-emesis prophylaxis, high levels of dexamethasone exposure begin to be a concern due to the premedication required, and an existing drug-drug interaction with aprepitant. This study seeks to determine if a reduction in the dexamethasone protocol dose increases a patient's risk to encounter a hypersensitivity reaction to paclitaxel.

Methods: This retrospective, single centered study includes patients who 18 years or older, have a positive diagnosis for any cancer, received a NCCN approved regimen containing a paclitaxel 3-hour infusion ± carboplatin infusion, and receive dexamethasone as a premedication. Patient charts will be reviewed from a date range of January 1st, 2023- December 31st, 2023. Patients who are 17 year of age or younger, who have a history of hypersensitivity reactions to paclitaxel, or did not receive dexamethasone as a premedication are excluded from the study. Encounters will be randomly selected to reach two equal groups. The primary outcome is the development of a hypersensitivity reaction to paclitaxel. Secondary outcomes to be measured are time until hypersensitivity and severity of reaction. Data analysis was done using descriptive statistics.

Results: A total of 186 encounters were analyzed and 2 equal groups were made. Group 1 received 20mg of dexamethasone, group 2 received 10mg of dexamethasone (n=93). In the 20mg of dexamethasone group, 5 encounter (5%) experienced a hypersensitivity reaction to paclitaxel. In the 10mg of dexamethasone group, 2 encounters (4%) experienced hypersensitive reactions to paclitaxel. The most common grade of reaction was grade 2. Average time to onset of hypersensitivity symptoms was 8 minutes.

Conclusion: Patients who were pretreated with 10mg of dexamethasone slightly less likely to develop a hypersensitivity reaction to paclitaxel compared to pretreatment with 20mg of dexamethasone (RR=0.79). There was not a difference between the two groups in time to onset of hypersensitivity reaction.

18 (ePoster)

Comparison of Cefdinir versus Cephalexin Failure Rates in the Treatment of Gram-Negative Bacteremia: A single-center retrospective chart

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Abstract

Current information regarding treatment of gram-negative bacteremia (GNBSI) with oral antibiotics favors the use of highly bioavailable antibiotics such as fluoroquinolones and sulfamethoxazole-trimethoprim due to decreased recurrence of infection. However, E. coli and Klebsiella species, the two most common GNBSI pathogens, can be treated by less bioavailable antibiotics such as cephalexin and cefdinir. The focus of this study was to determine whether cephalexin had more favorable outcomes as compared to cefdinir for treatment of GNBSI. This analysis was approved by an institutional review board as a single-center retrospective chart review of patients who were at least 18 years old with a diagnosis of GNBSI caused by E. coli or Klebsiella species. Once identified via the ICD-10 code for GNBSI (A41.50), patients were excluded if they had previous recurrent GNBSI as well as other factors. Data was extracted from 3/1/2023 through 8/31/2024. The data collected included patient demographics and the antibiotic regimen the patient was discharged on. The primary endpoint of this study was a composite outcome consisting of mortality, recurrent bacteremia with the same pathogen, and 90-day all-cause readmission. The secondary outcomes were emergency room visits, repeat antibiotic use of any kind, and development of resistance to the same antibiotic class used at discharge. A study population of 80 individuals was identified with 40 individuals in both the cefdinir and the cephalexin groups. In the cephalexin group, 10% (n=4) of patients were readmitted within the 90 day period while 5% (n=2) of patients from the cefdinir group were readmitted. One patient from the cefdinir group was found to have recurrent gram-negative bacteremia while no patients from the cephalexin group had recurrent bacteremia. 20% (n=8) of patients treated with cephalexin developed recurrent urinary tract infections (UTIs), however, 25% (n=10) of patients in the cefdinir group developed UTIs with the same organism within 90 days. Emergency room visits and additional antibiotic use were similar between the groups. The use of cefdinir for the treatment of GNBSI with E. coli and Klebsiella species from a urinary source may increase the patient's risk for developing recurrent UTIs with the same pathogen.

19 (ePoster)

Evaluating the Independence of C. difficile Infections and Irritable Bowel Disease Flares: A Retrospective Analysis

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Abstract

Introduction: It has been established that patients with Irritable Bowel Disease (IBD) are at higher risk of contracting a Clostridioides Difficile (C. diff) infection compared to those without IBD. However, the relationship between C. diff infections and subsequent IBD flares remains unclear. This study evaluates the temporal association between IBD flares and C. diff infections using a retrospective analysis of patient records.

Methods: This IRB-approved study (IRB#: WMed-2024-1118) utilized Bronson Methodist Hospital's electronic health records to identify all patients diagnosed with Crohn's disease or ulcerative colitis who also had a laboratory-confirmed C. diff infection between June 2014 and June 2019. Manual chart reviews were conducted for a one-year period before and after the first positive C. diff test. Data on emergency department (ED) visits and hospital admissions related to IBD were collected.

Results: A Wilcoxon Signed-Rank test was performed to assess differences in the number of ED or hospital visits pre- and post-C. diff diagnosis. Results indicated no significant difference in the number of visits one year before and after a C. diff diagnosis ($p = 0.9316$).

Conclusion and Clinical significance: Our findings suggest that C. diff infections do not significantly increase IBD activity to the extent of requiring hospital-level care. These results support the hypothesis that C. diff infections and IBD flares are independent processes.

Attached Figure: Example of a patient who had one hospital admission prior to their C. diff infection and one ED visit post-C. diff infection.
Acknowledgments: No external funding supported this research. ChatGPT was used to edit portions of writing in this abstract.

20 (ePoster)

Specialty Disrespect: Medical Student Experiences and Impact

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Abstract

Introduction: Physicians often teach medical students in an environment where learners may experience expressions of disrespect toward various specialties. Although most physicians view these statements as unprofessional, there is widespread recognition that this continues to be a problem within medicine. Previous studies have shown that up to 80% of learners have experienced Specialty Disrespect (SD) and 17-25% of students reported that SD impacted their career choice. Our study aims to define the degree to which WMed students bring experiences of SD with them upon matriculation and the extent to which new experiences impact them in each subsequent year of medical education.

Methods: An adapted version of a questionnaire developed by Kathryn Hart, MD, at Georgetown University, was used to survey WMed students about their experiences with SD. Members of the research team introduced the optional and confidential survey to students during their Clinical Skills courses (M1/M2) and Transition courses (M3/M4). A QR code directed them to the REDCap platform, allotting 10 minutes for completion.

Results: The survey was completed by 195 WMed students. Eighty-nine percent of students were familiar with the issue of SD. Fifty-seven percent of students felt that SD was a moderate to extreme problem at WMed. Fifty-seven percent of clinical students noted observing SD at least monthly while only eighteen percent of preclinical students described a similar frequency. The top 5 sources by role were social media, clinical faculty, residents, students, and clinical staff. The majority of the students reported that SD has affected their interest in certain specialties, but it has not altered their career choices.

Conclusions: SD remains to be a problem at WMed, especially, in the clinical setting. Therefore, exposure to faculty physicians may be a major contributor to students experiencing SD. Interventions to improve SD at WMed should be aimed at the resident or faculty level in the clinic setting while educating students about SD upon matriculation in the preclinical years.

21 (ePoster)

Does Taking a Gap Year Impact Success in Medical School?

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Abstract

Introduction: In recent years, a significant proportion of medical school matriculants have taken at least one gap year between undergraduate graduation and medical school. Data from the American Association of Medical Colleges (AAMC) in 2024 indicated that 74% of incoming medical students reported taking a gap year, yet limited research exists exploring the correlation between gap years and measures of success in medical school[1]. This study evaluates the impact of gap years on academic and non-academic success metrics to inform admissions committee practices.

Methods: For this retrospective study, data from WMed classes of 2018, 2019, and 2020 were collected, deidentified, and analyzed using undergraduate graduation and matriculation dates to calculate number of gap years taken. Students were then grouped based on the number of gap years taken (0, 1, 2, or 3+). Academic metrics included undergraduate GPA and MCAT scores, as well as performance metrics for pre-clerkship courses, clerkships, CBSE exams, and Step exams. Non-academic metrics consisted of demographic information, honors/awards received at WMed, and admissions data quantifying applicant experiences and attributes. Statistical analysis was performed using one-way ANOVA followed by Tukey's Honest Significant Difference test. Categorical variables were evaluated using Chi-Square testing.

Results: Out of 260 students included in the three matriculating classes, 215 (82%) took at least one gap year prior to medical school matriculation. Results showed significant decreases in average undergraduate total and science GPA as the number of gap years increased. Additionally, students with more gap years scored higher on Admissions Committee calculated experiences and attributes scores. However, no significant differences were observed in medical school performance, extracurricular leadership activities, or demographics.

Conclusion: Medical school admissions committees are seeking holistic review measures that predict success. While life experiences gained during a gap year likely add to the diversity of a class, our data show that, once matriculated, performance remains consistent among students regardless of time between undergraduate and medical school. In the future, larger experiments involving other institutions should be conducted to further explore the impact of gap years on medical students' academic and non-academic performance.

References: [1] Matriculating Student Questionnaire (MSQ). AAMC. https://www.aamc.org/data-reports/students-residents/report/matriculating-student-questionnaire-msq

22 (ePoster)

Health-care access in Puerto Rico following Hurricane Maria, a team-based disaster relief activity&

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Abstract

This study was reviewed by the WMed IRB and determined to meet criteria for exempt status: IRB#: WMed-2024-1184 Introduction: Disaster relief is a complex topic with many moving pieces. Medical students can benefit from learning and practicing these complexities in a team-based learning (TBL) environment, where they can apply procedural and background knowledge to a real-world scenario. As natural disasters become more common and widespread, the likelihood that physicians will need to know how to respond increases. Therefore, students should leave medical school prepared to address these emergencies.

Methods: We developed a TBL simulation for second-year medical students. This experience immerses students in the response to a real hurricane by giving each student a simulated role in the community. In their roles, students are tasked with various activities within their small groups. Each activity addresses a different aspect of disaster response, including personal obligations, stakeholder involvement, and resource allocation. Between activities, large group discussions are led by facilitators.

Results: This TBL was conducted with a class of 85 total students. Students were asked to complete a pre- and post-activity survey to assess the activity's utility in teaching about disaster relief and student attitudes toward the event. Overall, students reported a statistically significant improvement in their level of confidence regarding disaster relief procedures and student ability to name stakeholder groups increased significantly. Greater than 90% of survey respondents agreed that the activity is relevant to their medical education.

Discussion: This TBL simulation provides a novel method of addressing disaster response in medical school curriculum. It offers an engaging, interactive learning session that can be implemented at other institutions.

23 (ePoster)

Improving Learning Outcomes in Histology by Using Organized Lists of Histological Terms

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Abstract

Introduction: Medical education demands the rapid integration of vast amounts of information, creating a challenging learning environment for students. Histology, for example, requires a mastery of complex cellular structures and their relationships to function. Structured learning tools, such as organized lists of histological terms, may enhance retention, improve confidence, and support students in mastering foundational concepts before they advance to integrative topics. This study evaluated whether structured histological term lists improve students' confidence and performance in identifying tissues and cell types, applying histological knowledge, and effectively using histological terminology.

Methods: A prospective educational intervention study was conducted with first-year medical students enrolled in Fundamentals of Biomedical Sciences I and II courses. Participants completed pre- and post-course surveys assessing their confidence in key histological skills using a 5-point Likert scale. For the intervention, the students were given structured lists of histological terms and guidance on their effective use. Data were analyzed using the Wilcoxon signed-rank test to evaluate changes in confidence levels, with additional descriptive statistics for survey responses regarding perceived usefulness.

Results: Fourteen students completed both pre- and post-intervention surveys. Statistically significant improvements in confidence were observed in tissue identification (median pre-survey: 2; post-survey: 4; $p = 0.0010$), cell type identification (median pre-survey: 2, post-survey: 3.5, $p = 0.0010$), application of histological knowledge (median pre-survey: 2, post-survey: 3, $p = 0.0156$), and use of histological terms in communication (median pre-survey: 2, post-survey: 3.5, $p = 0.0010$). Student feedback highlights the usefulness of structured lists for improving students' understanding, confidence, and exam performance.

Conclusion/Clinical significance: Although structured lists are standard tools in gross anatomy education to help students master macroscopic structures, a similar approach has not been consistently applied to histology. Our study demonstrated that structured histological lists can enhance students' confidence and understanding, reduce their cognitive load, and bridge the gap between gross anatomy and histology. Further research will expand this work by focusing on helping students to integrate topics.

IRB#: WMed-2024-1155

24 (ePoster)

The Role of Grit in Predicting Success in Medical School

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Abstract

Introduction: Medical school admissions committees are increasingly using non-cognitive traits, such as motivation and attitude, rather than intellect alone, to predict which applicants are most likely to succeed in medical school. 'Grit' has been defined as a "predisposition for pursuing long-term, challenging goals with passion and perseverance." It has been associated with academic and professional success independent of IQ in a variety of fields. An objective measure of 'grit' may be helpful in predicting both academic and non-academic achievements in medical school.

Methods: A retrospective review of four medical school classes at a single institution was completed. The experiences section of each student's AMCAS admission application was de-identified and examined for pre-determined objective measures of grit. Seven objective measures of grit were pre-identified to highlight applicant experiences that demonstrate perseverance. Each application was independently reviewed by two reviewers using the same rubric for scoring. In cases of discrepancy, a third reviewer served as a tiebreaker. Students were assigned a grit score of '0' or '1' based on the experiences review. Multiple medical school performance metrics, both academic and non-academic, were obtained for each student and analyzed for correlation with grit.

Results: A total of 2564 experiences from 270 student applications were reviewed and grit scores assigned. Preliminary analysis indicates that students with 'grit' have higher scores in pre-clerkship courses and clerkship shelf exams, fewer professionalism concerns, and higher graduation rates than those without. Analysis of numerous other academic and non-academic metrics is currently underway.

Conclusion/Clinical Significance: Medical school admissions committees are seeking non-cognitive traits that predict success. Grittiness might predict academic and non-academic success in medical students and may have substantive implications for use in the holistic admissions process.

25 (ePoster)

Measuring the Educational Impact of Overtly Coding Lecture Slides to Learning Objectives: A Continued Analysis Regarding Student-Reported Use

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Abstract

Introduction: LCME standard 6.1 mandates that medical schools ensure the dissemination of learning objectives (LOs) for required learning experiences to all students. We have evaluated the impact of exceeding this standard by visually aligning LOs with lecture slides to establish a closer association with course material in the Genetics and Metabolic Disorders (GMD) course. Our previous results suggest enhanced student satisfaction with the approach and sustained high exam performance. Expansion of the analysis here aims to differentiate students who utilized the LOs to prepare for their summative examination from those who did not.

Methods: Seven lectures in the FBSII course (the second course in the curriculum) were edited to include the addition of pertinent LOs to the bottom corner of each slide, and summative performance of relative exam items compared to prior years where LOs were included only in the beginning of each lecture. An optional, anonymous survey to assess student perception was administered for the last two years. Surveys were modified for the second year to determine the utilization of LOs. This was followed by four Likert scale questions and a free-response section. The experimental group comprised average scores on test items linked to the seven modified lectures of students who self-reported use of LOs, while the control group consisted of the average scores of students who self-reported not using LOs. Two 2-sample t-tests compared difficulty between treatment and control groups, examining all items and those with a difficulty index exceeding 0.2.

Results: A response rate exceeding 48% was reported for the survey, and student responses to LO usage were positive, but not universally utilized for studying. Combined with statistical analysis on exam performance compared to prior years and controls, overtly coding LOs within a lecture is perceived positively by students and may aid exam preparation.

Conclusion: Early in the medical school curriculum, additional clarification of LO and learning goals helps to prepare students for the summative potentially by reducing test anxiety. Further analysis will be useful for measuring the level to which LO coding on slides translates to improved exam performance.

IRB Number: WMed-2023-1060

26 (ePoster)

Engaging the Body and Mind: Student Perceptions of Embodied Learning in Medical Education

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Abstract

Introduction: Active learning strategies have become increasingly used throughout educational practices due to improved retention of material and better application of knowledge. Embodied learning is a form of active learning that utilizes the human senses and student engagement with not only the material, but with their environment, to further student's understanding. Medicine is a practice that requires all the human senses, and medical education should reflect that learning is not solely cognitive. This study aimed to gather student perspective on embodied learning events within the preclinical medical student curriculum.

Methods: Following two separate embodied learning events in two different preclinical courses (Nervous System and Renal and Genitourinary Systems), students were given a survey addressing student perspective on engagement and enjoyment of the event, perceived utility of the event, and whether similar events are a desired modality of learning for future courses. Students were also given an opportunity to provide individual feedback on the event. Survey data was collected using a 5-point Likert scale. An additional questionnaire was distributed to the second event before and after the event to assess comprehension of material.

Results: 43 students completed the survey from the first event, and 20 students from the second. Averaged from both events, the two domains students rated the highest included how engaging the event was and the requirement of higher-order thinking. The two domains students rated the lowest included time effectiveness of the event and whether the event improved confidence in ability to answer questions. There were significant differences between the two events across all domains except whether the event required higher order thinking and the difficulty rating of the questions. Possible explanations for these differences include novelty of the second event and course placement within the curriculum. There were no significant differences in pre-/post-event questionnaire results.

Conclusions: Overall, students found the embodied learning events to be fun and engaging, requiring higher order thinking skills and offering challenging questions for practice. Incorporating embodied learning into medical education could provide another form of active learning, however, retention and application of reviewed content is yet to be fully evaluated.

IRB WMed-2024-1116

27 (ePoster)

3D Cultured Organoids as an Insight to Stem Cell Therapy

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Abstract

In early stages of human development, the yolk-sac (YS) hemogenic endothelial cells (HECs) are primarily responsible for producing hematopoietic cells, whereas the fetal liver (FL) fills the niche for the hematopoietic stem/progenitor cells (HSPC) development after ten weeks. The mechanism and significance of this transition is still not well understood. Common models to answer this question have been 2D cultures of HECs with stromal cells. However, with the introduction of an in-vitro 3D environment with lower culture related stress, it provides a unique angle not explored. With this development, we compared the 3D co-culture system to the 2D system for effective HSPC production. The 2D cultures were initiated by inducing CD34+ HECs from human embryonic stem cells (hES) cells, followed by co-culture with stromal cells. The ClinoStar is a novel culture system that rotates culture chambers (ClinoReactor®) following standard incubator conditions. The organoids are suspended stress free by the rotation. The YS and fetal liver organoids (FLO) were started by forming embryoid bodies (EB) in an Aggrewell® plate as a single cell suspension, adding growth factors. We then structurally supported the YS EBs with MS5 stromal cells overnight, then added the FL EBs in a 96 well plate overnight. The organoids were then transferred into the ClinoReactor®. Blood productions were analyzed as the supernatant by flow after medium changes with growth factors. We used qPCR to find fetal liver gene expression within the organoids. Compared to 2D cultures, blood production was more consistent in the 3D cultures. They displayed erythro-myeloid and megakaryocyte progenitor production, suggesting the presence of HSPCs within the organoid simulating the YS and FL. qPCR analysis showed lower levels of FL markers such as albumin or alpha-feto protein despite the co-culture of these two kinds of EBs. The growth of FLO in 3D culture is a point of improvement, as they did not grow well. Interestingly, the YSO culture expressed more endoderm markers than FLO, suggesting YSO are capable for forming FLO-like environments by themselves. The novelty of a stress-free 3D environment could offer perspective on personal treatments for patients with blood stem cell related ailments.

28 (ePoster)

Impact of a Brief Health Literacy-Focused Communication Curriculum on Pre-Clinical Medical Student Communication Skills

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Abstract

Introduction: Over one-third of US adults have basic or below basic health literacy. Limited health literacy has been demonstrated to cause difficulty navigating the US healthcare system and is linked to worse health outcomes and disparities. While health literacy-specific interventions have shown inconsistent impact on health outcomes, clear communication by providers has demonstrated benefit to patient care. Such communication involves universal use of techniques including using plain language, confirming patient understanding through "teach-back," and encouraging questions. A health literacy-focused communications curriculum for resident physicians increased understanding and use of targeted communication skills during patient encounters. Similar education during pre-clinical training is not common practice, but its implementation may improve students' patient-centered communication skills in medical school and beyond.

Methods: Instructors utilized survey responses from a curricular workshop regarding health literacy-focused communication skills, knowledge, and confidence. During the event, second-year medical students evaluated peer communication during practice sessions before and after the intervention. De-identified, paired data was analyzed quantitatively and qualitatively to determine effectiveness and student satisfaction. It was determined this was a WMed-specific quality improvement project and did not require IRB approval (WMed-2024-1211).

Results: Use of multiple peer-reported communication skills was significantly increased after this workshop, including "teach-back" ($t(70)=9.326$, $p<0.0001$), defining jargon ($t(70)=3.166$, $p=0.0023$), and taking responsibility for the interaction ($t(70)=5.165$, $p<0.0001$). Peer-rated overall performance was significantly improved ($t(70)=4.513$, $p<0.0001$). Self-reported confidence in communication was significantly increased ($t(70)=5.473$, $p<0.0001$). Qualitative analysis established several themes, with student feedback including "We need more events that talk about this," suggesting this was an important, well-received curricular addition. 100% of students agreed learning and practicing health literacy-informed communication is important.

Conclusion: This curricular event was effective in improving the skills and confidence of pre-clinical students' patient-centered communication. Integrating health literacy-focused communication training into early medical education is valuable and practical. Further investigation should evaluate long-term impacts of this intervention throughout medical school and residency. While this intervention fit uniquely within the WMed curriculum, its success should encourage others to introduce these concepts earlier and more frequently during medical training.

29 (ePoster)

Adapting to the Pace: Sleep, Caffeine, and Physical Activity Trends in the First Semester of Medical Education

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Abstract

Introduction: Adequate sleep and physical activity are cornerstones of a healthy lifestyle [1,2]. In the context of medical training, previous studies indicate the deterioration of healthy lifestyle habits over the course of a four-year medical education [3,4]. However, a gap in knowledge exists as to the state of lifestyle changes during the first semester of medical school. In addition, there is a void of research related to caffeine use among medical students, especially within this "shock" or "adjustment period." This study's objective was to investigate changes in sleep, caffeine use, and physical activity habits in first-year medical students from matriculation to the end of the first semester.

Methods: This study employed a cross-sectional design. An online RedCap survey containing 11 questions on sleep, caffeine use, and physical activity habits was sent to 86 first-year medical students at WMed, at the point of matriculation and at the conclusion of their first semester.

Results: Of the 86 students, 51 completed both the pre- and post-surveys (59% response rate). Statistical analyses were performed to determine significant changes ($p \leq 0.05$) between the two timepoints. On average, students reported fewer hours of sleep and decreased satisfaction with sleep habits at the end of the first semester, both of which achieved statistical significance. Even though changes in napping habits, seeking medical sleep advice, and using sleep aid medications were not statistically significant, trends toward adoption of unhealthy practices at the end of the semester were observed. There was no statistically significant difference in self-reported caffeine dependence, yet students reported a significantly higher daily caffeine intake and decreased satisfaction with caffeine use habits on the post-survey. Lastly, students reported less time spent on, and decreased satisfaction with, physical activity at the end of the semester, both of which achieved statistical significance.

Conclusion: To our knowledge, this is the first study investigating the acute nature of lifestyle changes in medical students in the United States, showing that healthy sleep, caffeine use, and physical activity habits decline within the first semester of medical school.

30 (ePoster)

Increasing the Access to STEM Education in Our Local Community: A Lesson on Nerve Endings to 7th and 8th Graders

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Abstract

Introduction: Improvement in the teaching of science, technology, engineering, and mathematics (STEM), is the foundation of economic growth in the United States. Yet, while 17% of suburban students pursue STEM-based careers after high school, only 13% of rural Americans do the same. Some factors that contribute to this disparity include a shortage of STEM teachers in rural America, high rates of teacher turnover, and a lack of internet access – all of which contribute to a decreased early exposure to STEM. Our goal is to determine if the usage of an actively engaging lesson plan on free nerve endings can improve STEM education in our local rural community.

Methods: A one-hour lesson plan was taught to eight 7th or 8th grade classes with approximately 20 students each. In the classroom, pretests with 3 multiple choice questions and one free answer question were circulated. Students were walked through the lesson plan using a worksheet and two hands-on activities. The classes were divided into two groups – group A was not told to put their worksheet away while group B was. Subsequently, posttests that mimicked the pretest were conducted. Tests were graded out of four, with a point for each of the multiple choice questions, and a point for the free answer question. A paired t-test was performed.

Results: Student performance significantly improved following the lesson plan in all groups ($t(52)= 15.34$, $p<0.0001$ for group A; $t(55)= 16.39$, $p<0.0001$ for group B; $t(108)= 22.45$, $p<0.000$ for A and B combined).

Conclusion/Clinical significance: The conduction of this lesson plan was effective. Especially, the usage of a follow-along worksheet and activities, which encouraged active engagement, proved to be an effective method of education for a STEM-related topic. This efficacy could translate to not only an increased understanding of STEM-related topics, but an increased exposure to STEM, and subsequently an increased rate of pursuit of STEM-related careers in students from rural communities.

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31 (ePoster)

Research Productivity in Home vs. External Orthopedic Surgery Residents: A Quantitative Multicenter Analysis

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Abstract

Introduction: The number of applicants for orthopedic surgery residencies has risen steadily, with 1,492 applicants vying for 916 positions in the 2024 match cycle (61.4% match rate). Key factors influencing match success include having a home program, access to mentors, clinical exposure, and research experience. During the COVID-19 pandemic, restrictions on away rotations may have further increased the advantage for home applicants, as evidenced by a rise in the proportion of residency spots filled by home program students (21.8% from 2017–2020 to 28.2% in 2021). This study aimed to compare the research productivity of residents who matched into their home orthopedic programs versus external programs, focusing on total publications, first-author publications, H-index, and AOA membership rates.

Methods: Data on 3,034 orthopedic surgery residents from 116 ACGME-accredited programs (PGY 1–5, 2019–2023) were collected from publicly available program websites and social media. Internal (home) residents were defined as graduates of the affiliated medical school, while external residents were graduates of other institutions. Programs with <10% or >50% home residents were excluded. Python scripts ensured accuracy in publication data collection, accounting for name variations. Study metrics included total publications, first-author publications, H-index, and AOA membership. Geographic analyses were based on ERAS regions.

Results: External residents had more total publications (4.33 vs. 3.79, p=0.08) and significantly more first-author publications (1.23 vs. 0.91, p=0.01). No significant differences were found in H-index (1.26 vs. 1.17, p=0.23) or AOA membership (30.03% vs. 29.1%, p=0.65). Geographic analysis revealed a significant difference in first-author publications in the South Atlantic region (external: 0.63 vs. internal: 0.30, p=0.02).

Conclusion: Home residents exhibited lower research productivity than external residents, particularly in first-author publications. This suggests home applicants may benefit from subjective factors like institutional familiarity, while external applicants rely more on objective metrics such as research. AOA membership did not significantly impact match outcomes, and regional differences highlight variability in institutional characteristics. These findings underscore the potential advantages conferred by home programs during the residency match process.

32 (ePoster)

Effect of Artificial Intelligence Assistance on the Time for Novice Users to Obtain Apical-4 Chamber and Right Upper Quadrant Windows

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Abstract

Introduction: Every emergency medicine resident physician must demonstrate competency in point-of-care ultrasound prior to graduation [1]. However, there are many barriers to ultrasound education including limited time to practice and lack of supervising physician support [2,3]. Novel ultrasound devices with artificial intelligence software provide real-time feedback to assist learners in improving image quality and have potential to address these barriers. As part of a larger study exploring the helpfulness of these devices in medical education, the objective of this investigation was to determine the effect of artificial intelligence assistance on the time for novice users to acquire the cardiac apical 4-chamber window and the right upper quadrant portion of the focused assessment with sonography in trauma.

Methods: This IRB (#WMed-2024-1134) approved study enrolled twelve first-year residents and two fourth-year medical students. Apical 4-chamber windows were performed using the EchoNous Kosmos device (Redmond, WA). Right upper quadrant windows were performed using the Butterfly iQ+ device (Burlington, MA). Participants were randomized to artificial intelligence first or second groups. Each group obtained both windows on the same three standardized patients with or without artificial intelligence during two sessions, one week apart. The first group utilized artificial intelligence assistance during the first session and the second group during the second session. The time to complete each ultrasound window was recorded. All datasets were skewed rightward. The Wilcoxon Signed-Rank Test was utilized for matched-pairs comparison.

Results: Median time (seconds) to obtain the apical 4-chamber window was longer with artificial intelligence assistance (89, IQR 91) than without (54, IQR 60, $p < 0.01$). Median time to obtain the right upper quadrant window was longer with artificial intelligence assistance (136, IQR 113) than without (75, IQR 67, $p < 0.01$). The results were consistent in subgroup analysis (Table 1).

Conclusion/Clinical significance: Real-time feedback from the artificial intelligence capable ultrasound devices was associated with longer image acquisition time, likely because users spent more time attempting to improve image quality. Therefore, these devices may not improve clinical efficiency, but may be useful for self-teaching purposes. Further analysis of the collected data will investigate the effect on image quality.

33 (ePoster)

Enhancing Residency Transparency: A Comprehensive Methodology for Collecting and Analyzing Data on Orthopedic Surgery Residents in the United States

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Abstract

Introduction: The demand for PGY-1 positions has exceeded supply since 1975, with competitive specialties like orthopedic surgery experiencing low match rates. In 2024, only 73.1% of U.S. MD seniors successfully matched into orthopedic surgery programs. Following the transition of USMLE Step 1 to a pass/fail format in 2022, research productivity has become a key metric for evaluating residency candidates. Current tools such as NRMP data, Texas STAR, and Residency Explorer provide valuable insights but lack granularity and program-specific benchmarks. This study outlines the careful methodology employed in creating a robust database that analyzes various application-relevant metrics—including research productivity, academic affiliations, and pre-residency achievements—and evaluates the database's potential for improving orthopedic surgery residency match outcomes.

Methods: A comprehensive database was created using publicly available data from 208 ACGME-accredited orthopedic surgery programs. A total of 2,723 residents (2019–2023) were included, with exclusion criteria applied to programs without updated data and residents with zero publications or IMG status. Bibliometric data were collected via Elsevier Scopus APIs and cross-referenced with PubMed, ResearchGate, and other platforms. Key metrics included total publications, pre-residency H-index, citation counts, authorship position, and journal impact factors. Data accuracy was validated by comparing program rosters with NRMP and Residency Explorer data. Descriptive statistics and comparisons with existing tools were performed.

Results: The database demonstrated significant advantages over existing tools by distinguishing research outputs by quality and quantity. Unlike NRMP, which aggregates abstracts, presentations, and publications, our database provides granular insights into journal impact factors, authorship order, and pre-residency H-index. It offers program-specific benchmarks across a variety of metrics, enabling applicants to identify programs aligned with their application profiles. Initial analysis revealed a strong correlation between pre-residency H-index and match success.

Conclusions: This database represents a critical advancement in transparency and benchmarking for orthopedic surgery residency applicants. By addressing gaps in current resources, it empowers applicants with actionable, program-specific insights. Development is nearing completion for databases in neurosurgery, plastic surgery, and dermatology, broadening the methodology's utility. Future iterations will incorporate additional metrics, expand to other specialties, and address limitations related to reliance on publicly available data.

34 (ePoster)

Training Novices to Perform the Head Impulse Test with a Free Smartphone Application

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Abstract

Introduction: Collectively, the head impulse test, evaluation of nystagmus, and test of skew can be more sensitive for early stroke detection than magnetic resonance imaging [1]. However, accuracy is limited by the difficulty of the head impulse test, which requires head turns at >100 degrees/second [2,3]. Expensive video-oculography devices have been used to teach the head impulse test [4]. The purpose of this study was to determine if a free smartphone application that displays rotational velocity can be used instead.

Methods: A preliminary sample of ten medical student participants in this IRB (#WMed-2024-1150) approved study were assessed on their baseline ability to perform the head impulse test using video-oculography (Otometrics ICS Impulse, Taastrup, Denmark) to record the number of successful attempts out of 20 on a training model [4]. Participants were then randomly assigned to perform 100 practice attempts on the training model with either video-oculography (n = 5) or the PhyPhox smartphone application (Aachen, Germany) feedback (n = 5). Aggregate learning curves were generated for each group from the practice data (Figure 1). Participants were reassessed by recording the number of successes out of 20 attempts on the training model immediately after the practice session and again 3 weeks later. Average success rates were compared with independent two-sample t-tests.

Results: The average final success rate determined by the learning curve for the phone application group was 47% and for the video-oculography group was 55% ($p < 0.01$). The average success rates during immediate post-testing remained similar, 47% in the phone application group and 52% in the video-oculography group. The average success rate at the 3-week follow-up was significantly different from the post-testing success rate for the phone application group (12%, $p = 0.01$) but similar for video-oculography group (50%, $p = 0.91$).

Conclusion: The smartphone application group demonstrated similar head impulse skill acquisition compared to the video-oculography group, however, there was poor skill retention in the phone application group. This preliminary data supports further investigation of the free smartphone application as a low-cost method to teach the head impulse test for improved assessment of acutely dizzy patients.

35 (ePoster)

Impact of Peer-Led Human Donor Demonstrations on Gross Anatomy Education

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Abstract

Introduction: The traditional approaches to teaching gross anatomy have increasingly integrated video demonstrations to enhance understanding and retention of complex anatomical structures. However, the effectiveness of peer-led video demonstrations in improving practical performance and engagement in anatomy education remains underexplored. This study investigates the impact of such videos on student performance and engagement, identifying a significant gap in current educational practices. This research aimed to assess the efficacy of peer-led cadaveric video demonstrations on students' practical performance and engagement in a gross anatomy course.

Methods: We conducted a quasi-experimental study involving 210 medical students who utilized peer-led video resources in their anatomy coursework. Video usage metrics were collected, and performance outcomes were assessed through subsequent practical exams. Surveys measured student engagement and perceived effectiveness of the videos.

Results: The study found responses were overwhelmingly positive, with 87% of students affirming increased confidence and 55% noting reduced anxiety during practical exams. The study did not show a correlation between seconds watched and performance on the practical exam. Furthermore, the study did not find significant evidence of a difference in practical performance between graduating classes of 2026 and 2027 for both male and female scores

Conclusion/Clinical significance: While video usage did not directly correlate with improved exam performance, the positive survey responses suggest that peer-led videos significantly enhance student confidence and comfort with material, potentially leading to better long-term retention and understanding. The variability in performance across classes may indicate a difference in perceived difficulty of male versus female reproductive anatomy. We may also consider that students across classes have variable previous anatomy knowledge that may influence their performance. This study underscores the potential of peer-led cadaveric videos to transform anatomical education by enhancing student engagement and reducing learning anxiety. These findings advocate for the broader integration of peer-led resources in medical curricula to cater to various learning preferences and needs, potentially setting a foundation for more personalized educational methodologies in medical training.

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IRB: WMed-2023-1061

36 (ePoster)

Drug-Related Deaths in the Elderly: A Five-Year Overview of Western Michigan

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Abstract

Introduction: In 2023, 2,646 deaths of older adults aged 65 years and over were reported to the Medical Examiner's Office at Western Michigan University Homer Stryker M.D. School of Medicine. This represents 58.9% of the deaths reported to the office, which serves 13 counties throughout western Michigan. Although elderly Americans do not typically come to mind when discussing drug overdoses, this presentation will demonstrate that this population is not immune to drug-related fatalities. The authors sought to examine the impact of the opioid crisis on the aging population within this region.

Methods: An advanced search was performed within the web-based database of deaths reported to the Medical Examiner. This search included all deaths of adults aged 60 years and older reported between January 2019 and December 2023 in which a drug, substance or poison was listed as contributory to death.

Results: A total of 301 cases were identified, with 255 cases of adults aged 60 years and over confirmed to be drug-related. Forty-six cases were excluded due to non-natural contributors, such as drowning or asphyxia. Over 82% of these deaths were of individuals in their sixties. Of the confirmed 255 cases, 116 (45.5%) were between the ages of 60 and 65 years. Accidental deaths accounted for 84.7% of these cases while deaths by suicide accounted for 13.3%. Sixty-four percent involved one or more opioids and over 47% of deaths by suicide involved an opioid. Methamphetamine contributed to 25.5% of these deaths. From 2019 to 2023, this age group represented 15.6% of all (1,629) drug-related deaths reported.

Conclusion: While special attention is often paid to elderly deaths for concerns of abuse or neglect, this study demonstrates the importance of a thorough medicolegal death investigation, including pill count(s) and signs of illicit or prescription drug use. Without this, forensic pathologists run the risk of missing intentional or unintentional drug-related deaths that require full autopsies and comprehensive postmortem toxicological examinations. Thorough death investigations and examinations can inform healthcare and community partners in the design and implementation of unique overdose prevention strategies for this vulnerable population.

37 (ePoster)

The Impact of Social Vulnerability on Time to Diagnosis and Disease Stage of Cutaneous Melanoma

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Abstract

Background: Despite the high prevalence of melanoma, mortality has decreased over the last decade due to improvements in diagnosis and therapies [1]. A previous report linked patients of lower socioeconomic status with later-stage melanoma and increased mortality [2]. The Center for Disease Control created the Social Vulnerability Index (SVI), a tool used to evaluate relationships of morbidity and mortality from diseases to SVI in underserved populations [3]. High SVI has been correlated with increased disease morbidity. Given the importance of early melanoma identification, we investigated the relationship between SVI and time to melanoma diagnosis and pathologic stage.

Methods: A retrospective study of 261 melanoma patients treated from 2016-2024 was performed. SVI is composed of five components: household composition, housing type, transport, minority status, and socioeconomic status. An Overall SVI percentile from 1-100 was formulated combining these 5 components. SVI low-moderate group scored 0-59 and SVI high group scored 60+. Time from the first concern of lesion to first evaluation was divided into two groups, <90 days and >91 days. Pathologic stage was divided into three groups: Stage 1, Stage 2, and Stages 3/4.

Results: There were 174 patients in the low-moderate SVI group. The time of patients' first concern to time of first evaluation was 1-90 days for 50% and 50% were seen in 91+ days. Of the 83 patients with high SVI, 48% were seen in 1-90 days, and 52% were seen in 91+ days (p-value: 0.7864). In the low-moderate SVI group, 64% of cancers were Stage 1, 17% were Stage 2, and 18% were Stages 3/4. While for patients in the high SVI group, 56% of cancers were Stage 1, 29% were Stage 2, and 15% were Stages 3/4 (p-value: 0.1379).

Conclusion: Unlike other studies, we did not identify a relationship between SVI and delays in melanoma identification or initial cancer stage. As 98% of our patient population self-identified as white, race may have been an underlying contributor to delays in diagnosis or presentation at more advanced stages in other studies. As most SVI studies use large national databases, our study may also be underpowered. Wmed-2024-1166

38 (ePoster)

Evaluation of Hospitalizations for Tick Borne Diseases in the United States from 2002 to 2021

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Abstract

Introduction: Hospitalizations with tick-borne disease (TBDs) are an important public health concern in the United States. The study aims to examine temporal and regional trends for hospitalizations with TBDs: Lyme Disease, babesiosis, ehrlichiosis/anaplasmosis, tularemia, rickettsia fevers, and other diseases that fall in the category of "other tick-borne diseases" from 2002 to 2021. These trends are important for improving prevention, but also tailoring control measures to different regions and populations.

Methods: The analysis was based off hospital-based Nationwide Inpatient Sample (NIS) data across different regions in the United States, specifically the Northeast, Midwest, South, and West. The data highlights metrics like: temporal patterns, peaks in different seasons, and how hospitalizations were distributed in different regions for each disease. These metrics were then analyzed with a focus on identifying peak periods of activity and dynamic changes over the study period.

Results: We identified 261,630 hospitalizations for TBDs during the study period. Lyme disease had the highest number of TBDs particularly in the Northeast during the summer months of June, July, and August. Babesiosis followed a similar pattern, showing an increasing number of hospitalizations in the Northeast over recent years. Babesiosis also had a 36% co-occurrence rate with other TBDs, which was higher than the other diseases. Ehrlichiosis and anaplasmosis both showed rising numbers in the South and the Midwest, while Rickettsia fever was largely concentrated in the South. Tularemia cases were rare and sporadic and with a predominance in the Midwest and Northeast. Demographically, hospitalizations were highest among Caucasian males, specifically middle-aged adults. Urban hospitalizations outnumbered rural, nearly fourfold. Interestingly, higher income quartiles were associated with increased hospitalizations, possibly reflecting disparities in healthcare access or reporting.

Conclusions: This study highlighted the significance of regional and temporal variations in hospitalizations with TBDs. The data highlighted increasing incidence of the diseases and interesting demographic findings. The South and Midwest had increasing trends for all the diseases. Specifically the emergence of ehrlichiosis, anaplasmosis, and Rickettsia fevers is to note. The results show the importance of tailoring interventions and evaluating tick control strategies, but also increasing public education to address the evolving burden of TBDs.

39 (ePoster)

From the Ground Up: An Analysis of Street Medicine Programs 30 years in

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Abstract

Introduction: Despite increases in the number of Street Medicine programs (SMPs), few descriptive studies have identified and outlined SMP operations. A mixed-methods survey was designed to cover the eight states bordering the Great Lakes. This proposal is an update to our 2023 Research Day poster presentation and contains the completed/full study results from 21 SMPs, versus the 10 SMPs analyzed at that time. In doubling the number of survey respondents, the data set provides a more diverse representation of SMPs across the northern U.S. and yields insights that were not previously available.

Methods: A mixed-methods electronic survey was designed and the WMed IRB declared this "exempt" research. The survey was distributed to SMP Medical Directors in an eight-state area of the northern U.S. between February 2023 and February 2024. Potential respondents were identified via an online directory of SMPs, Google search, personal contacts of the authors, and by referral from existing respondents (snowball method). Respondents were given a $35 Amazon gift card incentive after survey completion. Descriptive data analysis was completed with R software and Microsoft Excel. Theme analysis was undertaken on qualitative data.

Results: Out of 30 programs identified and invited for study, 21 SMPs were electronically surveyed. The aspects studied and select highlighted data includes trainees and curriculum (74% of SMPs with trainees have medical students), safety (74% of SMPs have a written safety protocol and only 1 SMP reported an episode of physical assault), funding (67% of programs rely on donations and private grants), services and settings (100% of SMPs provide wound care, 90% of SMPs perform street rounds), supplies, billing, personnel (all SMPs reported physicians within their leadership), medications, budget (12 SMPs reported annual budgets between $1,250-13,000,000), and demographics (86% of SMPs serve LGBTQIA+ community).

Conclusion: Overall, this work provides practical and novel insights into the operations of 21 SMPs among various domains. This study contributes to the current breakthroughs in Street Medicine as it relates to public health, expanding medical access to underserved communities, while also supporting the creation of future SMPs.

40 (ePoster)

Medical Student Burnout: Pass/Fail Grading For STEP 1 and Other Tools of Mitigation

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Abstract

Introduction: The medical profession is known to be one of the leading fields in worker burnout, suicide, and depression. While the field has acknowledged these statistics, medical student burnout as a subset has been understudied as identified in our literature search. Therefore, our goal is to study medical student burnout and propose solutions.

Methods: A survey was sent to students at WMU Homer Stryker MD School of Medicine (WMed) with 15 questions that inquire their level of current burnout, views on the school's decompressed curriculum, STEP 1 going Pass/Fail, and burnout mitigating strategies. We additionally interviewed a few participants to further elaborate. The survey and interview were completed by 58 and 15 participants respectively.

Results: We found ~48% of respondents reported they were experiencing burnout, with the highest level of burnout among 2nd year medical students. Only 37.3% of students endorsed STEP 1 going pass/fail alleviated their stress regarding residency applications. Alternatively, 81% of students found that the decompressed curriculum helped attenuate burnout.

Conclusion/ Significance: STEP 1 grading was amended to Pass/Fail was for medical student wellness per the AAMC. At WMed, it has been historically taken at the end of the second year, yet our second-year students are the most burnt out. Why? The interviews show us a lack of understanding on the definition and path to success within or past medical school to be a primary factor. Therefore, creating more clarity regarding the qualifications needed to match into residency could be beneficial. Further, the difficulty of persisting in an academically rigorous environment while also being an active participant in one's life was found to be taxing. A WMed measure to address this issue – the decompressed curriculum – was 81% favored by students, displaying that time off interspersed in the medical curriculum mitigated burnout and should be protected. Reference Number: WMed-2023-1034

41 (Printed Poster)

Vitamin C Supplementation in the Context of Treatment-Resistant Depression

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Abstract

Introduction: Vitamin C is one of the water-soluble vitamins known to be responsible for collagen production, wound healing and iron absorption. It also plays a role in regulating the synthesis of serotonin, which is found to be deficient in many psychopathologies.

Case Description: In this case of a 49-year-old woman with a past medical history of multiple sclerosis, chronic pain, hypothyroidism, and treatment resistant depression, it was found that a deficiency of Vitamin C may have been contributing to the lack of improvement in her mood symptoms with standard treatments. Laboratory levels collected from this patient revealed a level that was less than 0.1 mg/dL (normal range 0.4-2.0 mg/dL). With retrial of sertraline, CBT and Vitamin C supplementation, patient's depressive symptoms significantly improved (PHQ-9 score of 20 before addition of Vitamin C supplement and 5 after sufficient levels reached) after having been trialed on various antidepressants for more than 2 years.

Discussion: In the United States, it is estimated that approximately 7% of the population has a vitamin C deficiency. It is possible that this could be an underestimation of the true prevalence of this condition, as vitamin deficiencies that are asymptomatic are often not investigated. These findings may indicate a need for further investigation of Vitamin C's role in various psychiatric disorders that could further aid in treatment planning for individuals who may be unknowingly suffering from a deficiency.

42 (Printed Poster)

Expecting the Impossible: A Case Study of Pseudocyesis

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Abstract

Introduction: Pseudocyesis is a rare psychiatric phenomenon involving a delusional belief of pregnancy accompanied by physical pregnancy-like symptoms in non-pregnant individuals. Rooted in neuroendocrine pathology, it illustrates the profound link between mind, emotion, and body, with delusions causing measurable physical changes. More prevalent in cultures emphasizing fertility, pseudocyesis is often underdiagnosed in other settings.

Case Presentation: A 45-year-old female with a history of schizophrenia and a decade-long delusion of pregnancy was admitted to the psychiatric inpatient unit for disorganized behavior. Despite dozens of negative pregnancy tests in her record, including on admission, she insisted that she was pregnant and reported experiencing monthly "miscarriages", as well as symptoms of weight gain, breast tenderness, galactorrhea, morning sickness, and perceived fetal movements. She attributed her inability to deliver to external factors, including the influence of “poisonous” scents and perfumes, and a recurring olfactory hallucination during her hospitalization. Physical examination revealed breast engorgement and protruding abdomen with diffuse tenderness on palpation. The patient’s trauma history included sexual assault and a coerced abortion in her youth, after which her delusions of pregnancy began. Initial treatment with paliperidone failed to resolve her psychotic symptoms. A switch to fluphenazine resulted in significant improvement, with complete resolution of her delusion of pregnancy and abdominal distension.

Discussion: This case highlights the complexity and challenges of managing pseudocyesis in the context of severe psychiatric illness, emphasizing the need to distinguish from pure delusion of pregnancy, which lacks physical findings. The decision to transition from paliperidone to fluphenazine, prompted by the patient’s lack of response to initial therapy, underscores the value of individualized treatment strategies for addressing both psychiatric and somatic manifestations of pseudocyesis. This case contributes to the understanding of pseudocyesis, particularly in patients with coexisting psychotic disorders, and the clear influence of a past pregnancy-related trauma illustrates the validity of the biopsychosocial model, emphasizing the need for a multidisciplinary approach to management. Future studies should explore the role of neuroendocrine and psychosocial factors to optimize diagnostic and therapeutic interventions.

43 (Printed Poster)

Fool me twice: Recurrent atraumatic septic arthritis due to Lelliottia amnigena

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Abstract

Introduction: Atraumatic septic arthritis in children is typically caused by Staphylococcus aureus, Kingella kingae, or Streptococcus pyogenes. In contrast, septic joints caused by Enterobacter spp. are exceedingly rare, especially in healthy children without a history of open trauma. These organisms may be disregarded as contaminants, possibly leading to delayed treatment. Here we report an unusual case of recurrent atraumatic septic arthritis in a 6-year-old female caused by Lelliottia amnigena.

Case Presentation: The patient developed knee pain and swelling following a mild nonpenetrating injury. Imaging demonstrated joint effusion and synovitis prompting knee aspiration, which revealed a synovial fluid white blood cell (WBC) count of 42,300 with neutrophilic predominance. The bacterial cultures were negative. No improvement was observed following a one-week course of empiric cephalexin. Repeat aspiration revealed an increased WBC count (235,000) and was positive for an Enterobacter species, which was reportedly susceptible to cephalexin. A blood culture was positive for Lelliottia (formerly Enterobacter) amnigena. The primary service questioned the significance of the isolates. Two weeks later, irrigation and debridement were required. The fluid was culture-positive for L. amnigena. She subsequently received three weeks of trimethoprim-sulfamethoxazole with resolution of symptoms and normalization of C-reactive protein levels. Eighteen months later, the patient developed recurrent pain and swelling of the knee, with infrapatellar fluid collection and septic arthritis due to L. amnigena. She was treated with trimethoprim-sulfamethoxazole for 12 weeks with full clinical recovery.

Discussion: Lelliottia amnigena is an exceedingly rare pathogen in humans, especially in the absence of immunodeficiency, internal prosthetics, or traumatic injuries. This case underscores the pathogen's capacity for recurrence, despite the absence of traditional risk factors. Uncommon isolates from sterile sites should be carefully evaluated to avoid unnecessary treatment delays. For pathogens outside the typical spectrum of septic arthritis, extended antibiotic therapy may be warranted.

44 (Printed Poster)

A Confusing Case of Reversible Cerebral Vasoconstriction Syndrome

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Abstract

Introduction: Reversible Cerebral Vasoconstriction Syndrome is an underrecognized cause of thunderclap headache that is often misdiagnosed and typically requires multiple encounters before recognition [1]. The pathophysiology involves transient cerebral arterial constriction, which can be triggered by various factors, including medications [2]. The objective of this case is to highlight a rare trigger—glucocorticoids—and emphasize the importance of considering Reversible Cerebral Vasoconstriction Syndrome in patients presenting with acute severe headache.

Case Presentation: A 49-year-old female who recently finished a glucocorticoid burst for pyoderma gangrenosum presented with a sudden-onset thunderclap headache. Initial workup, including computed tomography of the head without contrast, computed tomography angiography of the head/neck, and lumbar puncture, was inconclusive. Symptoms improved transiently and the patient was discharged. On a subsequent visit due to recurrent thunderclap headache, the patient underwent repeat computed tomography angiography, which revealed cerebral vasoconstriction with scattered cerebral infarctions. Given the symptom recurrence and the imaging findings, the patient underwent cerebral digital subtraction angiography and was treated with intra-arterial verapamil, resulting in marked improvement of the vasospasm and confirming the diagnosis of Reversible Cerebral Vasoconstriction Syndrome. She was subsequently initiated on oral calcium channel blockers, resulting in significant clinical improvement.

Discussion: Reversible Cerebral Vasoconstriction Syndrome often mimics other acute headache conditions, such as subarachnoid hemorrhage, making timely diagnosis challenging [1]. The gold standard for diagnosis is cerebral digital subtraction angiography, which confirmed the diagnosis in this case [3]. While the syndrome is commonly triggered by factors like medications, drugs, physical strain, or emotional stress, glucocorticoid burst therapy has been reported as a rare trigger, with only one previous case in the literature [4]. Treatment typically involves blood pressure control and symptomatic management, with more severe cases requiring pharmacological intervention with intra-arterial calcium channel blockers [5]. This case highlights the importance of considering Reversible Cerebral Vasoconstriction Syndrome in patients presenting with thunderclap headache, particularly when there is a history of medication use such as glucocorticoids. Early recognition and appropriate management, including digital subtraction angiography for confirmation, can prevent complications such as cerebral infarction or hemorrhage, improving outcomes and reducing morbidity.

45 (Printed Poster)

Salvaging Function Through Cross-Finger Flap Reconstruction: A Case Report

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Abstract

Introduction: Revision amputations are commonly performed for traumatic amputations of the phalanges which results in significant shortening of the phalanx, restricting post-procedural functionality in patients. Few treatment options are available for such patients, but alternative procedures can be useful in preserving length. In this case, we present a patient in which cross-finger flap (CFF) reconstruction was used in favor of revision amputation for a traumatic partial thumb amputation which preserved both length and functionality.

Case Presentation: A 69-year-old right-hand-dominant male presented with a traumatic right thumb crush injury after losing his grip while carrying a 700 lb. safe with another individual, leading to a traumatic partial amputation of his right thumb with visible distal phalanx and a significant volar defect. Radiography revealed avulsion of the soft tissues overlying the tip and volar aspects of the distal aspect of the distal phalanx without discernable underlying osseous or joint abnormalities. The treatment selected was CFF reconstruction. This flap was designed on the dorsum of the middle phalanx of the index finger. The donor site was treated with a skin graft. Two weeks later, the fingers were separated. The patient was encouraged to begin range of motion exercises. At 7.5 weeks post-operatively, the patient was participating in therapy and had improved range of motion with only minor discomfort at the tip of his thumb.

Discussion: The extent of injury in this patient allowed for few surgical options to preserve thumb length. The use of CFF reconstruction is unusual for volar thumb lacerations; however, considering the patient's right-hand dominance and functionality post-procedure, it was determined that this could be more beneficial than revision amputation, which would result in significant loss of thumb length. This case highlights the role of CFF reconstruction in improving patient functionality by preventing significant loss of thumb length after revision amputation.

46 (Printed Poster)

Extreme Outlier in Temporality of Temporal (Giant Cell) Arteritis: a Case Report

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Abstract

Introduction: Giant cell arteritis (GCA) is a systemic autoimmune vasculitis of medium and large size arteries that predominantly affects the elderly population, with a peak incidence between 70 and 80 years of age and a slight bias towards affecting the female sex and those of northern-European descent. The diagnosis of GCA in centenarians is exceptionally rare. Furthermore, management and confirmatory testing can prove challenging given various age-related factors. We present a 100-year-old patient who was diagnosed with GCA and successfully treated with empiric glucocorticoid therapy.

Case Presentation: A 100-year-old male presented to the office with relapsing and remitting left-sided headaches of several months duration that had become increasingly more frequent and persistent with associated malaise and weight loss. Physical examination was significant for left-sided scalp tenderness overlying the area of the temporal artery. Laboratory evaluation demonstrated elevated erythrocyte sedimentation rate (ESR) of 98 mm/hr and elevated C-reactive protein (CRP) of 245 mg/L. The patient met the diagnostic criteria according to American College of Rheumatology with age >50 years, new-onset headache, temporal artery abnormality (tenderness with palpation) and elevated ESR> 50mm/h. The patient was immediately started on 60 mg of prednisone which resulted in prompt resolution of symptoms. Temporal artery biopsy was discussed, but the patient elected to forgo this test. Patient still undergoing gradual taper of prednisone dose.

Discussion: To our knowledge, this is one of the oldest documented cases of GCA. GCA occurs typically in patients greater than 50 years of age and has a mean onset at age 70. Despite the peak incidence of disease occurring several decades earlier, this case demonstrates the importance of considering the diagnosis of GCA when signs and symptoms of the disease are present, even in patients with advanced age. Diagnosis of GCA can be made clinically without temporal artery biopsy, which especially in a very old patient may be less helpful due to senescent changes; an ultrasound can also be considered as an adjuvant diagnostic tool. Early diagnosis and immediate initiation of corticosteroid therapy is essential in preventing disastrous complications such as vision loss.

47 (Printed Poster)

Spontaneous Coronary Artery Dissection in Ehlers-Danlos Syndrome: A Case Report

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Abstract

Introduction: This is a cautionary tale addressing the identification, management, and complications of Spontaneous Coronary Artery Dissection (SCAD) in the setting of Ehlers-Danlos syndrome (EDS) and fibromyalgia. EDS and fibromyalgia are clinical diagnoses often associated with chronic, irreversible processes. While the role of the emergency department in the treatment and management of these chronic processes is limited, the presentation of anginal symptoms should be taken seriously.

Case Presentation: A 49-year-old female with EDS and fibromyalgia presented for evaluation of chest pain. The pain was exertional and associated with nausea. Initial EKG demonstrated new T wave abnormalities in V3-V5, normal sinus rhythm, incomplete RBBB, and right axis deviation. High sensitivity troponin was found to be 787, then 839 (normal <13). She was admitted for cardiac evaluation. Diagnostic coronary angiography identified dissection of the posterior descending artery (PDA). Angiography was complicated by catheter-associated proximal dissection of the RCA and vasospasm of the circumflex.

Discussion: SCAD is a non-atherosclerotic cause of myocardial infarction (MI) associated with exposure to female sex hormones, extreme physical or emotional stress, and connective tissue disorders [1]. Initial presentation varies from anginal chest pain to acute ST elevation MI, dysrhythmias, congestive heart failure, or sudden cardiac death [1]. The index of suspicion should be high among patients with connective tissue disorders presenting to the ED for evaluation of anginal equivalents. A brief bedside assessment for connective tissue risk factors performed by the ED physician can assist in determining pretest probability. Initial management is similar to acute coronary syndrome; however, fibrinolytic therapy is contraindicated, as it may cause coronary artery rupture and cardiac tamponade [1,2]. Symptomatic patients without biomarker elevation or hemodynamic instability can be conservatively managed, demonstrating 90% angiographic healing[1]. Diagnostic angiography is reserved for patients with hemodynamic instability or biomarker elevation due to possible dissection extension and coronary artery rupture. [1] S. Nepal, M. Bishop. Spontaneous Coronary Artery Dissection. StatPearls Publishing (2023) [2] S. Hayes, M. Tweet, D. Adlam, E. Kim, R. Gulati, J. Price, C. Rose. Spontaneous Coronary Artery Dissection: JACC State-of-the-Art Review. Journal of the American College of Cardiology, 76(8) (2020) pp. 961-984.

48 (Printed Poster)

Beyond the Marrow: Systemic Mastocytosis with Pleural and Pericardial Effusions

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Abstract

Introduction: Systemic mastocytosis (SM) is a rare and complex myeloproliferative neoplasm characterized by the accumulation of mast cells in various tissues, notably the bone marrow, liver, skin, and spleen. The clinical presentation and prognosis of SM are highly variable, ranging from indolent forms with normal life expectancy to aggressive variants with poor survival outcomes. Most complications are mediator-related, potentially leading to multiorgan dysfunction and anaphylaxis. This case report discusses, to our knowledge, the fifth case of SM with effusion and the first involving both pleural and pericardial effusions.

Presentation: A male in his 60s with a history of hypertension, obstructive sleep apnea, obesity, chronic kidney disease, and atrial fibrillation (on apixaban) presented to the emergency department with two months of exertional shortness of breath and orthopnea. He also reported peripheral edema, dizziness, lightheadedness, a productive morning cough, palpitations, and urinary frequency. Laboratory work was remarkable for microcytic anemia (hemoglobin 9.0 g/dL); increased absolute monocytes, blasts, and myelocytes; elevated B-type natriuretic peptide (5227 pg/mL); and worsening renal function. Imaging revealed pericardial and bilateral pleural effusions and a right infrahilar nodule. Bone marrow biopsy confirmed myelodysplastic neoplasm and systemic mastocytosis, prompting initiation of avapritinib therapy.

Discussion: SM affects approximately 1 in 10,000 to 20,000 individuals, most of whom possess the KIT D816V mutation. This leads to constitutive activation of the receptor tyrosine kinase and abnormal mast cell degranulation, resulting in a broad spectrum of inflammatory symptoms. Cardiovascular or pulmonary involvement is exceedingly rare, with only a handful of cases reported to involve effusions. Our patient, who has the KIT D816V mutation and age-related risk factors, represents the first reported case of both pleural and pericardial effusions secondary to SM. The proposed mechanism involves mast cell infiltration in the form of a pulmonary nodule, with the release of inflammatory mediators triggering fluid accumulation. His myelodysplastic syndrome may have also served as a precursor in the development of SM. This case highlights the role of avapritinib, a recently approved medication targeting the KIT D816V mutation, in effectively managing these diverse symptoms.

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Anti-NMDA Receptor Encephalitis in the Context of Ovarian Teratoma: A Complex Neuropsychiatric Presentation

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Abstract

Background: Anti-NMDA receptor encephalitis is a rare autoimmune disorder characterized by psychiatric symptoms, cognitive decline, dyskinesia, and autonomic instability. In females, it is often associated with ovarian teratomas, making timely diagnosis and treatment critical to improving outcomes.

Case Description: We present the case of a previously healthy 14-year-old female who presented due to concern of altered mental status which developed over one week. Initial symptoms included rapid speech, episodic agitation, unintelligible speech, and lethargy. Episodes featured non-directed aggression, crying, and grasping at her chest and shoulders. Despite fluctuating periods of lucidity, her agitation increased, and sleep became severely disrupted. Neurological evaluation showed disorganized behavior without focal deficits. Routine lab tests were unremarkable except for dehydration. Brain imaging was normal, but cerebrospinal fluid analysis revealed lymphocytic pleocytosis. Continuous EEG demonstrated intermittent delta slowing in the right posterior temporal region. Anti-NMDA receptor antibodies were detected. A pelvic MRI identified a 3.8 cm left ovarian teratoma with a 1.4 cm nodule containing macroscopic fat, consistent with a mature cystic teratoma. Tumor marker levels, including CA-125 and alpha-fetoprotein, were within normal limits. The patient underwent successful laparoscopic left salpingo-oophorectomy, with histopathology confirming the teratoma. Immunotherapy included high-dose methylprednisolone, intravenous immunoglobulin, plasmapheresis, and rituximab. During plasmapheresis, the patient required sedation in the intensive care unit due to agitation and risk of self-injury. Post-treatment, she exhibited waxing and waning catatonia but has showed gradual improvement with psychiatric management and tapering of sedative medications.

Conclusions: This case highlights the importance of considering anti-NMDA receptor encephalitis in adolescents with complex neuropsychiatric symptoms and altered consciousness, even without seizures. The diagnostic process was complicated by the episodic nature of symptoms and the absence of focal neurological signs. Early detection and excision of the teratoma, coupled with immunotherapy, were crucial for disease management. This report underscores the necessity for a multidisciplinary approach and illustrates the variable presentation of anti-NMDA receptor encephalitis, advocating for further research into optimizing treatment protocols.

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Parainfluenza-Associated Encephalitis in a Child: A Rare Case of Long-Term Neurological Sequelae and Sympathetic Dysregulation

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Abstract

Introduction: Post-viral encephalitis remains a rare but significant cause of pediatric morbidity, with severe cases often leading to long-term neurological deficits. Parainfluenza type 2, typically associated with upper respiratory infections, rarely manifests with central nervous system involvement. This case highlights a rare presentation of parainfluenza encephalitis complicated by sympathetic storming and prolonged neurological impairment.

Case presentation: A previously healthy 3-year-old male presented with fever and seizure-like activity and subsequently developed altered mental status, unresponsiveness, and status epilepticus. His developmental history prior to this illness was unremarkable. Family history was notable for maternal hypertension, diabetes, and anemia but no neurological conditions. Diagnostic workup confirmed parainfluenza type 2 infection. MRI revealed extensive T2/FLAIR hyperintensities across multiple brain regions, including the cerebral hemispheres, basal ganglia, thalami, and brainstem, indicative of diffuse inflammation and neuronal injury. Electroencephalogram (EEG) findings demonstrated generalized background slowing without epileptiform discharges, consistent with moderate encephalopathy. The patient's clinical course was further complicated by episodes of paroxysmal sympathetic hyperactivity characterized by tachycardia, tachypnea, hyperthermia, and agitation. Management included autonomic stabilizers (Baclofen, clonidine, and diazepam) and anticonvulsants (levetiracetam and clobazam) to prevent seizures. Nutritional support was provided through G-tube placement due to oromotor dysfunction. Intensive inpatient rehabilitation, including physical and occupational therapy, was initiated to address motor and functional impairments. While initially nonverbal and unable to ambulate, over the course of one year patient has demonstrated gradual improvements, including sporadic vocalizations, intentional movements, and increased environmental awareness. Patient continues to be managed with ongoing rehabilitation and antiepileptic medications to support recovery.

Conclusion: This case highlights the rare association between parainfluenza type 2 and severe encephalitis with significant post-infectious sequelae. Sympathetic storming in the context of post-viral encephalitis is a unique complication that should require prompt recognition and tailored management to prevent additional metabolic stress and secondary injury. The patient's gradual yet significant progress illustrates the plasticity of the pediatric brain and the potential for functional recovery despite profound initial impairment. However, the prolonged nature of his rehabilitation emphasizes the need for sustained, multidisciplinary care, including neurology and rehabilitation services. Figure 1, 2, 3, 4: MRI showing extensive bilateral hyperintense signal abnormalities.

51 (Printed Poster)

A Shocking Presentation of Male Breast Cancer in a 17-year-old

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Abstract

Introduction: Male breast cancer is rare. In 2024, it was predicted that 2,790 new cases of male breast cancer would be diagnosed. The rarity of the disease and its presentation later in life may preclude us from believing that it is important to screen for this disease. Men themselves still don't know it's a possibility or are unwilling to speak about it due to taboo. Our case of breast cancer in this 17-year-old boy shows us that male breast cancer can present at any age, which is our objective.

Case Presentation: Patient is a 17-year-old male that found a lump behind his right nipple while scratching it. The patient sought out help from his school's physicians, both of whom were unconcerned. No further testing was pursued. Seven years later, the lump didn't go away so the patient sought out another opinion. This time, the patient was referred for a sonogram and mammogram. The lump was removed and the pathology revealed stage 1 DCIS ER+ cancer of grade 1 status. Patient then underwent a mastectomy and was placed on anastrozole for 5 years. He additionally underwent four rounds of cytotoxin and taxotere. Patient is now cancer free.

Discussion: Here, we see that repeatedly, the patient's breast health was not considered unless advocated by the patient. This is concerning considering that in this case, the patient did in fact have breast cancer and while male breast cancer may only make up 1% of presenting breast cancer in the United States, it still does present, and when it does, it is imperative that we can catch it and we can only catch is if the following two parameters are met: (i) physicians regularly perform clinical breast exams on men; (ii) men in the community are educated on male breast cancer and its existence. Therefore, the goal of this project is to promote awareness regarding male breast cancer and to encourage the healthcare community to screen for it regularly in men so that it may be treated.

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52 (Printed Poster)

Postpartum endometritis due to Streptococcus dysgalactiae: a Case Report

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Abstract

Patient Presentation: A 43-year-old primigravid underwent a spontaneous vaginal delivery at 39 weeks. She was discharged the next day. Her prenatal course was complicated by anxiety, diet controlled gestational diabetes, asthma and reflux. On postpartum day 2, she developed a fever with body aches and chills and presented to the hospital. Her initial temperature was 39.4 degrees C with fundal tenderness. An initial white blood cell count and absolute neutrophil count were elevated. The patient was initially started on intravenous gentamicin and clindamycin for postpartum endometritis. Diagnosis and Treatment: Blood, urine and vaginal cultures grew Streptococcus dysgalactiae (group C or G). The patient defervesced after her initial fever and did well with supportive care, antibiotics were changed to ceftriaxone and the patient was discharged after three days. Bacterial profile: Infection with Streptococcus dysgalactiae subspecies equisimilis (SDSE) has a similar profile to Group A Streptococcus (GAS). Both can be considered as commensal but immunocompromised, young, and elderly patients are at an increased risk of infection and bacteremia. Virulence factors of this pathogen include fibronectin-binding protein, M protein, and bacteriocin-like inhibitory substance. Epidemiology: Recent studies have noted an increased rate of incidence of SDSE infection worldwide particularly in Europe. A majority of the documented cases within the United States manifest as skin and soft tissue infections in high-risk patients and are likely to have originated from colonization of the nasopharynx. However, a recent study in Finland documented multiple cases of postpartum endometritis caused by SDSE. This study found that pregnant women colonized by SDSE had an increased incidence of postpartum endometritis than those colonized with Streptococcus pyogenes. An additional case documented meningitis in an immunocompetent pregnant woman due to SDSE. Our literature search showed no other cases of maternal infection with SDSE.

Conclusion: Group A streptococcus is a rare but potentially serious cause of postpartum endometritis, and has many similarities to SDSE infection. With the increasing prevalence of SDSE, clinicians should be aware of this bacterial strain when treating endometritis within North America and future research should define the role of this pathogen in obstetrical infections.

53 (Printed Poster)

Male Breast Cancer: A Rare but Deadly Cancer

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Abstract

Introduction: Male breast cancer makes up less than 1% of the breast cancers in the United States. While the incidence is significantly lower than female breast cancer, the survival rates vary, with male breast cancer exhibiting an 83% 5-year survival rate and female breast cancer exhibiting a 91% 5-year survival rate. Our objective is to show that delayed detection may contribute to this discrepancy.

Case Presentation: Patient was a 66-year-old male that presented for routine lab work to monitor his diabetes. Patient had right arm and shoulder pain for months, though this was not reported to the physician. Lab work revealed an elevated alkaline phosphatase. Ultrasound revealed 6 lesions in the liver. Patient then underwent an MRI, PET/CT scan, bone survey, and biopsies of the breast and liver. Pathology revealed stage 4 metastatic breast cancer of grade 1 status with ER/HER2+ PR- tumor markers. The cancer had metastasized to the liver, lungs, adrenal glands, lymph nodes, bones, brain, and brainstem. Patient was treated with Perjeta, Herceptin, and Taxotere. In addition to chemotherapy, he was treated with radiation for the mets to his brain. Patient had a family history of a daughter with breast cancer. The patient passed 5 months after diagnosis.

Discussion: This patient, like many others, was not aware of the existence of male breast cancer. When he met with an oncologist, he didn't know to look for lumps in his breast even though he'd been symptomatic for months– the right shoulder pain, which he had thought was just an incidental muscle strain that failed to heal and significant cognitive changes. Grade 1 cancers are the slowest growing, and for this cancer to have metastasized shows us that this cancer was growing in this patient for a very long time and may have progressed differently if caught earlier. Therefore, it is imperative that we screen for breast cancer with clinical breast exams in male patients as well as educating the community.

Acknowledgements: We thank Patricia Washburn for allowing us to share her husband's story.

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54 (Printed Poster)

Beyond the Antidepressant – A Case Report of Bupropion Toxicity

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Abstract

Introduction: The deprescribing movement is gaining recognition in Geriatrics and expanding into other fields of medicine. However, polypharmacy remains widespread, with a global prevalence of 37% (1), especially among older patients with multiple chronic conditions (2). We present a patient who developed a constellation of side effects from a common drug that went undetected for almost a year despite numerous provider visits.

Case Description: A 78-year-old woman with a complicated medical history was referred to a Geriatrics clinic for intermittent episodes of neuro-psych symptoms including incoordination, word-finding difficulties, disorientation, and hallucinations for more than nine months. Despite two hospitalizations, neurology consults, multiple primary care visits, and with extensive work ups, no causes could be found. She was finally diagnosed with somatoform conversion reaction due to symptom variability without apparent explanation. Her medications at her first geriatrics visit included: aspirin, rosuvastatin, ezetimibe, bupropion, escitalopram, levothyroxine, and metoprolol succinate. Physical exam and labs were unremarkable except for rheumatologic hand changes and subtle cognitive impairment. She was on a high dose of bupropion that had been increased to 450 mg shortly before symptom onset and so was reduced back to 300 mg. Symptoms soon resolved, regaining her cognitive function, and her quality of life improved significantly. She was tapered off without incident.

Conclusion: All the mentioned symptoms have been individually reported in patients on bupropion, but this patient was unusual in presenting a combination of side effects. Studies show bupropion toxicity is more common in women and at higher dosage (3). Our patient was taking bupropion in the recommended range, which may have led multiple providers to overlook potential toxicity. Her polypharmacy also made it more difficult to pinpoint the culprit. Providers should carefully review medications and assess side both risks and benefits to optimize care for their patients.

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55 (Printed Poster)

Cefdinir-Induced Red Stools in a 7-Month-Old Male

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Abstract

Introduction: This case report presents a 7-month-old male who presented to the emergency room with red-colored stools, initially raising concerns for serious gastrointestinal issues. While the initial workup for red-colored stools often considers common causes like gastroenteritis, intussusception, milk protein allergy, necrotizing enterocolitis, or anatomical abnormalities, rarer etiologies may require a more comprehensive history and a range of diagnostic tools from laboratory tests to upper and/or lower endoscopies.

Case Presentation: A 7-month-old male with a history of milk protein allergy and eczema presented to the emergency department with multiple episodes of red-colored stools. The patient had been diagnosed with an ear infection the previous day and was prescribed cefdinir. The patient had previously experienced bloody stools due to his milk protein allergy and was switched to a hydrolyzed formula months earlier. He maintained a good appetite, consuming five to six bottles daily, with no signs of dehydration on physical examination. His vital signs were normal. The abdominal examination revealed a non-tender, non-distended abdomen. Laboratory results showed an elevated white blood cell count of 17.9, hemoglobin of 11.2, and potassium of 5.7, with a notably negative stool heme-occult test. A literature review during the clinical evaluation mentioned potential red discoloration of stools due to cefdinir interacting with iron supplementation. The patient's hydrolyzed formula contained 1.8 mg of iron per serving. After consultation with the pediatric hospitalist, pediatric surgery service, and emergency room pharmacy, it was decided to discontinue cefdinir, administer a single intramuscular injection of ceftriaxone, and discharge the patient with strict return precautions. The patient's parents reported complete resolution of the red stool discoloration at his follow-up visit the following day.

Discussion: Cefdinir is commonly used in pediatric patients for the treatment of a broad range of infectious pathologies. Case reports have noted instances of "bloody diarrhea" associated with cefdinir use, with fewer than ten cases documented in the current literature. To avoid unnecessary diagnostics and treatments, recognizing Cefdinir as a potential cause of red stool discoloration is crucial, especially in patients with recent cefdinir use and ongoing iron supplementation.

56 (Printed Poster)

Integrative Care for Hereditary Multiple Exostoses: Addressing Complications and Enhancing Quality of Life

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Abstract

Background: Hereditary Multiple Exostoses (HME) is a rare genetic condition defined by the growth of multiple osteochondromas affecting many skeletal elements. Although these tumors are considered benign, their location may predispose to significant pathology. Symptoms generally manifest in early childhood, and numerous complications are possible, including pain, reduced mobility, fractures, limb deformities, osteoarthritis, vascular compromise, impingement, and neurologic sequelae. Surgical intervention is common, and quality of life is often significantly impacted.

Case Description: This report evaluates a complex case of HME diagnosed at an early age in a patient who presented with palpable exostoses at the age of 6, attributable to her father's history of HME. She developed severe osteochondromas of her lower extremities, and later developed osteochondromas of her ribs and upper extremities. She required multiple orthopedic interventions, including surgical excision of painful or functionally limiting osteochondromas and corrective osteotomies, with varied postoperative outcomes. Over several years, the patient developed numerous complications, including genu valgum, limb varus and valgus deformities, and scoliosis, among others. Polyneuropathy and pain limited the patient from participating in sports and hobbies, and further impacted her ability to hold writing utensils and fully engage with her academic responsibilities.

Conclusions: This case illustrates the complexity and ongoing challenges in managing HME, emphasizing the importance of a coordinated care plan tailored to the patient's evolving needs—from initial complaints of skeletal pain and deformity to managing various post-surgical complications such as infections, nerve compression, and wound healing. Collaboration between various specialties, including, but not limited to, pediatric orthopedic surgery, neurology, and diagnostic radiology, is imperative for quality continuity of care. The patient described in this report offers a unique teaching opportunity to consider local and systemic effects of this disease, both from a biomedical and psychosocial viewpoint. Understanding how this disease could manifest clinically and impact quality of life through the review of similar cases, including patient experiences, is necessary for the delivery of comprehensive care to current and future patients diagnosed with this disease.

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Beyond Recovery: Recurrent Dilated Cardiomyopathy After Prolonged Remission in an Adolescent with Resolved Infantile Myocarditis

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Abstract

Introduction: Dilated cardiomyopathy (DCM) in pediatric populations is often idiopathic or secondary to myocarditis, genetic mutations, or systemic illnesses. Most pediatric patients recover with treatment, though some experience residual structural or functional abnormalities. However, recurrence of DCM after a prolonged period of normal cardiac function is extremely rare. This report presents a unique case of recurrent DCM in an adolescent with a history of early childhood cardiomyopathy.

Case Presentation: A 15-year-old female presented with progressive exertional dyspnea and cough, culminating in acute decompensated heart failure requiring ICU admission. Echocardiography demonstrated left ventricular dilation with an ejection fraction (EF) of approximately 30%. Cardiac MRI revealed dilated cardiomyopathy with mid-wall late gadolinium enhancement (LGE), suggestive of myocardial fibrosis. Notably, the patient had a history of cardiomyopathy during infancy, presumed secondary to myocarditis, with normalized cardiac function by early childhood. During hospitalization, she exhibited frequent multifocal premature ventricular contractions (PVCs) and non-sustained ventricular tachycardia (NSVT). She was treated with a milrinone infusion and guideline-directed medical therapy (GDMT), including sacubitril-valsartan, spironolactone, dapagliflozin, and beta-blockers. Her condition improved, with echocardiography showing an EF increase to 50% and improved global longitudinal strain. Despite symptomatic improvement, she continued to experience multifocal PVCs without sustained arrhythmia. Following discharge, electrophysiology evaluation did not recommend an implantable cardioverter-defibrillator (ICD) due to the absence of sustained VT or high-risk features. Ongoing management is focused on optimizing GDMT and monitoring arrhythmias.

Discussion: This case highlights the complexity of recurrent DCM after prolonged remission and the potential role of myocardial fibrosis in recurrence. LGE findings support the hypothesis of persistent structural changes despite clinical recovery. The presence of multifocal ventricular ectopy and NSVT underscores the need for vigilant monitoring, as arrhythmic risk stratification remains a challenge. This case emphasizes the importance of comprehensive long-term follow-up, the use of advanced imaging modalities for prognostic assessment. The literature on recurrent dilated cardiomyopathy (DCM) following remission remains limited and insufficient. Further research is needed to understand the mechanisms behind recurrent pediatric DCM and optimize management strategies to improve outcomes.

58 (Printed Poster)

Delayed Extrusion of Hydroxyapatite Cement Orbital Floor Implant: A Rare Case Report of Augmentation Failure

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Sudden Death of a Young Man with Seizures and Prior Brain Tumor Resection

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Abstract

Introduction: We report the sudden death of a young man with a history of seizures due to a brain tumor that was reported to have been previously resected.

Case Presentation: A 35-year-old man with a history of seizures due to a brain tumor, status-post resection, was found collapsed at home and was pronounced dead at the scene. A full autopsy showed evidence of a prior craniectomy and an intact ventriculoperitoneal shunt. Examination of the heart revealed cardiomegaly with left ventricular hypertrophy and coronary artery atherosclerosis, with a firm thrombus within the left anterior descending coronary artery. Microscopic examination demonstrated an acute-on-chronic myocardial infarct. Neuropathologic examination revealed a gray-tan cystic mass, 3 x 3 x 2 centimeters, with gritty cut surfaces, abutting the anterior commissure and left caudate nucleus, within the third ventricle and extending into the left lateral ventricle (Figure 1). Microscopic examination showed a multicystic tumor composed of nests, lobules, and cords of squamous cells with peripheral palisading columnar epithelium, keratin, pigment-laden macrophages, lymphocytic infiltrates, giant cells, and calcifications, consistent with recurrent/residual adamantinomatous craniopharyngioma. Cause of death was certified as coronary artery thrombus with myocardial infarct due to atherosclerotic cardiovascular disease, with hypertensive cardiovascular disease and recurrent/residual adamantinomatous craniopharyngioma as contributory factors.

Discussion: Craniopharyngiomas are rare, low-grade tumors that develop along the craniopharyngeal duct. There are two types: adamantinomatous craniopharyngioma and papillary craniopharyngioma. Adamantinomatous craniopharyngiomas are characterized by epithelial origin, β-catenin mutations, cystic structure, and calcification. Their histological appearance includes palisading epithelium, anucleated ghost cells, and stellate cells. While benign, their location near crucial structures may impact quality of life through endocrine changes, visual disturbances, and increased intracranial pressure. Proximity to these structures also means surgically removing the entire tumor is not always possible, so treatment often involves radiation or chemotherapy. This case highlights the importance of a full autopsy in individuals with a history of seizures to rule-out concomitant pathology and to accurately certify deaths. Figure 1. Cystic, gritty mass within third ventricle.

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Precision in Action: Using Patient-Specific Cutting Guides for En-Bloc Resection of Large Sacral Chordomas: Case Report

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Abstract

Background and Importance: Chordomas are rare malignant tumors of notochordal origin, with sacral chordomas being the most common. En-bloc resection with negative margins is the preferred treatment for long-term disease control. However, the technical complexity of en-bloc sacrectomy cannot be overstated. This case instruction highlights the use of a patient-specific 3D-printed cutting guide to assist in the precise en-bloc resection of a large sacral chordoma.

Clinical Presentation: A 51-year-old male with a history of refractory constipation and lower back pain was diagnosed with a large sacral chordoma. Preoperative planning included the creation of a patient-specific 3D-printed cutting guide used to make precise bony cuts while preserving critical structures. Complete en-bloc resection with negative margins was achieved. The patient recovered well postoperatively; follow-up imaging at 13 months showed no tumor recurrence. At 25 months, however, a small recurrence was noted in the right piriformis/gluteal muscle.

Conclusion: En-bloc resection with negative margins is considered the gold standard for achieving long-term tumor control. Still, the technical difficulty of performing a sacrectomy requires a multidisciplinary approach and advanced surgical tools.3-5The use of a 3D-printed cutting guide is a novel technology that can be used to facilitate en-bloc resection of bony tumors. Use of the cutting guide simplified the technical difficulty involved with more traditional methods for sacrectomy.

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A case of compressive spinal brown tumor without neurologic compromise

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Abstract

Introduction: Brown tumors are benign osteolytic bone lesions due to excess production of parathyroid hormone from uncontrolled hyperparathyroidism. They are found in any part of the skeleton but are frequently encountered in the mandible, pelvis, ribs or shafts of long bones. Spinal involvement is rare. In most cases, management focuses on treating underlying hyperparathyroidism with parathyroidectomy, which typically resolves the bony tumor. However, brown tumor of the spinal column may require emergent surgical decompression and stabilization to prevent permanent neurological damage. There are only a handful of case reports of spinal brown tumors and most present clinically with neurologic deterioration. We describe a unique case of a patient with biopsy-proven brown tumors who presented to the emergency room with acute onset of low back pain without neurologic symptoms.

Case Presentation: The patient is a 54-year-old female with history of end-stage renal disease on hemodialysis complicated by biopsy-proven brown tumors who presented with intractable low back pain. She had no reported weakness, numbness or paresthesia and was able to ambulate without difficulty. MRI demonstrated a large expansile mass involving the posterior elements of T12, L1 and L2 with intraspinal extension resulting in severe spinal cord compression. Due to concern for impending neurologic compromise, she subsequently underwent decompressive laminectomy, tumor debulking, and posterior spinal fusion from T11-L4. She had her scheduled parathyroidectomy a few weeks later.

Discussion: Spinal brown tumors are rare; however, when present, they often manifest with neurologic symptomatology. Despite extensive lytic destruction and impressive spinal canal stenosis on advanced imaging, the described patient had minimal neurological symptoms. This may be cause for concern as it suggests a population of patients with hyperparathyroidism at risk of impending spinal compromise without preceding presentation of neurologic symptoms. This case also begs the question of treatment sequencing. Parathyroidectomy typically results in shrinkage or resolution of brown tumors. However, when spinal involvement is so extensive, this could potentially lead to gross destabilization of the spine accelerating neurologic collapse, thus indicating spinal management first.

62 (Printed Poster)

DRESS Syndrome Devoid of Peripheral Eosinophilia: The Importance of a Thorough Medication Review

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Abstract

Introduction: Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) syndrome is a rare, potentially life-threatening, drug-induced hypersensitivity reaction that typically presents 2-8 weeks after exposure to an inciting medication. Patients present heterogeneously, although a diffuse morbilliform rash, fever, eosinophilia, and visceral involvement are common. We present a unique pediatric case of DRESS syndrome without peripheral eosinophilia, likely secondary to exogenous steroid suppression.

Clinical Presentation: A 12-year-old otherwise healthy male was admitted with diffuse morbilliform rash, sore throat, purulent eye discharge, and persistent fever. 11 days prior, a blanchable erythematous rash developed and was treated with topical triamcinolone and oral prednisone. Shortly after, the patient developed a second rash, for which he was treated with additional prednisone, TMP-SMX, and mupirocin. This regimen improved the second rash. However, a third morbilliform rash indicative of DRESS syndrome developed. CBC did not demonstrate peripheral eosinophilia, though transaminitis developed on day 2 of admission. Screening for commonly associated pathogens was negative.

Discussion: Criteria for DRESS syndrome is often met gradually and preceding steroid use may mask peripheral eosinophilia. Though eosinophilia is not required to diagnose DRESS syndrome, the lack of this characteristic finding should prompt a thorough exposure history.

Conclusion: The patient presented with three unique rashes and was prescribed multiple medications, including oral corticosteroids, before the diagnosis of DRESS syndrome. This case underscores the importance of a thorough medication history in combination with a broad differential in the diagnosis of rash and highlights the value of understanding polypharmacy and medical reconciliation.

63 (Printed Poster)

Superficial Radial Nerve Neuroma After First Extensor Compartment Release: A Case Report

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Abstract

Introduction: A neuroma is a benign tumor of nerve tissue that can form due to repetitive trauma to the nerve. It can lead to pain, hypersensitivity, and functional impairment in the affected region. Surgical intervention may be required to alleviate symptoms and restore function if conservative management is not effective. This report describes the identification and management of a symptomatic superficial radial nerve neuroma following a prior first extensor compartment release.

Case Presentation: A 49-year-old female presented with pain, hypersensitivity, and altered sensation in her left lateral forearm, wrist, and hand after a left thumb trigger-finger release and first extensor compartment release. Physical exam revealed hypersensitivity along the radial sensory distribution, tenderness over the first extensor compartment, and instability with wrist motion. Ultrasound confirmed entrapment of the superficial radial nerve at the first extensor compartment consistent with a radial nerve neuroma. Initial conservative treatment included occupational therapy, a Comfort Cool brace, and a custom thumb spica brace. After 10 weeks without improvement, the patient elected to proceed with surgical intervention. Intraoperatively, a 1.5 cm neuroma was excised. The remaining nerve ends were then secured using a nerve conduit. A flap from the extensor retinaculum was used to reconstruct the first extensor compartment for prevention of tendon subluxation and neuroma recurrence. Immediately postoperatively, the patient experienced hypersensitivity and wrist stiffness. After three months of physical therapy, she reported significant pain relief, improved wrist range of motion, and overall satisfaction with her outcome, despite mild altered sensation near the surgical site.

Discussion: Neuromas of the superficial radial nerve can arise from iatrogenic injury during dorsal wrist exposure. Both chronic irritation from subluxation of the extensor tendons and direct irritation from previous procedures likely played a role in the neuroma formation. Surgical excision, nerve conduit repair, and compartment reconstruction can effectively alleviate nerve pain and paresthesia. Reconstruction of the extensor compartment also reduces the likelihood of recurrence. This case highlights the risk of neuroma formation following first extensor compartment release and discusses its diagnosis and management of symptomatic cases.

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The Hidden Tumor: Choroidal Melanoma Mistaken for Retinal Detachment

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Abstract

Introduction: Choroidal melanoma is the most common primary intraocular malignancy in adults, with an incidence of 5–6 cases per million annually in the United States. This malignancy arises from melanocytes within the uveal tract, most commonly affecting the choroid. Choroidal melanoma is often associated with secondary complications such as exudative retinal detachment (ERD), which can contribute to poor visual prognosis. This report describes a unique case of choroidal melanoma that was initially misdiagnosed and treated as retinal detachment. The condition was further complicated by the continued growth of the choroidal melanoma, which displaced the emulsified silicone oil anteriorly, resulting in pupillary block.

Case Presentation: A 60-year-old male with a history of vitrectomy and silicone oil tamponade for presumed retinal detachment was referred to our retina service for decreased vision and ocular pain in the left eye. His intraocular pressure was 32 mmHg, and examination revealed reverse hypopyon and 360-degree posterior synechiae, with no view of the posterior segment. Posterior synechiolysis and removal of emulsified silicone oil were performed, revealing a large choroidal mass with adjacent ERD. Systemic workup for metastasis was negative, and enucleation of the left eye was carried out. Histopathological analysis confirmed the diagnosis of choroidal melanoma, characterized by densely pigmented spindle cells and fibrovascular membranes with pigment-laden macrophages, consistent with pigmented perisilicone vitreoretinopathy.

Discussion: Choroidal melanoma typically presents with blurred vision, photopsia, floaters, and occasionally ocular pain. ERD is a common complication (75% of cases) and can significantly impair vision. This condition develops when tumor thickness exceeds 4 mm, causing the accumulation of subretinal fluid (SRF) due to disruption of the retinal pigment epithelium which complicates diagnosis and delays treatment, as it can conceal the tumor beneath the retina. Misdiagnosis of uveal melanoma is rare (0.48%), making this case highly unusual. Ultrasound and fluorescein angiography are essential in distinguishing choroidal melanoma from other conditions such as retinal detachment. This case underscores the importance of considering the possibility of choroidal melanoma in patients with ERD, especially when emulsified silicone oil can obscure imaging modalities. Timely diagnosis and intervention are critical to improving visual outcomes.

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Pulmonary Alveolar Microlithiasis: A Case Report

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Abstract

Introduction: Pulmonary alveolar microlithiasis is a rare autosomal recessive disorder characterized by the intra-alveolar accumulation of calcium phosphate microliths due to mutations in the SLC34A2 gene, affecting the sodium-phosphate IIb cotransporter protein on type II alveolar cells. We report a case of a 34-year-old male patient who presented with chest pain and shortness of breath, for whom this diagnosis was incidentally established using a chest radiograph and CT scan. Pulmonary alveolar microlithiasis is typically diagnosed on imaging performed for unrelated clinical presentations, as was the case for this patient whose primary complaints were attributed to underlying cardiopulmonary comorbidities. While there are no definitive treatments, supportive care and close monitoring are crucial for disease management.

Case Presentation: A 34-year-old man with a history of heart failure, coronary artery disease, diabetes, and schizophrenia presented with chest pain, shortness of breath, and leg swelling. He was afebrile with a blood pressure of 148/87 mm Hg, heart rate of 113 beats/min, respiratory rate of 20 breaths/min, and oxygen saturation of 98%. Exam findings included nonspecific ST-T wave changes, diminished breath sounds, a soft S1, fixed S2, and 2+ pitting edema in the lower extremities. A chest radiograph signified prominent bronchovascular markings with heterogeneous airspace disease and bilateral multiple punctate calcifications. A CT scan of the thorax revealed multiple clustered calcified nodules in the upper and lower lobes. These imaging findings led to the incidental diagnosis of pulmonary alveolar microlithiasis, to be managed with supportive care focused on symptom control and monitoring for respiratory complications.

Discussion: In this patient, the presence of pathognomonic imaging signs including a “sandstorm lung”—denoting diffuse symmetrical sand-like microcalcifications—led to the diagnosis of pulmonary alveolar microlithiasis. This disease has a variable presentation and is often asymptomatic in early stages. Patients can present with dyspnea and cough, potentially progressing to respiratory failure. It should be considered in patients with characteristic calcifications on imaging, and its prognosis necessitates early diagnosis and regular monitoring. This case highlights the importance of recognizing characteristic imaging findings of pulmonary alveolar microlithiasis, which can lead to diagnosis even in asymptomatic or minimally symptomatic patients.

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Herniation of Cecum, Ascending Colon, and Adhesive Macroappendix through the Foramen of Winslow: A Case Report

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Abstract

Foramen of Winslow hernias are rare, accounting for 0.08% of all hernias and <200 reported cases described in the literature. Risk factors include anatomical variants which permit migration of bowel into the lesser peritoneal cavity or hypermobile bowel segments, with an increasing population of patients having history of gastric bypass. While foramen of Winslow hernias typically contain only small bowel, up to one-third of cases contain cecum, ascending colon, gallbladder, transverse colon, or omentum. They pose a challenging clinical diagnosis as patients typically present with acute-onset nonspecific right-sided abdominal pain or obstructive symptoms. With accessible contrast-enhanced CT imaging, mortality rates of foramen of Winslow hernias have decreased from approximately 50% to 5% in the past decade. We present a 36-year-old female with one day of constant severe epigastric pain radiating to the back and right hemiabdomen, with associated nausea, chills, and chest pain but no obstructive symptoms. Notably, this same pain had occurred twice before in the prior year with spontaneous resolution. Physical exam was unremarkable and initial blood tests were within normal range. Abdominal CT demonstrated multiple gas-filled loops in the lesser peritoneal cavity coursing posterior to the hepatoduodenal ligament and lateral displacement of stomach. After unsuccessful laparoscopic approach and conversion to laparotomy, it was found that the entire cecum, ascending colon, and an extremely large 13.5 cm appendix were herniated posterior to the hepatoduodenal ligament without strangulation or necrosis. These were manually reduced with lysis of adhesions anchoring the appendix into the cavity. The ascending colon was intraperitoneal and there was extremely redundant right colon, permitting excessive bowel mobility. Right hemicolectomy was performed to prevent future volvulus or recurrent internal hernia. There were no postoperative complications and no recurrences have occurred to date. As demonstrated by this patient, patients with foramen of Winslow hernia have unremarkable physical exam, vital signs, and laboratory tests, contributing to diagnostic uncertainty and delayed intervention. It is important to maintain a broad differential diagnosis including internal hernia for a patient presenting with acute abdominal pain and an awareness of radiological findings to promptly identify foramen of Winslow and other internal herniations.

67 (Printed Poster)

Itching for an Answer: The First Known Case of Epidermolysis Bullosa Acquista (EBA) in the Setting of ITCH Deficiency

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Abstract

Introduction: ITCH deficiency, a rare autosomal recessive disorder, presents as a syndrome of short stature, developmental delay, hypotonia, syndromic facial features, and can include chronic lung disease, recurrent infections, and several autoimmune diseases, including hypothyroidism, hepatitis, enteropathy, and diabetes mellitus. Only 12 cases have been reported, caused by mutations of ITCH (MIM 606409) on 20q11, leading to ITCH E3 ubiquitin ligase deficiency. E3 ubiquitin ligases regulate all protein metabolism by tagging proteins for degradation by proteasomes, and their dysfunction may allow survival of autoreactive T-cells, leading to autoimmunity. Treatment of ITCH deficiency usually requires significant immunosuppression and infection control; one successful stem cell transplant has been reported.

Clinical Presentation: We report a 13-year-old Amish female with known ITCH deficiency who presented with a 2-month blistering rash covering 40% of her body, including buccal mucosa. Home treatment with antibiotics, steroids, and herbal remedies failed, prompting hospital care. On presentation she was hypertensive, tachypneic, and tachycardic, and admitted for ongoing management of fluids, infection, bullous skin disease, pain control, and further diagnostic workup. Her hospital course required complex intensive care and wound management given the extent of skin lesions. EBA was confirmed by positive indirect cutaneous immunofluorescence and positivity of anti-collagen VII antibodies on day 14. Treatment of EBA included corticosteroids, cyclosporine, dapsone, colchicine, and IVIG. Dapsone was limited by toxicity causing methemoglobinemia, and ongoing diarrhea hindered perineal skin healing, though remainder of skin is healed and EBA appears controlled. Several complications were encountered during hospitalization including COVID infection, cardiomyopathy, Haemophilus influenza pneumonia, Candida parapsilosis bacteremia, Escherichia coli UTI, septic shock, fecal and urinary incontinence, electrolyte imbalances, feeding intolerance, and new-onset seizures. She remains in PICU for management of these complications, awaiting healing of perineal skin, management of diarrhea (suspected autoimmune enteropathy), procedural anxiety around dressing changes, and coordination of care.

Discussion: EBA is a rare autoimmune disorder with IgG autoantibodies against type VII collagen at the dermal-epidermal junction and is often refractory to immunosuppressive therapy even in patients without ITCH deficiency. This case highlights the diagnostic and treatment challenges in ITCH deficiency-related autoimmunity, which often require significant medical intervention.

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Early Intervention of Isolated Congenitally Corrected Transposition of Great Vessels Aided by Prenatal Diagnosis

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Abstract

Introduction: Congenitally corrected transposition of the great vessels (ccTGV) is a rare congenital heart defect characterized by atrioventricular and ventriculoarterial discordance. The right atrium connects to the left ventricle, which directs blood to the pulmonary artery, while the left atrium connects to the right ventricle, pumping blood into the aorta. Despite this discordance, systemic and pulmonary circulations remain in series, theoretically allowing adequate oxygenation at birth. CcTGV seldom occurs without other cardiac lesions and isolated cases are challenging to detect prenatally. Without prenatal diagnosis, ccTGV can lead to heart failure within the first year depending on associated defects. Rarely do patients remain asymptomatic into adulthood.

Clinical Presentation: A 27-year-old primigravida woman presented for a routine anatomy scan at 20w1, and initial cardiac evaluation of cardiac outflow tracks did not appear to cross, suggesting a transposition of great vessels. Fetal echocardiogram at the gestational age of 23w1 was also suggestive of ccTGV. The pregnancy was complicated by maternal cannabis use, anxiety and depression treated with fluoxetine. The patient was born at 35w3 via cesarean section due to maternal HELLP Syndrome, with Apgar scores of 5 and 9 at 1 and 5 minutes, respectively. Following resuscitation with positive pressure ventilation, the patient maintained expected oxygen saturation on room air, with no cardiac murmur or hemodynamic instability. Echocardiogram after 24 hours of life confirmed ccTGV with trivial insufficiency of left-sided tricuspid valve. The patient underwent pulmonary artery banding at 16 days, had an uneventful postoperative course, and was discharged at 24 days of age.

Discussion: CcTGV is a rare congenital cardiac anomaly, especially when presenting in isolation. Undiagnosed ccTGV can lead to heart failure, arrhythmias, and eventually death. Pulmonary artery banding minimizes the morphologic left ventricle atrophy and optimizes cardiac function for a future double-switch operation. Banding also decreases pulmonary blood flow when associated with large ventricular septal defects thereby decreasing symptoms of heart failure. Other surgeries may be necessary depending on the associated defects and comorbidities. This case highlights the importance of routine anatomic ultrasounds in every pregnancy, as well as fetal echocardiogram when a cardiac anomaly is suspected.

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Unfinished Care: A Rare CNS Teratoma Case with Post-Therapy Complexities

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Abstract

Introduction: Central nervous system (CNS) teratomas are rare, accounting for less than 0.6% of all brain tumors. These tumors, derived from embryonic germ cells, most often occur in the pineal region of the brain and may present therapeutic complications. This report highlights a unique case of a white male in his early forties with a history of "brain cancer", status post-surgery at around ten years of age, who was found deceased in his bathtub. He had no follow-up care after 18 years of age, emphasizing the consequences of inadequate long-term medical care.

Case Presentation: The decedent was a white male in his early forties with a history of a malignant pineal germ cell tumor diagnosed in childhood, with recurrence around age ten. Following bitemporal craniotomy and ventriculoperitoneal shunt placement, medical follow-up ceased at age 18. He subsequently led an independent life, operating a healthcare office before transitioning to other employment. When the decedent last spoke to his parents, he complained of a severe headache. He was subsequently found deceased in his bathtub. An autopsy revealed three CNS lesions: two dural-based tumors and a pineal region mass. The dural tumors were histologically consistent with post-therapeutic meningiomas. The pineal mass was calcified and cystic and contained keratinous debris, cholesterol clefts, and scattered bone with hematopoietic elements, consistent with a teratoma.

Discussion: This case underscores the importance of routine follow-up to monitor for post-therapy recurrence and complications. The decedent's meningiomas are likely due to prior surgical intervention, a recognized but underreported outcome in long-term survivors of CNS embryonic tumors. The failure of the decedent to transition to adult oncological care highlights a critical gap in survivorship management. This case also highlights the complex diagnosis of CNS teratomas with evident therapy-induced lesions and the challenges in clinically correlating symptoms in the absence of routine follow-up. This report also contributes to the understanding of long-term outcomes of CNS teratomas and emphasizes the need for structured follow-up care to maximize patient outcomes and mitigate late complications.

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Evaluating Presenting Curve Magnitude of Adolescent Idiopathic Scoliosis During the COVID-19 Pandemic

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Abstract

Introduction: In Adolescent Idiopathic Scoliosis (AIS), larger curvatures are associated with increased progression and need for surgical intervention. Bracing for moderate curvatures can prevent progression.1 USPSTF guidelines report insufficient evidence for recommendation of regular scoliosis screenings2. Given reduced access to healthcare during the COVID-19 pandemic, evaluating scoliosis presentation around this time may grant further insight into screening utility. Our objective is to compare presenting AIS curve magnitude before, during, and after pandemic-related restrictions. We predict that patients who presented during and after COVID-19 will have a greater average curve magnitude (ACM) compared to patients who presented before.

Methods: A retrospective chart review was conducted for patients with a diagnosis of AIS who met inclusion criteria. Data collected included: date of patients first scoliosis visit, curve magnitude at presentation, BMI, sex, race, and social vulnerability index (SVI) parameters (Housing Type, Socioeconomic Status, and Overall). Patients were categorized by date of presentation into Pre-COVID (3/01/2018 – 2/28/2020), During-COVID (3/01/2020 – 2/28/2022), and Post-COVID (3/01/2022 – 2/28/2024). Results 319 patients were included (72.3% female, 27.3% male), 105 (33%) Pre-COVID, 88 (28%) During COVID, and 126 (40%) Post-COVID. The ACM for Pre-COVID, During-COVID, and Post-COVID were 24.5̊, 22.7̊, and 21.9̊, respectively (p=0.33). ACM and BMI demonstrated a statistically significant positive relationship for the overall timeframe (p=0.02) and Pre-COVID group (p=0.02). Overall SVI (poverall=0.01, pPre-COVID=0.007), SVI Housing Type (poverall=0.0003, pPre-COVID=0.003, pDuring-COVID=0.04), and Socioeconomic Status (poverall=0.02, pPre-Covid=0.02) also showed a statistically significant positive relationship with ACM. Patients presenting with ≥50̊ curves had higher SVI overall (p=0.04) and SVI Housing Type (p=0.002).

Discussion: The significance between ACM and BMI is a previously well-established relationship3. The relationship between SVI parameters and ACM for the overall timeframe is likely explained by increasing SVI indicating greater barriers to care. Access became more difficult across SVI during the pandemic. Governmental assistance during COVID may also explain the lack of a significant relationship between certain SVI parameters and ACM in the During-Covid and Post-Covid groups.

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Medical Students Feel Failure Jeopardizes Future

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Abstract

PURPOSE: To date, there are no studies quantifying medical students' fear of failure (FoF) in the United States, nor how FoF may differ between lived experiences. Understanding students' mentality regarding learning and failure proves paramount to improving medical education; attitudes towards failure affect a student's self-efficacy, future performance and feelings of imposter syndrome. With the high stakes medical students face in pre-clinical examinations, instructors' abilities to understand their students' fears could enhance student-instructor relationships.

METHODS: We utilized the validated Performance Failure Appraisal Inventory (PFAI) contains control data from higher education students (n=440) assessing FoF quantitatively from -2 to 2. The PFAI breaks down FoF into five categories: (a) fear of experiencing shame and embarrassment (FSE), (b) fear of devaluing one's self-esteem (FDSE), (c) fear of having an uncertain future (FUF), (d) fear of important others losing interest (FIOLI), and (e) fear of upsetting important others (FUIO). WMed's corresponding data was collected through an anonymous, de-identified survey sent to the MS1 and MS2 class before STEP 1 examination.

RESULTS: Of the 68 responses received, there was a significant difference between students surveyed and the control group regarding fear of an uncertain future ($p < .05$). All other categories were not statistically significant. Modifiers such as a race, first-generation status, and previous exam failure did not produce any significant differences, although some categories lacked normal distribution.

CONCLUSION: Medical students are traditionally known for being more afraid of failing than other higher education students, however this study proves otherwise. As medical education shifts to pass/fail curriculum, considering attitudes surrounding failure and failure's impact on learning ability increases in importance. If students believe failure puts their future in jeopardy, will they be motivated to work hard, or too terrified to face exams? Moreover, we must examine the work we do as educators to give or take away fear's power.

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Senior Surgery Residents Assessment of Junior Residents on ACGME Milestones

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Abstract

INTRODUCTION: Residents are rigorously evaluated for readiness to practice in unsupervised environment, using competency-based developmental outcomes (Milestones) and discussed by a semiannual ACGME-mandated clinical competency committee (CCC). Self-assessment (SE) using Milestones enables residents to critically evaluate their abilities. The study compares residents' milestones as graded by self, CCC, and Chief surgery residents (CRs).

METHODS: We retrospectively analyzed Milestones; self-reported, CCC-reported, and those completed by CRs, over 5 years (2019-2024). Milestones prepared for CCC report included the average scores of many evaluations by faculty for each resident over 6 months on the six Core Competencies (Patient Care, Medical Knowledge, Professionalism, Interpersonal and Communication Skills, Practice-based Learning and Improvement, and Systems-based Practice). CRs independently provided separate milestone evaluations for residents (PGY1-PGY4). Each resident completed a self-assessment, and the scores (CCC, SE, CR) are discussed with residents in PD meetings. We used ANOVA with post hoc analysis to evaluate differences between groups. We used intraclass correlation (ICC) to assess interrater reliability between CCC-SE, SE-CR, and CCC-CR.

RESULTS: Thirty-nine residents (25 male, 14 female) in this study were evaluated by 50 faculty (39 males, 11 females), and 18 chief residents (10 males and 8 females). Each resident has three evaluations, and total of 462 evaluations were completed for 46 (29.9%) PGY1, 43 (27.9%) PGY2, 39 (25.3%) PGY3, and 26 (16.9%) PGY4. SE(PGY1-4) scores were similar to CCC. However, CRs score residents (PGY1-through-PGY4) significantly higher than the residents themselves or CCC ($p<0.001$). ICC was >0.90 between SE-CCC ($p<.001$), indicating excellent reliability, but 0.24 to 0.73 between SE&CR and CCC&CR, indicating poor to moderate reliability.

CONCLUSION: Chief residents tend to score residents higher than residents themselves or CCC. This discrepancy is likely related to CRs subjectively valuing the amount of work residents do. Reemphasizing the importance of accurate Milestone evaluation and providing teaching tools is needed.

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Risk of Fall with Device-Based Advanced Treatments in Parkinson's Disease: A Systematic Review and Network Meta-Analysis

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Adolescent Soccer Overuse Injuries: A Review of Epidemiology, Risk Factors, and Management

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Abstract

Introduction: Overuse injuries are a growing concern among adolescent soccer players, with the repetitive nature of the sport placing significant physical demands on young athletes. These injuries can have long-term implications on physical development, performance, and overall well-being. This review aimed to evaluate the existing literature on the epidemiology, risk factors, and management strategies for overuse injuries in adolescent soccer players.

Methods: A comprehensive literature search was conducted using PubMed and Embase. A total of 123 articles were identified, of which 29 met the inclusion criteria after screening. Studies focusing on overuse injuries in adolescent soccer players were included, while those addressing acute injuries, non-soccer populations, or adult athletes were excluded. Relevant quantitative and qualitative data were extracted and evaluated.

Results: 12 studies found a peak incidence of overuse injuries at or around peak height velocity (PHV: the period of maximal vertical growth), while increased body size, asymmetries in leg lengths, truncal weakness, sport specialization, increased ratio of organized: free playtime, and increased frequency of practice and matches were all also found to carry significant risk in some studies. There was a wide variability in strategies used for managing injuries across the studies and some found an increased injury burden (defined by the time an injury keeps an athlete from playing) of overuse injuries at players' PHV.

Conclusion: Many studies mention the need for education and standardized protocol to protect youth players from overuse injuries. Standardized education should start at or before puberty about the lower extremity overuse injuries soccer puts them at risk for, when they are at highest risk because of growth velocity and other factors, and how to protect themselves. Alongside these measures, sport and health authorities should provide guidelines for standardized growth tracking, limiting frequency of play, especially around players' PHV, limiting the ratio of organized sport to free play, and increasing screening for insidious injuries.

75 (Printed Poster)

The Impact of Leukemia in the United States: Trends from 1990 to 2021

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Abstract

Introduction: Leukemia remains a significant cause of cancer-related morbidity and mortality in the U.S. Despite advances in treatment and diagnosis, its burden persists. Our study analyzes leukemia trends over the past three decades, focusing on subtype variations and state-specific differences, using data from the Global Burden of Disease (GBD) database to guide targeted healthcare efforts.

Methods: Data from 1990 to 2021 on annual leukemia cases, deaths, disability-adjusted life years, age-standardized incidence rates, age-standardized mortality rates, and age-standardized disability-adjusted life year rates were analyzed. Percentage changes and estimated annual percentage changes in these rates were calculated using linear regression. Correlations with the Socio-demographic Index were assessed using Pearson correlation. All analyses were performed using R programming version 4.3.3.

Results: In 1990, leukemia caused 21,859 deaths, increasing to 29,786 in 2021, a 36.3% rise. Despite this, the ASMR dropped from 6.97 to 5.17 per 100,000 (25.82% decrease, EAPC -1.04%). The ASIR fell from 13.50 to 9.81 per 100,000 (27.33% drop), and the ASDR declined from 210.71 to 132.89 per 100,000 (36.93% decrease). While most subtypes showed reduced ASIR and ASMR, AML saw increases of 11.27% and 1.75%, respectively. Hawaii had the lowest ASDR in 1990 (163.4) and 2021 (105.2), while the highest shifted from D.C. (300.9) to Mississippi (181.6). DALYs showed a significant negative correlation with SDI in 2021 ($r = -0.78$, $p < 0.001$).

Conclusion: Our analysis shows a significant decline in leukemia mortality and incidence rates in the U.S. over the past three decades, reflecting advancements in treatment and diagnosis. However, acute myeloid leukemia (AML) stands out with rising incidence and mortality, highlighting ongoing challenges. The inverse correlation between DALYs and the Socio-demographic Index (SDI) highlights the impact of socio-economic factors on outcomes, emphasizing the need for targeted strategies to address disparities. These findings highlight the importance of advancing leukemia care and reducing healthcare inequities.

76 (Printed Poster)

Examining Patient Demographic Trends in Medically Managed Weight Loss Program in Family Medicine Residency Program

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Abstract

Introduction: The prevalence of obesity continues to increase; however, racial minorities are less likely to pursue medical assistance regarding weight management [1]. This study analyzed the patients of a medically managed weight loss program at a family medicine residency program over two phases to understand the demographics of those seeking medical assistance for weight loss.

Methods: Data from adults (18+) with a BMI ≥ 27 who completed office visits at the WMed Health Family Medicine Crosstown Parkway location were abstracted for 7/1/2022–9/30/2022 and 4/1/2024–6/30/2024. Descriptive statistics were recorded on demographics and insurance plans. No statistical testing was conducted for this program evaluation.

Results: Female patients increased from 66.1% to 73.57%, while male patients decreased from 33.6% to 26.06% between phases. Female-identifying patients rose from 61.64% to 69.5%. Caucasians remained the largest group (52.4% to 56.93%), then African-Americans (35.27% to 33.09%). Most patients in Phase 1 had Medicaid (28.37%), whereas "unknown" insurance was most common in Phase 2 (40.67%).

Conclusion: The significant increase in Caucasian patients and decrease in African-American patients seeking obesity management in this study calls for further analysis of racial disparities in medically managed weight loss. Racial minorities face greater barriers in healthcare [2], and previous studies on pharmacotherapy [3] and behavioral modifications [4] demonstrated overall decreased effectiveness in African-American patients. Future research should address identifying limitations in implementing equitable obesity management across all demographics. Building a medically managed weight loss program that encompasses Diversity, Equity, Inclusion principles along with a health equity component may be necessary to make obesity management accessible for all.

Acknowledgements: Theresa McGoff and Kirsten Hickok References: [1] Narain K, Scannell C. Racial and Ethnic differences in Medications for Obesity Management, Nationally Representative Survey. J Racial Ethnic Health Disparities. 2024. [2] Burnes Bolton, L, et al. "Structural and racial barriers to health care." Annual Review of Nursing Research, 2004;22:39-58. [3] Egan, BM, White, K. "Weight loss pharmacotherapy: Brief Summary of Clinical Literature on Racial Differences." Ethnicity & Disease, 2015;25(4):511-4 [4] Fitzgibbon ML, et al. "Weight Loss and African-American women: systematic review of behavioral weight loss intervention." Obesity Reviews, 2012;13(3):193-213

77 (Printed Poster)

An Analysis of the Association Between Thromboelastography and Low-Molecular-Weight Heparin Anti-Xa Levels in Trauma Patients

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Abstract

Introduction: Limited research exists into the utility of using thromboelastography (TEG) in the management of anti-coagulation in trauma patients. TEG can be used to evaluate various characteristics of hemostasis, such as clot formation time. These factors can identify underlying hyper- and hypo-coagulability in patients. Currently, anti-Xa levels are used to monitor low molecular weight heparin (LMWH) prophylaxis. Previous studies have identified that TEG parameters correlate with anti-Xa levels and can better predict venous thromboembolism (VTE) events in trauma patients that anti-Xa levels1. More investigation is needed into the ways that TEG can be used to guide VTE chemoprophylaxis in trauma patients.

Methods: A retrospective review of Bronson Trauma Registry patients from January 1, 2021 to December 31, 2023 was performed. Patients were included if they received enoxaparin with a measured LMWH anti-Xa and TEG within the same time period. Parameters measured from the TEG results included the R-value, which was analyzed to determine association with the LMWH anti-Xa level.

Results: Data was collected and analyzed from 36 patients. The p-value for the association between the LMWH anti-Xa level and TEG R-value was 0.0941 (see Table 1 below). There were two patients who experienced a thrombotic event, equating to 5.56% of the study population. When looking at LMWH anti-Xa results, 23 patients (63.89%) were subprophylactic after three doses of LMWH.

Conclusion: Our study indicates no statistical association between LMWH anti-Xa and TEG R-value (p-value=0.0941). One pitfall of our study was the low sample size, due to inadequate timing between many of the patients' lab work. A future project could be a prospective study in which these lab values are taken at the same time, so that they could be directly compared in a larger patient population. A larger sample size would allow for analysis of VTE events, when taking into account anti-Xa and TEG values. This could help determine which parameter is better for predicting success of chemoprophylaxis. References: [1] Van PY, et al. Thrombelastography versus AntiFactor Xa levels in the assessment of prophylactic-dose enoxaparin in critically ill patients. J Trauma. 2009 Jun;66(6):1509–15; discussion 1515- 7.

78 (Printed Poster)

Incorporating Family Interviews into the Fetal Infant Mortality Review Process: A Qualitative Analysis.

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Abstract

Introduction: A community's Fetal/Infant Mortality Review (FIMR) Case Review Team reviews regional cases of Fetal/Infant death to identify trends in medical and socioeconomic factors that contribute to infant death. In addition to administrative and medical records, FIMR staff interview families to obtain greater detail of circumstances and events surrounding the death. These findings can then be used to inform policy or systems change to improve future birth outcomes. However, despite usefulness in obtaining contextual information about the family's fetal/infant death experience, family interviews are not universally implemented. This study aimed to highlight the potential benefits and difficulties of including family interviews in the FIMR Case Review process.

Methods: This study used a qualitative research design using semi-structured interviews of a national sample of nine FIMR administrators and staff. Transcribed and redacted interview quotes were individually coded by two medical students into one of five themes: "more complete information", "difficulty obtaining interviews", "increasing impact", "emotional and human connection", or "current impact of family interviews". Intercoder reliability was evaluated using Cohen's kappa and percentage agreement.

Results: Cohen's kappa coefficient was κ=0.91, indicating almost perfect agreement amongst coders. Percentage agreement was calculated as 94%. Some frequently coded themes were "more complete information" and "difficulty obtaining interviews".

Conclusion: Findings suggest that family interviews play a positive role in the FIMR case review process. Most prominently, family interviews' ability to uncover the complex circumstances behind infant/fetal deaths and associated social determinants of health provide more actionable information for improving health systems. Family interviews add contextual information that electronic health records alone are unable to adequately capture. While respondents perceived family interviews as valuable, they emphasized the difficulty of obtaining these interviews, given low response rate from families and limited staffing. Despite these difficulties, our study found that family interviews can serve as an invaluable source of information as review teams generate recommendations for policy and systems change that can improve birth outcomes and reduce health inequities.

79 (Printed Poster)

Electronic Medical Record Templates and Measuring Melanoma Care Quality on 346 Patients

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Abstract

Introduction: In 2009, the National Quality Forum (NQF) introduced melanoma-specific quality indicators to improve care. However, adoption and reporting of these measures has not occurred, likely due to variability in documentation practices and difficulties in electronic capture of data elements. Those challenges prevent reliable assessment and reporting of melanoma care quality. To address this, we developed a comprehensive Melanoma Treatment Outcomes Registry at WMED, capturing key demographic, diagnostic, surgical, and pathologic factors. Most elements currently require manual chart abstraction. The goal of this study is to identify critical variables that could be included in a standardized EMR template, reducing manual chart reviews and offering the possibility to assess care across institutions.

Methods: The Melanoma treatment outcomes registry uses the 30 melanoma quality metrics established - 111 data points were required to assess those quality indicators. Twenty-six of those data points were then made into an EMR template to enhance electronic abstraction into the database. To be considered for inclusion, the variables needed to have a standardized response.

Results: Prior to the implementation of the EMR template, 24% of the elements were amenable to electronic data query. With the proposed use of the EMR templates, 47% of the elements will be able to be extracted electronically. We anticipate initially reducing manual abstraction time by 25%. The attached table includes variables that will be included in the operative report template.

Conclusion: The development of EMR templates reduces the number of elements that require manual abstraction and improves consistency of data entry. This efficiency will streamline the collection of melanoma quality metrics, enabling more robust measurement of quality of care. Additionally, we feel EMR templates will allow other hospitals to implement measurement of melanoma quality, allowing for comparisons of care across institutions.

80 (Printed Poster)

Thematic Analysis of Prehospital Provider Narratives involving 911-Responses with Reported Violence

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81 (Printed Poster)

Gamification and its Utility in Continuing Education for Emergency Medicine Physicians

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Abstract

Introduction: Since the mid 1980s, the Liaison Committee on Medical Education (LCME) has required ethics to be a part of the core competency of medical education and as such, many healthcare graduate programs have enforced the values of "Responsible Conduct of Research", also known as RCR, which is primarily the knowledge of ethics in the field of research. The fundamental issue with this, however, standard medical ethics education delivers book knowledge on ethical ideals and norms, but often is less effective in how to navigate ethical dilemmas practically. Our project shows how gamification can be used to address this issue.

Methods: In this project, we created a CE course using Articulate Storyline and CloudCME as the sharable content object reference model. We created an online CME module focused on the complexity of informed consent in an emergency setting. We created these models using Western Michigan University Homer Stryker M.D. School of Medicine's simulation center and staff. Our online CE module was distributed to practicing healthcare providers and medical students. We collected a variety of data from users, including engagement, decision accuracy, and behavioural change. Using these parameters, we assessed the effectiveness of this module.

Results: Our data shows that there have been changes to behaviour with 33% saying that they changed their skills and strategies. Furthermore, 100% of participants listed that when barriers to change were encountered, it was the lack of opportunity that acted as a barrier.

Conclusion/Clinical significance: From this project, we have learned that ethics education needs innovative solutions to solve gaps in knowledge, and that gamification is an effective tool that can be used to do this due to its engaging nature. It is important to note, however, that thoughtful design and user feedback are pivotal for the success of this platform.

82 (Printed Poster)

An Evaluation of Gamified Simulation Training as a Teaching Method for Healthcare

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Abstract

Introduction: Methods for improving medical education are popular topics in healthcare, with research showing that traditional approaches such as lectures often fail to engage students. A non-lecture approach to teaching in medical settings utilizes simulation-based learning. While simulation-based teaching is an effective tool, studies have shown it does not increase student motivation. One method shown to increase intrinsic motivation in learners is gamification, leading to improved retention and engagement with the material. In this project, we have applied gamification into the simulation-based training already standard within the WMed EIH2 program. This program aims to provide early exposure to healthcare careers for high school students in Kalamazoo through monthly sessions.

Methods: Students will be separated into two groups, each having the same simulation lesson. However, one group will have a gamified element and the other will not, serving as the control group. Prior to the simulation, the students will complete a quiz, and then complete the same quiz after the simulation. The quiz scores will be compared before and after the simulation to quantify a potential change in knowledge and engagement.

Results: To date, we have results from one EIH2 session. The students in the gamified session had an average preliminary quiz score of 3/5, and a post session average of 4.07/5. The non gamified session had no significant change in scores from an average of 3.52/5 to 3.47/5. Overall, this preliminary result demonstrates a significant increase in knowledge retention within the gamified group over the control group.

Conclusion: Given healthcare workforce shortages, there is an increased need for early exposure to healthcare careers, and is thus necessary to evaluate medical education for high school students. While simulation-based learning has been proposed to improve medical education, it fails to significantly improve student motivation. We hypothesize that adding a gamified element to simulation teaching will increase student engagement and information retention. Thus, this project aims to further evaluate the efficacy of gamification within simulation training in EIH2 and its potential application in other settings.

IRB Submission: WMed-2024-1208, Determined non-human research

83 (Printed Poster)

Quality Improvement Project for Improving Pediatric Obesity Diagnosis in Pediatric Outpatient Setting

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Abstract

Purpose/Objectives Obesity is defined as a body mass index (BMI) at or above the 95th percentile, as the CDC growth charts indicate. This study aims to increase the rate of obesity diagnosis among the patient population of the WMED pediatric clinic to 50% within six months and sustained for three months more.

Design/Methods: This study used the PDSA (Plan, Do, Study, Act) cycle. Investigators collected baseline obesity diagnoses from well-child examination visits from 3-17 years from November 2023 to August 2024. The knowledge gap shown by the initial data was addressed by raising awareness among the resident physicians through an oral presentation in February 2024. Education was given to residents to add obesity as a secondary diagnosis on all well-child visits based on BMI percentiles. In March, follow-up data highlighted the further need for intervention. Three PDSA cycles achieved the target.

Discussion: Descriptive data was collected and analyzed. The figure shows the percentage of obesity with overall well-child visits. Baseline data of residents adding obesity as a secondary diagnosis for November 2023, December 2023, and January 2024 were 28.75%, 18.75% and 31.82%, respectively. Our initial educational intervention for our QI project showed minimal impact on the baseline with secondary diagnosis rate dropping to 15.70% in March 2024 (February data was omitted to remove internal bias). A brief lecture on obesity, its importance and about our project on resident didactics was done as a second intervention and secondary diagnosis rate increased to 42.80%. In the subsequent month, the rate dropped again to 25.5%. Then as a 3rd attempt, we reminded all residents via close group, placing gentle reminder note on work room and another morning report on obesity with project update. Then the diagnosis rate increased to 54.80% which met our goal of 50% on January 2025. The arrows in blue show the 3 interventions. Our next effort focused on sustaining the diagnosis rate over two months but declined the following month.

Conclusion: While continuous lectures and reminders did help achieve the target of 50% goal of putting obesity diagnosis in well visits, maintaining long-term sustainability remains challenging.

84 (Printed Poster)

Impact of AAFP Conference on Recruitment for FM-KZ Residency Program

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Abstract

Introduction: Recruiting high quality Family Medicine (FM) residency candidates that can elevate patient care and residency culture has become increasingly challenging over the past several years. To help FM residencies recruit more effectively, the American Academy of Family Physicians hosts a conference every year to help medical students connect with Family Medicine residency programs across the country(1). Participating programs meet prospective applicants at this conference just before the recruiting season begins. We wanted to explore the impact of participation in this conference on our residency recruitment and match. Methods: The AAFP conference was a three-day event that took place in Kansas City, MO. Two residents and one faculty member represented the Kalamazoo branch of WMed FM. We spoke to each prospective applicant that came to our table, gave them swag (hats, notebooks, water bottles and pens), and explained the unique features of our program. All conference attendees had an ID badge with a barcode that we could scan to keep track of who came to our table. Expected Results: Our team met many prospective applicants and were able to get their contact information during the conference to keep in touch. We expect to use the scanned barcodes to compare the applicants we met to those who received interview invitations, and eventually to those who matched into our program. Conclusion: Overall, the AAFP conference has the potential to yield useful recruiting prospects. In-person interactions with prospective candidates is a large benefit of the event, and we had a significant amount of people that applied to our program after coming to the conference(2). We should continue to use this conference as a recruitment tool. 1. Mitchell D; AAFP News. Students, Residents Build Connections at National Conference. Ann Fam Med. 2023 Sep-Oct;21(5):475-476. doi: 10.1370/afm.3045. PMID: 37748896; PMCID: PMC10519760. 2. Wang JC, Wiechert K, Chapman JR. The Magic of Meeting in Person. Global Spine Journal. 2023;13(1):7-7. doi:10.1177/21925682221143437

85 (Printed Poster)

Revitalizing Emergency Department Naloxone Programs: A Dynamic Multimodal Protocol

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Abstract

Introduction: Naloxone is an effective medication for opioid overdose that is underutilized by those at risk for opioid overdose, including those with opioid use disorder (OUD), and other substance use disorder (SUD) at risk for using substances contaminated with opioids. Take home naloxone is a vital component of the response to the global overdose problem, yet naloxone continues to be unavailable in many areas of the United States. Naloxone is particularly important in decreasing overdoses in patients who refuse transfer to the hospital, which is as high as 20% in our community. The investigators aimed to increase the availability of naloxone in the community to those most at-risk by implementing an expansion of our local ED distribution program. Writing a naloxone prescription for patients who had indications, was filled by patients less than 10%, consistent with national averages. Efforts to ease barriers to naloxone distribution may improve opioid overdoses in the community.

Methods: The project included 1. an emergency department nurse driven protocol allowing nurses to order take-home naloxone kits and 2. update an existing provider BPA to suggest “dispense naloxone kit” in certain high-risk patients.

Results: The project is ongoing. At baseline, 9-26 kits per month were distributed in a four ED system, an average of 17.36 kits per month. Following initiation of a new protocol, 14-27 kits were distributed per month, an average of 20.75 kits per month. This reflects a 19.52% increase in distribution over an eight-month duration.

Discussion: These findings underscore the importance of innovative ED-driven strategies to increase naloxone access. The objective was an increase of 50% in kit distribution over one year. The project is ongoing. Early data showed an increase of 19.52% in kit distribution, a modest increase. Ongoing refinements are being developed and implemented to increase kit distribution and decrease barriers towards distribution, but initial results are promising and may help other emergency departments develop similar strategies. If the 50% target is not met, further investigations should be investigated. Increasing access and distribution of naloxone to high-risk individuals is vital to reduce morbidity and mortality in patients with substance use disorders.

86 (Printed Poster)

Elder Death Review Teams in Michigan: Quality Improvement

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Abstract

Introduction: Funded by the Michigan Department of Health and Human Services, the Medical Examiner's Office housed at Western Michigan University Homer Stryker M.D. School of Medicine has spent the last three years establishing and operating Elder Death Review Teams in eight counties throughout western Michigan. Elder Death Review Teams are multidisciplinary groups that examine the death of an elderly or vulnerable adult, specifically those that may have been attributed to abuse or neglect. These teams seek to identify gaps in the system of antemortem care and postmortem investigation processes to generate unique death and injury prevention strategies for this vulnerable population. In 2024, a survey was disseminated to team members throughout all participating counties to assess these meetings, including its strengths and weaknesses, aiming to identify areas for improvement.

Methods: An electronic, anonymous survey was designed and disseminated. The survey had a combination of open- and closed-ended questions and used a Likert rating scale.

Results: Twenty-eight representatives from agencies such as Adult Protective Services, law enforcement, Licensing and Regulatory Affairs, and the Medical Examiner's Office completed the survey. Ninety-three percent of respondents believe that their participation in Elder Death Review Team meetings has improved their knowledge of other participating organizations and 93% either agree or strongly agree that the Elder Death Review Team process is beneficial to the community. Fifty percent of respondents said that their participation led to more referrals to other agencies, while one third of respondents stated that these meetings resulted in policy or process changes at their agencies. Seventy-five percent of respondents agreed that meetings resulted in identifying barriers for detecting and responding to victims of elder abuse, neglect or exploitation, while 57% of these individuals reported that these identified barriers have led to recommendations to improve systems level response.

Conclusion: While Elder Death Review Teams have proven beneficial to communities served, recommendations for process or policy change or actionable prevention strategies are needed. Project leadership believe that aligning state and local-level practices, networking to more public health partners and organizations, and focusing on education will help to further the goals of this project.

87 (Printed Poster)

Improving screening of alpha-1-antitrypsin deficiency (AATD) in Chronic Obstructive Pulmonary Disease (COPD) Patients at Grace Health clinic

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Abstract

Introduction: Alpha-1-antitrypsin deficiency (AATD) is a genetic disorder affecting the alpha-1-antitrypsin protein, primarily produced in the liver. It can cause lung conditions like emphysema, especially in younger individuals, and may also impact other organs. Screening for AATD in patients with chronic obstructive pulmonary disease (COPD) is essential for early diagnosis and effective management. This project aims to enhance access to AATD screening for young COPD patients at Grace Health, addressing barriers like limited testing access, clinician awareness, stigma, and treatment costs. Overcoming these barriers is vital for improving patient care and outcomes.

Methods: An educational intervention on AATD screening in COPD was conducted for family medicine residents and faculty at Western Michigan University MD School of Medicine. Data on screening rates before and after the intervention at Grace Health was analyzed, focusing on patients diagnosed with COPD at a young age and minimal or no tobacco use. The frequency and percentage of screened patients were calculated.

Results: Prior to the educational intervention, 2 out of 50 eligible patients were screened, representing 4% of the eligible cohort. Following the intervention, 3 out of 75 eligible patients were screened, maintaining a screening rate of 4%.

Conclusion/Clinical significance: Despite the absence of a difference in the number of COPD patients screened before and after the educational intervention, our findings highlight a potential gap in the early detection of alpha-1 antitrypsin deficiency in COPD patients, particularly those diagnosed at a young age with minimal or no tobacco use history. We recommend incorporating alpha-1 antitrypsin deficiency screening into the AVARA system at Grace Health to prompt healthcare providers to order this test for eligible patients. This proactive approach could improve early diagnosis, guide personalized treatment strategies, and potentially enhance patient outcomes in this underserved subgroup of COPD patients.

88 (Printed Poster)

A Public Health Service Project in Rural Ghana: A Water, Sanitation, and Hygiene Needs Assessment Survey

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Abstract

Background: Many rural communities in Ghana lack access to clean water, sanitation facilities, and healthcare facilities [1]. In 2023, four communities considered “neglected” by local farmers in the Tano North Constituency of the Ahafo Region in Ghana were referred to our team to investigate their public health needs.

Methods: Investigators designed a needs assessment questionnaire exploring proximity to healthcare facilities, clean water access, sanitary facilities, disease burden, occupational health, environmental health, reproductive health, and mental health. The Ghanaian interviewers translated the English questionnaires to Twi during field interviews. The leadership of each community was sampled including (1) the Chief, (2) the Community Drug Distributor (CDD), and (3) the main healthcare worker.

Results: In September of 2024, ten interviews were conducted, including the Chief and CDD from all four communities, and the healthcare worker from two of the communities. Results show that none of the community leaders were satisfied with any aspect of health assessed. The nearest Community Health Planning Services (CHPS) compound is 3-11 km away from each community. Since most people do not have access to transportation, they instead go to the “Chief’s place” for medical emergencies. None of the communities have access to clean water and either drink out of a lake, river, or stream. None of the communities have toilets that flush, leading to open defacation. The most common diseases reported are Malaria, Typhoid Fever, Cholera, and gastrointestinal infections, including symptoms of bloating and distention. Schistosomiasis and Onchocerciasis are also reported. None of the housing structures can keep out insects and many houses are open, allowing livestock to enter. Prenatal care, immunizations and mass drug administrations were not being conducted at the time of the survey. There are no reports of miscarriages, infant or maternal death, substance abuse or mental health issues. Community priorities are (1) gaining access to clean water, (2) healthcare facilities, and (3) education.

Conclusion: The four communities assessed during this service project are neglected with no access to clean water, proper sanitary facilities, or proper healthcare. Investigators will continue to partner with the Rotary Club, District 6360 to improve their public health needs.

89 (Printed Poster)

Assessing the Effects of School-Based Mindfulness Classes and Family Conversations on Adolescent Mindfulness Development

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Abstract

Introduction: Adolescence is a critical stage of development marked by numerous challenges, often leading to heightened stress. Mindfulness, the practice of present-focused awareness, has shown promise in improving emotional regulation, reducing anxiety, and enhancing well-being during this transition. This study aims to explore the effects of offering mindfulness classes in schools or initiating conversations about mindfulness at home on improving mindfulness in these students. This study hypothesizes that mindfulness initiatives, whether in structured educational settings or through informal family interactions, can positively influence adolescent mindfulness levels, contributing to improved mental health and resilience. The survey was conducted by a student-run organization named Key2Finesse on middle school-aged students in various schools in Michigan. The results indicated that children who participated in mindfulness classes at school or admitted having conversations on mindfulness at home demonstrated higher mindfulness scores compared to their peers. However, the differences were not statistically significant. Mindfulness class curriculum could vary greatly among the schools surveyed. Future research could examine whether standardizing the mindfulness class curriculum could enhance their effectiveness in promoting mindfulness in adolescents.

Methods: The Mindful Attention Awareness Scale for Children (MAAS-C) survey was self-administered by the participants to assess their baseline mindfulness levels. The subjects were club members of Key2Finesse, a public-speaking organization for middle-school and high-school students.

Results: Individuals who either had a class in school on mindfulness or talked about mindfulness at home had higher total score of mindfulness in comparison to those who did not. However, there was not a statistically significant difference in total score of mindfulness.

Conclusion/Clinical significance: Although not statistically significant, the observed trend suggests that school-based mindfulness interventions may benefit adolescents. Given rising mental health challenges in adolescents, further research into standardizing the curriculum and exploring long-term impacts is essential to understand how mindfulness supports emotional regulation and well-being.

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Sickle hemoglobin aggregation is enhanced under acidic conditions and modified by FAIM

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Abstract

Introduction: Abnormal protein aggregation is implicated in the pathogenesis of numerous diseases, such as Alzheimer's, Parkinson's, and sickle cell disease (SCD). In SCD, a point mutation in the hemoglobin β chain creates a mutant hemoglobin S protein (HbS) that is prone to abnormal self-assembly, particularly in its deoxygenated form, causing red blood cells to sickle and occlude capillaries. Therefore, SCD could potentially be treated by disrupting the aggregation of HbS. We have shown that Fas apoptosis inhibitory molecule (FAIM) inhibits the aggregation of proteins that play a role in neurodegenerative diseases. However, whether FAIM has activity against other aggregation-prone proteins remains unknown. Here we explored the conditions which facilitate HbS multimerization and investigated if FAIM alters HbS aggregation.

Methods: Aggregation of adult hemoglobin (HbA) and HbS and activity of FAIM was optimized in vitro in response to protein concentration, incubation time, and temperature. Hb aggregation was tested in the presence of weak organic acids and FAIM. Photo-induced cross-linking of unmodified proteins (PICUP) was employed to stabilize protein aggregates prior to evaluation by SDS-PAGE, silver stain, and Western blot.

Results: Aggregation of HbA and HbS increased with concentration and time, approaching maximum levels around 15-30 min of incubation. All weak organic acids tested induced aggregation, with the greatest response observed in response to lactic and crotonic acid. HbS formed aggregates more readily than HbA, with observable protein species at 75 kDa, 100 kDa, and higher. The introduction of FAIM altered aggregation in both normal and mutant hemoglobin but more prominently in HbS, with new high and low molecular weight species present after incubation for 24 hrs.

Conclusion: HbS readily forms aggregates of >60 kDa in vitro in response to increased concentration and decreased pH, while HbA may aggregate in similar conditions but to a lesser degree. HbS appeared to interact with FAIM in a way that altered its aggregation kinetics, forming low-molecular-weight protein species that may indicate a less pathogenic protein state. Further studies are needed to determine whether this interaction can modify HbS in a way that holds therapeutic potential for sickle cell patients.

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Potential role for ESR1 in regulation of liver Ceacam1 expression in a mouse model of PCOS.

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Abstract

Introduction: Nonalcoholic fatty liver disease (NAFLD) is a major health concern with an estimated 30% of the U.S. population being affected (1), and is often associated with metabolic diseases such as obesity, diabetes, insulin resistance, and polycystic ovarian syndrome (PCOS). Little is known about the mechanism and pathophysiology of NAFLD in women with PCOS. Considering up to 12% of women of reproductive age in the U.S. are diagnosed with PCOS, this is a significant knowledge gap. Our long-term goal is to determine if the transmembrane glycoprotein carcinoembryonic antigen-related cell adhesion molecule 1 (CEACAM1), an important regulator of insulin clearance, contributes to insulin resistance and hyperinsulinemia observed in PCOS. In this study, we tested the hypothesis that Ceacam1 is regulated by estrogen receptor 1 (ESR1) in the ESR1 knockout (KO) mouse model of PCOS.

Methods: Livers and blood were collected from young and old female wildtype (WT) and ESR1 KO mice. Total RNA was isolated from livers collected from female wildtype (WT) and ESR1 KO mice. RNA was reverse transcribed into cDNA and used for qPCR analysis. In addition, an ELISA is performed to determine Ceacam1 amounts in serum from WT and ESR1 KO females.

Results: ESR1 KO livers appeared pale and larger compared to WT indicative of NAFLD. Real time PCR analysis revealed the absence of Esr1, and significant ($P<0.05$) decreased amount of Ceacam1 in livers from ESR1 KO compared to WT females.

Conclusions: Results thus far indicate development of NAFLD in the ESR1 KO mouse model of PCOS, and a role for ESR1 in the regulation of Ceacam1 in the liver. Potential regulation of Ceacam1 by ESR1 can be used to evaluate development of insulin resistance. Current studies are in progress to determine if ESR1 binds directly to the Ceacam1 promoter region, and if serum levels of soluble Ceacam1 can be used as a biomarker of NAFLD development. 1- Saiman Y, Duarte-Rojo A, Rinella ME. Fatty Liver Disease: Diagnosis and Stratification. Annu Rev Med [Internet]. 2022 Jan 27;73:529–44. Available from: http://www.ncbi.nlm.nih.gov/pubmed/34809436