Musculoskeletal Infection Society

35th Annual Open Scientific Meeting

MUSCULOSKELETAL INFECTION SOCIETY

August 1-2, 2025

JERSEY CITY, NJ

Objectives

At the conclusion of this educational activity, participants will:

- Understand the open questions in the management of musculoskeletal infections, including optimal surgical approaches and systemic antibiotic therapy.

- Discuss challenging clinical cases of musculoskeletal infection, including diagnostics and management strategies.

- Evaluate the utility of various irrigation solutions and local antibiotic therapy.

Intended Audience

This course is designed for member and nonmember clinicians, including orthopaedic surgeons, infectious disease specialists, PAs, NPs, podiatrists and other health care providers who manage the care of patients with musculoskeletal infections.

Continuing Education Credit

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American Academy of Orthopaedic Surgeons and the Musculoskeletal Infection Society. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

The American Academy of Orthopaedic Surgeons designates this live activity, MSIS 35TH Annual Open Scientific Meeting, for a maximum of ***12.5 AMA PRA Category 1 Credits™***. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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Special Thanks

To the Members who answered the call to serve when additional help was needed with Abstract and Presentation Reviews

Anne Sullivan, MD, Thorsten Seyler, MD PhD, Kenneth Urish, MD PhD, Angela Hewlett, MD

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MUSCULOSKELETAL INFECTION SOCIETY

35th Annual Open Scientific Meeting
August 1-2, 2025
Jersey City, NJ

Agenda

Friday, August 1, 2025
Hudson Ballrooms
Third Floor

6:30-9:00am	**Breakfast**
7:00am *Hudson Pre-Function*	**Registration**
7:45am	**Welcome** Andy Miller, MD, MSIS President
SESSION I	**ANTIBIOTICS AND DIAGNOSIS** **Moderators:** Vinay Aggarwal MD, and Jenny Aronson, MD
8:00am	Cefazolin and the R-1 Side Chain: Why Your Joint Arthroplasty Patients with Cephalosporin Allergy Can Safely Be Given Cefazolin (*#1533*) ***Josef Jolissaint,*** *Katherine Mallet, Andrew Thomson, Alberto Carli, Matthew Austin*
8:06am	Postoperative Oral Antibiotics Continues to Increase in Prevalence without Associated Improvements in One-Year Periprosthetic Joint Infection Rates (*#1509*) *Joshua Rainey, Brenna Blackburn, Christopher Pelt, Jeremy Gililland, Lucas Anderson, Michael Archibeck,* ***Laura Certain***
8:12am	PJI Treatment and the Emergence of Antimicrobial Resistance: A Retrospective Cohort Study (*#1490*) *Andy Miller, Andrew Thomson, Mia Fowler, Ananya Alleyne,* ***Michael Henry****, Alberto Carli*
8:18am	Prosthetic Joint Infection due to Candida Species: What Affects Outcome of Treatment? (*#1581*) ***Martin McNally***
8:24am	Discussion
8:30am	Machine Learning Can Be Fine-Tuned to Match Different Criteria-Based Definitions of PJI (*#1468*) *Jim Parr, Krista Toler, Van Thai-Paquette, Pearl Paranjape, Alex McLaren,* ***Carl Deirmengian*** Development and Validation of a Synovial Fluid Machine-Learning Score for PJI, with Clinical Verification in an External Cohort (*#1472*) *Jim Parr, Krista Toler, Van Thai-Paquette, Pearl Paranjape, Yale Fillingham, Alex Mclaren,* ***Carl Deirmengian***

8:38am — Sonication Aids in Diagnosis and Treatment of Prosthetic Joint Infection (*#1583*)
Alfredo Puing, Thilinie Bandaranayake, Anne Spichler, Ilda Molloy, Adam Winter, David Peaper, ***Marjorie Golden***

8:44am — Rapid Detection and Differentiation of PJI-Relevant Pathogens in Enriched Synovial Fluid via Voc Sensing (*#1396*)
Xiaonao Liu, ***Derese Getnet****, Robert Hopkins, Taejun Ko, Deyu Liu, Jennifer Dootz, Buyu Yeh, Subramaniam Somasundaram, Mya Wilkes, Krista Toler*

8:50am — Discussion

Symposium 1 — **Advanced Topics in Antibiotics for Bone and Joint Infections**
Moderator: Alaina Ritter, MD

9:00am

Personalized Antibiotic Therapy: The Role of Therapeutic Drug Monitoring in Orthopedic Infections
Lisa Vuong, PharmD, Infectious Diseases Clinical Specialist
UF Health Shands Hospital, Gainesville, FL

Intra-osseous Vancomycin in Arthroplasty
Stephen Incavo, MD, Orthopaedic Surgeon
Houston Methodist Hospital, Houston, TX

European Perspectives on Antibiotics for Bone and Joint Infections
Jaap Hanssen MD, Internal Medicine and Infectious Disease
Leiden University Medical Center, Leiden, The Netherlands

10:15am — **Break**
Hudson Pre-Function — Visit Exhibitors
Visit ePosters and Physical Posters (1411, 1416, 1437, 1450, 1462, 1463, 1466, 1478, 1487, 1535, 1556, 1565)

Session II — **FRACTURE AND SPINE**
Moderators: Jeremy Shaw, MD, and Michael Henry, MD

10:45am — Prevalence of Occult Infections in Primary Posterior Instrumented Spinal Fusion (*#1558*)
Celeste Abjornson

10:51am — Outcomes of Septic Long Bone Nonunions: Which Organisms are Associated with Poorer Results? (*#1457*)
Kathryn Barth, ***Robert Bilodeau****, Heather Haeberle, Mark Megerian, Craig Klinger, Gregory Schimizzi, William Ricci*

10:57am — Safety and Efficacy Testing for the First of its Kind, FDA Approved, Commercially Available Antibacterial Surface Treatment for Permanent Limb Salvage and Spine Stabilization Implants (*#1528*)
Celeste Abjornson

11:03am — Negative Pressure Wound Therapy Reduces Deep Infection Rate versus Conventional Wound Dressings for Gustilo Type II/III Open Lower Extremity Fractures: A Meta-Analysis (*#1574*)
Justin Le*, Nicholas Moscardelli, Zeshan Fahim*

11:09am	Discussion
11:15am	Armed to the Teeth: Fight Bite-Associated Native Joint Septic Arthritis of the Hand Differs from Other Forms of Septic Arthritis (#*1549*) ***Lauren Whearty**, Stephen J McBride*
11:21am	Can We Validate the Musculoskeletal Infection Society Criteria in Patients Suspected of Infection After Transfemoral Osseointegration Surgery? (#*1526*) *Ashley Anderson, Julio Rivera, **Sarah Rabin**, Jason Souza, Benjamin Potter, Jonathan Forsberg*
11:27am	Toward Defining Optimal Antibiotic Duration in Spinal Implant Infections: Insights from a Multicenter Study (#*1399*) ***Don Bambino Geno Tai**, Jessica O'Neil, Sandra Nelson, Daniela De Lima Corvino, Alaina Ritter, Jenny Aronson, Laura Certain, Alexander Tatara, Aaron Tande, Jessica Seidelman For SPIRIT Study Group*
11:33am	Discussion
Symposium 2	**Advances in Osteomyelitis and Fracture Related Infection** **Moderator:** Elizabeth Robilotti, MD
11:40am	**Patient-Friendly Surgery in FRI** Martin McNally, MD MBCHB, Orthopaedic Surgeon Oxford University Hospitals, Oxford, UK **Preventing Fracture-Related Infections: Turning Evidence into Impact** Ashley Levack, MD, Orthopaedic Surgeon Loyola University Medical Center, Maywood, IL **Diagnosing Fracture-Related Infection: What We Know, What We Question, What Comes Next** I. Leah Gitajn, MD, Orthopaedic Surgeon Dartmouth Hitchcock Medical Center, Lebanon, NH
12:50pm *Hudson Ballrooms*	**Lunch** Box Lunch **Visit Exhibitors and Posters**
Session III	**HIP AND KNEE 1** **Moderators:** Anne Sullivan, MD, and Talha Riaz, MD
1:50pm	Colonoscopy within 6 Months before TKA May Be Associated with Worse Postoperative Outcomes, but Not Infection: A National Database Analysis (#*1441*) *Khaled Elmenawi, Shujaa Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew Deren, Viktor Krebs, Robert Molloy, Nicolas Piuzzi*
1:56pm	Failure Rates Significantly Decrease at 1.2 Years after Two-Stage Exchange for Chronic Periprosthetic Joint Infection of Total Knee Arthroplasty (#*1366*) ***Michael Shannon**, Scott Rothenberger, Victoria Wong, Kenneth Urish*

2:02pm	International Success and Failure of the Treatment of Periprosthetic Knee Infection: A Preliminary Report (*#1410*) International Success and Failure of the Treatment of Periprosthetic Hip Infection: A Preliminary Report (*#1409*) *Carlos Higuera Rueda,* ***Jesus Villa****, Jesse Otero, Thomas Fehring, Cade Shadbolt, Craig Aboltins, Yves Poy Lorenzo, Michelle Dowsey, Sina Babazadeh, Orthopaedic Device Infection Network (ODIN)*
2:10pm	Discussion
2:16pm	Early Periprosthetic Joint Infection after Total Joint Arthroplasty is a Risk Factor for New Onset Mental Health Disorders (*#1564*) *Daisuke Furukawa,* ***Alvaro Ayala***
2:22pm	Cost of Antibiotic Loaded Cement to Prevent Prosthetic Joint Infections in Primary Total Joint Arthroplasty Procedures. (*#1560*) *Kelly Guerin, Travis Larsen, Michael Henry, Eytan Debbi, Alberto Carli,* ***Elizabeth Robilotti*** Antibiotic Loaded Cement Does Not Prevent Periprosthetic Joint Infection in Primary Hip and Knee Arthroplasties. (*#1520*) *Travis Larsen, Joseph Nguyen, Andy Miller, Peter Sculco, Alberto Carli,* ***Elizabeth Robilotti***
2:30pm	Resurface it or Respect it? Reassessing Patellar Resurfacing in Two-Stage Revision for PJI (*#1538*) *Josef Jolissaint,* ***Andrew Thomson****, Peter Sculco, Alberto Carli*
2:36pm	Discussion
Symposium 3	**My Trickiest Case** **Moderator:** Poorani Sekar, MD **Panelists:** Sandra Nelson, MD, Nicolas Piuzzi, MD, Peter Sculco, MD Jessica Seidelman, MD, Aaron Tande, MD, Kenneth Urish, MD PhD
2:45pm	**Case Presentations:** Ana Salas Vargas, MD, Infectious Disease Houston Methodist Hospital, Houston, TX Peter Sculco, MD, Orthopaedic Surgeon Hospital for Special Surgery, New York, NY Allison Lastinger, MD, Infectious Disease West Virginia University, Granville, West Virginia
3:45pm	**Break** Visit Exhibitors Visit ePosters and Physical Posters (1465, 1491, 1496, 1501, 1502, 1504, 1519, 1525, 1534, 1542, 1586)

Session IV	**HIP AND KNEE 2** **Moderators:** Johannes Plate, MD, and Laura Damioli, MD
4:15pm	Aspirin Leads, Infection Falls: A 12 Year Review of Changing Antithrombotic Trends and Their Impact on Infection Risk after THA (*#1508*) Antithrombotic Therapy and Their Association with PJI Risk after TKA: A 12-Year Review (*#1506*) *Anzar Sarfraz, Benjamin Padon, Farouk Khury, Kush Attal, Joshua Rozell, Ran Schwarzkopf,* ***Vinay Aggarwal***
4:23pm	Surgeon vs. Center Volume: Who Really Affects Infection Rates in Total Hip Arthroplasty? (*#1536*) ***Josef Jolissaint****, Andrew Thomson, Alexandra Grizas, Andy Miller, Geoffrey Westrich*
4:29pm	Lower Limb Cellulitis in the 3 Months before Total Knee Arthroplasty Increases Risk of PJI and Infection-Related Complications (*#1438*) Lower Limb Cellulitis Three Months Before Total Hip Arthroplasty Increases Risk of PJI and Infection-Related Complications (*#1440*) *Khaled Elmenawi, Shujaa Khan, Ignacio Pasqualini, Anabelle Visperas, Matthew Deren,Viktor Krebs, Robert Molloy,* ***Nicolas Piuzzi***
4:37pm	Discussion
4:43pm	A Standardized Dair Protocol Involving Specific Antiseptic Solutions Produces Promising Short-Term Results in Hip and Knee PJI (*#1507*) *Peter Sculco, Allina Nocon, Mark Youssef, Bianca Nakar, David Mayman, Gwo-Chin Lee,* ***Alberto Carli***
4:49pm	Effective Seven-Day Antibiotic Irrigation for Chronic PJI: 12-Month Results from Two Prospective Randomized Comparative Studies (*#1493*) *Bryan Springer, Carlos Higuera-Rueda, Brian De Beaubien, Kevin Warner, Andrew Glassman, Hari Parvataneni, Kenneth Urish, Johannes Plate, Edward Stolarski,* ***Nicolas Piuzzi***
4:55pm	Discussion
5:05pm	**Member Survey:** Alberto Carli, MD and Nicolas Cortes-Penfield, MD (non CME)
6:30 pm *Manhattan Ballroom Ninth Floor*	**President's Reception** Cocktails and Dinner

Saturday, August 2, 2025
Hudson Ballrooms
Third Floor

6:30-9:00am **Breakfast**
Visit Exhibitors and Posters

7:00am MSIS Business Meeting (**MSIS members only**) (non CME)
Hudson Ballroom

Special Presentations

7:45am **Diagnosis of Postoperative Spine Infection**
Jeremy Shaw, MD, Spine Surgeon
Intermount Health, Salt Lake City, UT

Unified PJI Diagnosis
Thorsten Seyler, MD PhD, Orthopaedic Surgeon
Duke University, Durham, NC

Symposium 4 **Transforming Ortho-ID Training: From local Curricula to National Tools**
Moderator: Elizabeth Thottacherry, MD

8:15am **House Staff Education**
Jenny Aronson, MD, Infectious Disease
Stanford Healthcare, Redwood City, CA

The Joint Approach: Podcast and Related Media
Jessica Seidelman, MD MPH, Infectious Disease
Duke University, Durham, NC

Johannes Plate, MD PhD, Orthopaedic Surgeon
University of Pittsburgh, Monroeville, PA

The OrthoID Library
Don Bambino Geno Tai, MD, Infectious Disease
University of Minnesota, Minneapolis, MN

Mayo's Musculoskeletal Infection Fellowship
Aaron Tande, MD, Infectious Disease
Mayo Clinic, Rochester, MN

Mentorship and Education in Surgical Training
Mathias Bostrom, MD, Orthopaedic Surgeon
Hospital for Special Surgery, New York, NY

Session V	**BASIC SCIENCE** **Moderators:** Derek Amanatullah, MD, and Ashley Levack, MD
9:15am	Proteomic Insight into Immune Pathways and Biomarker Discovery in Periprosthetic Joint Infection (*#1392*) *Nicolas Piuzzi, Suan Sin Foo, Weiqiang Chen, Thaddeus Stappenbeck,* ***Anabelle Visperas***
9:21am	The Role of Staphylococcal Host Antibody Inhibition in Orthopaedic Device Infection (*#1382*) *Abhinay Adlooru, Lauren Kemp, Walid Bibi, Antonia Chen,* ***Alexander Tatara***
9:27am	Immunologic Markers of Dormant Infection Predict Infection Free Survival in Total Joint Replacements (*#1386*) ***Derek Amanatullah****, Robert Manasherob, Shay Warren, Lyong Heo, Daisuke Furukawa, Stuart Goodman*
9:33am	Probe-Based Ultrasonication Effectively Removes Biofilm from Clinically Relevant Orthopedic Materials: An In-Vitro Proof of Concept (*#1422*) ***Matthew Shirley****, Sarah Romereim, Bailey Fearing, Thomas Fehring, Jesse Otero*
9:39am	Discussion
9:45am	Halicin Prevents Accumulation of Aminoglycoside-Induced Small Colony Variants of *S. aureus* (*#1532*) *Allison Wintring,* ***Jason Minnich****, Akira Morita, Roman Natoli, Edward Greenfield*
9:51am	Inherently Anti-Staphylococcal Bone Cement (*#1384*) *Lauren Kemp, Ivan Delgado Alvarado, Robert Tower,* ***Alexander Tatara***
9:57am	Ex Vivo Antibacterial Efficacy of MDPB-Coated Cobalt Chromium Implants against Staphylococcus aureus and Staphylococcus epidermidis in Preventing Bacterial Contamination (*#1499*) ***Samuelson Osifo****, Michael Shannon, Victoria Wong, Adrian Santana, Kenneth Urish, Gene Kulesha*
10:03am	Pretreatment with Vancomycin Prevents Biofilm Formation on Marlex Mesh Utilized in Revision Knee Arthroplasty (*#1389*) ***Christina Chao****, Tyler Hoskins, Mohammed Hammad, Suenghwan Jo, Mathias Bostrom, Alberto Carli*
10:09am	Discussion
10:15am	**Break** Visit Exhibitor Visit ePosters and Physical Posters (1385, 1394, 1398, 1445, 1510, 1539, 1546, 1551, 1553, 1568, 1585)

Symposium 5 **Osseointegration and Infection**
Moderator: Laura Certain, MD PhD

10:45am

Osseointegration Limb Replacement:
A Radical Functional Solution for Chronic Infection
Robert Rozbruch, MD, Orthopaedic Surgeon
Hospital for Special Surgery, New York, NY

Basic Science of Osseointegration: A Focus on Infectious Perspectives
Jason Hoellwarth, MD, Orthopaedic Surgeon
Hospital for Special Surgery, New York, NY

Diagnosis and Management of Osseointegration-related infections
Michael Henry, MD, Infectious Diseases
Hospital for Special Surgery, New York, NY

11:55am **Hall of Fame Induction of Jeanette Wilkins, MD** (non CME)
John Blaha, MD, Michael Patzakis, MD

12:05pm **Introduction of Incoming President** (non CME)
Presentation of Awards
Jon T. Mader Award; Jeanette Wilkins Award; Poster Award
Closing Remarks and Prize Drawing
Andy Miller, MD

12:20pm Adjourn

We look forward to seeing you again in 2026!

Session I
Antibiotics and Diagnosis

[1533] Cefazolin and the R-1 Side Chain: Why Your Joint Arthroplasty Patients With Cephalosporin Allergy Can Safely Be Given Cefazolin

Authors: **Josef E Jolissaint**, Katherine E Mallet, Andrew Thomson, Alberto V Carli, Matthew S Austin

Background And Rationale: Cefazolin, a first generation cephalosporin, is the standard of care for perioperative antibiotic prophylaxis in hip and knee arthroplasty patients. Research has shown that prosthetic joint infection (PJI) rates are significantly higher when non-cefazolin antibiotics are used for perioperative TKA and THA prophylaxis. Cefazolin contains an R1 side chain that has not shown cross reactivity with other cephalosporins. Despite these data, the declaration of a cephalosporin allergy causes uncertainty regarding the optimal antibiotic choice in these patients.

Study Question: The purpose of this study was to determine the safety of administering perioperative cefazolin in patients with a cephalosporin allergy undergoing joint arthroplasty.

Methods: We identified all patients (n=1267) with a documented cephalosporin allergy who underwent total hip or knee arthroplasty at a high volume academic medical center from 2016-2024. We compared patients who received perioperative cefazolin despite the presence of a cephalosporin allergy (n=481) to patients who received alternative antibiotic prophylaxis (n=786). The primary outcome measure was the incidence of IGE mediated (type 1) or severe delayed-type (type iv) allergic reactions with end-organ dysfunction within the first 72 hours postoperatively. Secondary outcomes included 90-day complication rates including PJI, *C. difficile* infection, adverse events and readmission.

Results: The incidence of allergic reaction in cephalosporin allergic patients who received cefazolin was 0.0% (0/481) compared to 0.51% (4/786) in patients who received alternative antibiotics prophylaxis (p=0.12). There were no significant differences in the incidences of PJI (0.23% vs. 0.30%; p=0.83), *C. difficile* infection (0.0% vs. 0.0%) or readmission (3.95% vs. 4.34%; p=0.75) within 90 days. There was one adverse event related to cefazolin administration which was urethral irritation and was self-limited. There were three adverse events related to alternative antibiotic prophylaxis including cutaneous manifestations, GI distress and headache in a patient with idiopathic intracranial hypertension. All four allergic reactions in the alternative antibiotic prophylaxis cohort required supportive treatment with IV corticosteroids, fluids and antihistamines.

Discussion: In this cohort of hip and knee arthroplasty patients, perioperative administration of cefazolin was not associated with an increased risk of clinically significant allergic reactions or postoperative complications compared with alternative antibiotic regimens. This is likely secondary to the fact that cefazolin possesses a unique R1 side chain that is structurally distinct from those of other cephalosporins and penicillins, and does not share immunogenic determinants with other β-lactams.

Conclusion: These data and the fact that cefazolin's unique R1 side chain is not shared by any other cephalosporins suggests that cefazolin can safely be administered to most patients with a documented cephalosporin allergy.

Attachments:
There is no figure for this abstract.

1509] Postoperative Oral Antibiotics Continues To Increase in Prevalence without Associated Improvements in One-Year Periprosthetic Joint Infection Rates

Authors: Joshua P Rainey, Brenna E Blackburn, Christopher E Pelt, Jeremy M Gililland, Lucas A Anderson, Michael J Archibeck, **Laura K Certain**

Background And Rationale: In an effort to reduce periprosthetic joint infections (PJIs) following total hip arthroplasty (THA) and total knee arthroplasty (TKA), extended oral antibiotic (EOA) prophylaxis has gained national popularity. However, there is conflicting literature regarding its efficacy.

Study Question: Is prescription of oral antibiotics at the time of primary arthroplasty associated with reduced risk of PJI at one year?

Methods: The Epic Cosmos database (Epic Systems Corporation, Verona, WI, USA) was queried, which includes 299 million patients from over 1,700 hospitals and 40,000 clinics in the united states. All patients who underwent primary THA or TKA between 2016 and 2024 and had osteoarthritis as their primary diagnosis were included. We evaluated all patients who received cefadroxil or cephalexin, trimethoprim-sulfamethoxazole (TMP-SMX), or doxycycline postoperatively and compared each of these three groups to patients who did not receive oral antibiotics postoperatively. Stratification to account for obesity, diabetes, and chronic kidney disease was performed. The primary outcome was PJI within one year postoperatively.

Results: Prescriptions of cephalexin/cefadroxil and doxycycline after primary THA and TKA increased more than tenfold from 2016 to 2024; prescriptions of TMP-SMX increased fourfold. Patients who received cefadroxil/cephalexin had an odds ratio (OR) of PJI within one year of 1.09 (P = 0.0002) compared to those who received no oral antibiotics. When accounting for comorbidities, there was no difference in one-year PJI rates for patients who did versus did not receive postoperative cefadroxil/cephalexin. When evaluating all patients and when accounting for obesity, patients who received TMP-SMX had increased odds of PJI at one year postoperatively, OR = 2.07 (P < 0.0001) and OR = 1.29 (0.0255), respectively. When evaluating all patients and when accounting for comorbidities, patients who received doxycycline postoperatively had significantly increased odds of PJI at one year (ORs 1.38-1.84, P values

Discussion: Though the use of EOA has increased dramatically in recent years, this large, national database study did not show reduction in PJI for patients who receive EOA, even among patients at higher risk of PJI due to obesity, diabetes, or CKD.

Conclusion: The use of EOA after primary THA or TKA is not associated with reduced rates of PJI at one year

Attachments:

Table 1: Patients who received cefadroxil or cephalexin versus patients who received no oral antibiotic

All comers							
	PJI	No PJI	All	% PJI	p-value	Odds ratio (95% CI)	p-value
Cefadroxil/cephalexin	1834	109740	111574	1.64%	<0.001	1.09 (1.04, 1.15)	0.0002
No oral antibiotic	19862	1300565	1320427	1.50%			
BMI > 35							
	PJI	No PJI	All	% PJI	p-value	Odds ratio (95% CI)	p-value
Cefadroxil/cephalexin	713	32297	33010	2.16%	0.809	1.01 (0.93, 1.09)	0.8091
No oral antibiotic	6652	304232	310884	2.14%			
BMI > 35, diabetes							
	PJI	No PJI	All	% PJI	p-value	Odds ratio (95% CI)	p-value
Cefadroxil/cephalexin	388	15641	16029	2.42%	0.512	0.97 (0.87, 1.07)	0.5122
No oral antibiotic	3839	149383	153222	2.51%			
BMI > 35, diabetes, CKD							
	PJI	No PJI	All	% PJI	p-value	Odds ratio (95% CI)	p-value
Cefadroxil/cephalexin	133	3674	3807	3.49%	0.634	0.96 (0.80, 1.15)	0.6345
No oral antibiotic	1490	39396	40886	3.64%			

[1490] PJI Treatment and the Emergence of Antimicrobial Resistance: A Retrospective Cohort Study

Authors: Andy O Miller, Andrew L Thomson, Mia Fowler, Ananya Alleyne, **Michael Henry**, Alberto V Carl

Background And Rationale: Periprosthetic joint infection (PJI) is a devastating complication following total joint arthroplasty (TJA), often necessitating prolonged antibiotic therapy, which may increase the likelihood of reinfection with antibiotic-resistant organisms. This study aimed to evaluate the likelihood that PJI patients with recurrent PJI will be infected with microorganisms that are resistant to initial antibiotic therapy.

Study Question: 1. What is the rate of the acquisition of antibiotic resistance in recurrent PJI cases? 2. Does the rate vary by joint (hip or knee) or by surgical strategy (DAIR or two-stage)?

Methods: We conducted a retrospective review of patients with culture-positive PJI of the hip or knee at a single center from 2018 to 2023. Eligible patients underwent either DAIR or two-stage revision and developed a relapse of infection during a two-year follow-up. Antibiotic resistance to the initial antimicrobial regimen was assessed by two infectious disease specialists and denoted by: 1) emergence of acquired resistance in the original organism, or 2) new infection with a different, resistant, organism. Fisher's exact test was used to compare resistance rates by joint and surgical treatment.

Results: Ninety-nine patients met inclusion criteria: 62 knees and 37 hips. Relapse secondary to new organisms with resistance to the initial therapy were observed in 26 cases (26.3%). Knees and hips did not differ significantly ($p = 0.64$). A significantly higher rate of resistance acquisition was found in patients undergoing two-stage revision (39.1%, 18/46) compared to DAIR (17.3%, 9/52; $p = 0.02$). When the relapse was secondary to a recurrence of the initial pathogen causing PJI, no cases of acquired resistance were observed, regardless of joint type or treatment approach

Discussion: Pathogens resistant to initial therapy were present in over one-quarter of recurrent PJI cases, but all were new pathogens. Resistance rates were significantly higher after two-stage revisions, potentially due to increased antibiotic exposure or selection pressure in prolonged treatment protocols.

Conclusion: These findings underscore the need for targeted strategies to address the emergence of antibiotic-resistant organisms in recurrent PJI cases. Future research should focus on identifying and mitigating risk factors associated with new resistant pathogens to enhance patient outcomes in this challenging patient population.

Attachments:

There is no figure for this abstract.

[1581] Prosthetic Joint Infection Due to Candida Species: What Affects Outcome of Treatment?

Authors: **Martin McNally**

Background And Rationale: Candida species are an uncommon cause of prosthetic joint infection (PJI). We evaluated the surgical management of candida PJI in a large multinational study.

Study Question: What factors affect outcome after surgical treatment of PJI due to candida species?

Methods: Patients with EBJIS definition confirmed PJI, due to candida species, from 19 medical centres were assessed. Demographic, diagnostic, microbiological, medical and surgical treatment and outcome data were collected.

Results: 269 patients were recruited with >1 year follow-up. Mean age was 70.2 years (+/- 12.4) with 10.8% being immunocompromised. The most common fungal species were C. albicans (55.8%), C. parapsilosis (29.4%), C. glabrata (7.8%) and C. tropicalis (5.6%). Co-infection with bacteria occurred in 138 (51.3%) cases. rnDAIR was performed in 96 (36.2%) cases, with 169 (63.8%) having implant exchange or removal (Table 1). Patient demographics and antifungal therapy were similar in all surgical groups.rnTreatment was successful in 156 (58%) cases. Failure was more likely in older patients (>70 years; p=0.008) and those who had DAIR (OR 1.945; 1.156-3.279; p=0.004). Failure was less likely with C. parapsilosis infection compared to C. albicans (31.6% vs 48%; p=0.037).rnDAIR patients had more co-infection with bacteria (63.5% vs 47.4%; p=0.013) and more previous surgeries (median 4 vs 3; p=0.007), but multivariate analysis showed that these were not independent risks for failure. Mortality was not different between DAIR patients and those with other surgery (13.5% vs 17.7%; p=0.372). rnDAIR was successful in 45/96 (46.9%) cases compared to 110/169 (65.1%) cases with other surgery (p<0.004).rnTwo-stage revision was successful in 54/78 (69.2%); significantly better than DAIR (p=0.003). One-stage revision was successful in 51/76 (67.1%) patients; also significantly better than DAIR (p=0.002), but equivalent to two-stage revision (p=0.777).rnDuration of antifungal therapy did not affect outcome (<6 weeks vs 6-12 weeks vs >12 weeks; p=0.913).

Discussion: This is the first large study to report multivariate analysis of multiple components of care and their effect on outcome.

Conclusion: Dair was successful in <50% of patients with candida PJI. We could not identify any subgroup which might have better outcomes with this surgical option. Almost 90% of patients had no immunocompromise. One or two-stage revision offer a better option, if possible, and do not increase mortality.

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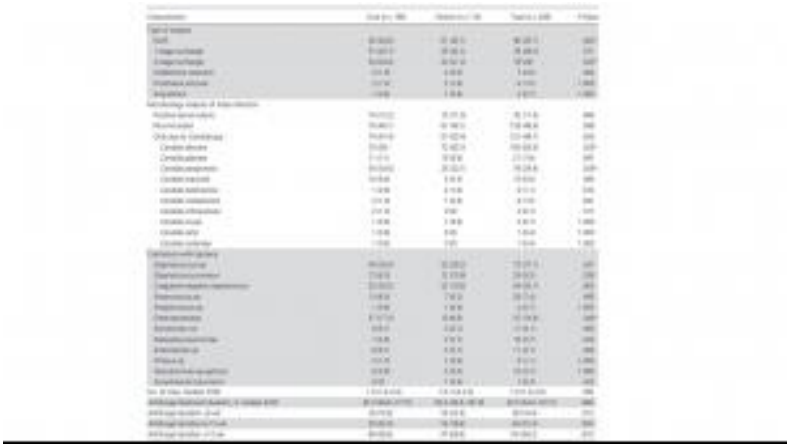

[1468] Machine Learning can be Fine-Tuned to Match Different Criteria-Based Definitions of PJI

Authors: Jim Parr, Krista Toler, Van THAi-Paquette, Pearl Paranjape, Alex McLaren, **Carl Deirmengian**

Background And Rationale: Different criteria-based definitions for periprosthetic joint infection (PJI) reveal distinct biases along the sensitivity–specificity tradeoff. The International Consensus Meeting (ICM) prioritizes specificity, whereas the European Bone and Joint Infection Society (EBJIS) emphasizes sensitivity. As the field moves from rigid binary rule sets toward machine-learning (ML) solutions, it would be advantageous to have flexible models, which can pattern match any criteria-based definition.

Study Question: Can an unsupervised ML model, derived from the same synovial-fluid dataset, be fine-tuned to reproduce the diagnostic outputs of different criteria-based systems for PJI?

Methods: We retrospectively analyzed 104,090 hip and knee synovial-fluid samples, each with 11 biomarkers spanning specimen integrity, microbial detection, and inflammation. After scaling, data were reduced to five principal components (>85 % variance) and clustered with a two-component gaussian mixture model, yielding a per-sample infection probability. Probability cut-offs that maximized the Youden index were derived separately against synovial fluid derived 2018 ICM and 2021 EBJIS labels.

Results: Using a PJI probability cut-off of 0.94, the model matched the 2018 ICM definition with 99.6% sensitivity, 99.6% specificity, a Youden index of 0.99, and AUC of 1.00. The same tuning resulted in 88.5% sensitivity, 99.9% specificity, and Youden index of only 0.88 when predicting the 2021 EBJIS diagnosis. However, when the ML model was fine-tuned to a PJI probability cutoff of 0.03 (more sensitive), the diagnostic performance versus the EBJIS definition improved to a 95.1% sensitivity, 97.9% specificity, Youden index of 0.93, and AUC of 0.99.

Discussion: A single unsupervised PCA-GMM model can closely reproduce either definition by shifting its probability threshold: higher values capture the specificity of ICM, whereas lower values attain the sensitivity favored by EBJIS. This flexibility allows the ML model to be fine-tuned, matching various current and future iterations of PJI definitions.

Conclusion: An unsupervised PCA-GMM ML model can be fine-tuned to reproduce the diagnostic classifications of different criteria-based definitions of PJI, allowing it to evolve with future changes in PJI definitions.

Attachments:

There is no figure for this abstract.

[1472] Development and Validation of a Synovial Fluid Machine-Learning Score for PJI, With Clinical Verification in an External Cohort

Authors: Jim Parr, Krista Toler, Van THAi-Paquette, Pearl Paranjape, Yale Fillingham, Alex Mclaren, **Carl Deirmengian**

Background And Rationale: Diagnosing PJI relies on complex criteria-based definitions requiring clinician implementation. Laboratory-implemented methods matching these definitions could simplify and democratize PJI diagnosis at a public health level.

Study Question: Can a machine learning (ML) model using synovial fluid (SF) biomarkers, without culture results, rapidly match a criteria-based definition?

Methods: We analyzed 104,090 sf samples with complete laboratory data (WBC, PMN%, CRP, alpha-Defensin, RBC, a280, and microbial antigen tests) using a two-stage ML approach. First, unsupervised learning without predefined thresholds identified two naturally distinct diagnostic clusters (Fig. 1). Second, a supervised model was developed using a training dataset (n=83,272) to generate PJI probability scores (Syntuition™, Zimmer Biomet) based on cluster labels. The model was internally evaluated versus a modified 2018 ICM standard using a validation dataset (n=20,818). The model performance was externally verified versus the full unmodified 2018 ICM definition, using an independent cohort (n=164) with full clinical data.

Results: In the validation dataset, the ML model achieved 99.3% sensitivity (95%CI: 98.9-99.5%), 99.5% specificity (95%CI: 99.4-99.6%), and 99.7% agreement (95%CI: 99.6-99.8%) with the clinical reference. For ICM-inconclusive samples (n=1,442), the model classified 95% as Infected or Not-Infected with high confidence (>80% or <20% probability). Validation using an external clinical cohort confirmed these performance characteristics when compared against the complete 2018 ICM definition. Alpha-defensin, WBC, and PMN% were the most influential ML features.

Discussion: The ML-based PJI score leverages greater information content (11 laboratory results as continuous data) compared to criteria-based definitions that reduce tests to binary outcomes. This enables the model to match criteria-based results without culture data and classify 95% of samples deemed inconclusive by conventional systems. By combining multiple lab results into a diagnosis that matches a criteria-based system, the PJI score democratizes diagnosis by shifting workload from clinician to laboratory, effectively eliminating the implementation gap.

Conclusion: The ML-based PJI score utilizes sf test results, without culture data, to accurately match the performance of a criteria-based definition, providing results within one day.

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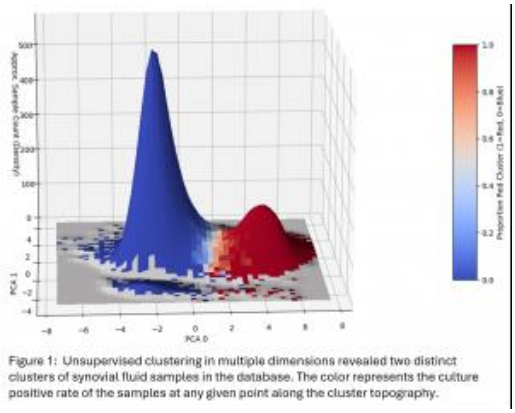

Figure 1: Unsupervised clustering in multiple dimensions revealed two distinct clusters of synovial fluid samples in the database. The color represents the culture positive rate of the samples at any given point along the cluster topography.

[1583] Sonication aids in diagnosis and treatment of prosthetic joint infection

Authors: Alfredo Puing, Thilinie Bandaranayake, Anne Spichler, Ilda Molloy, Adam Winter, **Marjorie Golden**

Background And Rationale: Identifying pathogens in prosthetic joint infection (PJI) may be challenging. Organisms may be embedded in biofilm, so sonication of explanted prostheses may improve diagnostic yield. We report our experience using sonication in patients with PJI of shoulders, hips and knees.

Study Question: Does sonicate fluid culture improve diagnostic yield and impact treatment in patients with prosthetic joint infection (PJI)?

Methods: Retrospective review of all sonicate culture from hips, knees and shoulders collected January 2021-December 2023. PJI diagnosed using IDSA, ICM 2018 or EBJIS criteria. We compared sonicate culture results with preoperative and standard intraoperative cultures. Chart review determined if sonication impacted clinical decision making. Analysis included descriptive comparisons and chi-square tests for categorical variables.

Results: 419 specimens collected from 337 patients (54% female; median age 67 years), including 222 knees, 169 hips and 28 shoulders. Sonicate cultures positive in 54.7%, with 17.9% having polymicrobial growth. Sonication detected at least one organism not isolated in conventional culture in 104 cases (24.8%). Sonication impacted management in 20/419 cases (4.8%), sometimes in more than one way: Antibiotics adjusted in 7 patients, diagnostic criteria fulfilled in 10 patients, and in 8 instances, sonication provided the only positive culture (See figure). There was a significant association (p=0.012) between higher CFU counts (>20/10ml) and concordance with conventional culture for all sites.

Discussion: Sonication improved organism recovery, yielding positive cultures in over half of cases and impacting clinical management in 4.8%. Using sonicate data, no patient had culture negative PJI. CFU count >20/10 ml was significantly associated with concordance between sonicate and routine cultures, whereas organisms with <20 CFU/10 ml counts were more often detected only by sonication. CFU quantify should be interpreted in context to avoid overtreatment of potential contaminant

Conclusion: Sonicate culture improves diagnostic accuracy by enhancing organism recovery and identifying pathogens not captured by standard cultures, impacting treatment decisions for some patients. Results should be interpreted in the context of CFU burden and clinical criteria.

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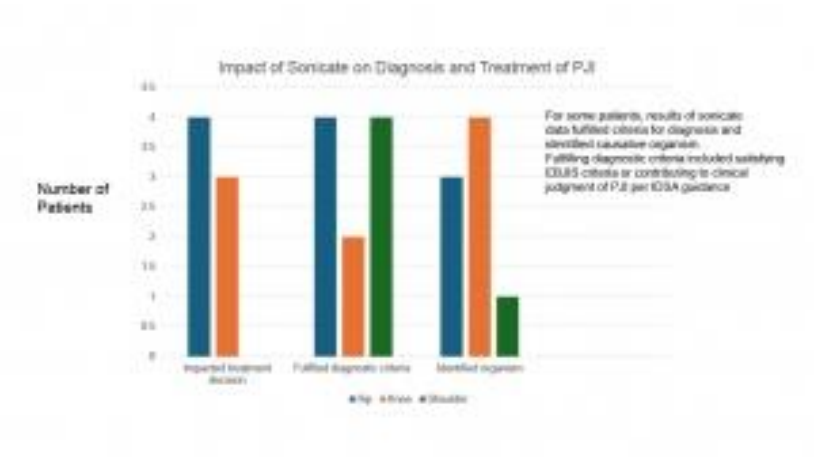

[1396] Rapid Detection and Differentiation of PJI-Relevant Pathogens in Enriched Synovial Fluid Via Voc Sensing

Authors: Xiaonao Liu, **Derese Getnet**, Robert Hopkins, Taejun Ko, Deyu Liu, Jennifer Dootz, Buyu Yeh, Subramaniam Somasundaram, Mya Wilkes, Krista Toler

Background And Rationale: Standard synovial fluid (SF) culture for PJI diagnosis involves turnaround times of up to a week. This inherent delay hinders timely microbial identification, often necessitating prolonged empirical antibiotic therapy and complicating clinical decision-making. Faster diagnostic methods are needed to streamline laboratory workflows and accelerate targeted patient care. We have explored a novel nanosensor array and artificial intelligence (AI)-based analytics to detect microbial volatile organic compounds (VOCs). We evaluated its feasibility for rapid analysis of enriched sf to enable earlier detection and facilitate efficient, targeted antibiotic.

Study Question: Can VOC nanosensors rapidly detect and differentiate key gram-positive (*S. aureus* [SA], *S. epidermidis* [SE]) and gram-negative (*P. aeruginosa* [PA]) PJI bacteria via real-time VOC analysis in enriched SF? How does detection time correlate with bacterial load (1-10^6 cfu/ml)?

Methods: Pooled, uninfected remnant SF from a single clinical laboratory was enriched 1:1 with broth. Samples were spiked with SA, SE, or PA (1 -10^6 cfu/ml); controls lacked bacteria. Bacterial load was confirmed via plating. The nanosensor array monitored headspace VOCs during 37°c incubation. Signal onset time and VOC patterns were analyzed. The microbial VOCs were confirmed by gas chromatography-mass spectroscopy (GC-MS) analysis.

Results: The nanosensor array detected VOCs from SA, SE, and PA in enriched SF at all concentrations (1-10^6 CFU/mL) within 9 hours. Signal onset time inversely correlated with bacterial load. Distinct, reproducible VOC signal patterns specific to each pathogen enabled differentiation between organisms and controls. The GC-MS verified the VOCs.

Discussion: A nanosensor array can rapidly (<9 hours) detect and differentiate key pji pathogens (sa, se, pa) via unique voc signatures in enriched sf, representing a significantly faster timeframe compared to standard of care culture timelines. The distinct patterns provide a basis for ai-driven microbial classification. The distinct patterns provide a basis for ai-driven microbial classification. This technology shows strong potential for same-day screening, accelerating the pji diagnostic workflow and guiding timely treatment decisions.

Conclusion: This novel nanosensor array reliably detects and differentiates PJI-relevant bacteria (SA, SE, PA) in enriched synovial fluid within hours by analyzing voc profiles.

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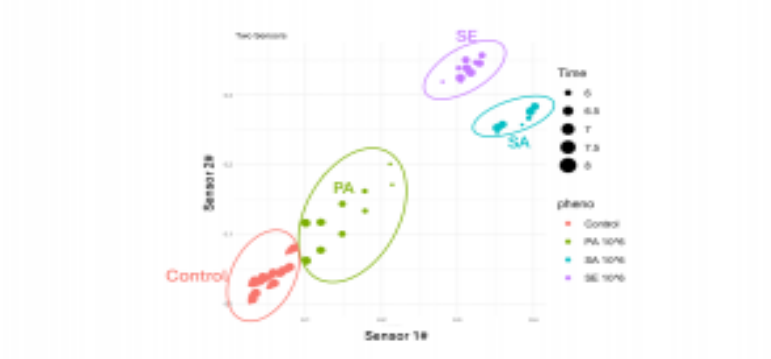

Session II
Fracture and Spine

[1558] Prevalence of Occult Infections in Primary Posterior Instrumented Spinal Fusion

Authors: **Celeste Abjornson**

Background and Rationale: Occult bacteria inhabit the dermal and deeper tissue layers, including the intervertebral disc and bone. Upon implantation of instrumentation, these organisms can form biofilms deleteriously affecting surgical outcomes and have been linked to aspectic loosening and pseudoarthrosis.

Study Question: We hypothesize that neither standard surgical skin preparation nor preoperative antibiotics access and eradicate innate organisms prior to primary spine surgery.

Methods: Fifty-four prospective, consecutive patients undergoing primary instrumented lumbar spine surgery were enrolled.
All patients received preoperative antibiotics and skin preparation.
Culture samples were obtained from the superficial skin, dermal wound-edge following incision, hypodermis, and vertebral pedicle prior to implantation of instrumentation.
Control culture samples were taken of the scalpel, suction, and tap prior to incision.
The rate of positive culture samples from the layers traversed during standard surgical spine exposure was the primary outcome.

Results: Positive cultures were found in 33.3% of patients (18/54). Culture-positive patients had on average 3.1 positive samples per case. Superficial skin samples were positive in 13.0% (n=7), dermal layer in 16.7% (n=9), hypodermis in 13.0% (n=7), and vertebral body in 19% (n=10) of cases. There was not a direct correlation between skin-positive and vertebral body-positive cultures. All control samples prior to incision were negative. *C. acnes* was isolated in 83.3% of culture-positive cases. Lower risk factors included female gender (p=0.007) and ChloraPrep utilization (p=0.017). At 4 years post-operative, secondary surgical intervention was more than twice as high in culture-positive (27.8%) versus culture-negative (13.9%) patients.

Discussion: Primary instrumented posterior spine surgery deep culture samples of the vertebral pedicle were more often positive than dermal layer samples. The data collected supports our hypothesis that occult bacteria persists in the skin and deeper tissue layers perioperatively, regardless of preoperative skin preparation and prophylactic antibiotics.

Conclusion: Current surgical methodology is not addressing the innate bone biome which plays an important role in clinical outcomes.

Attachments:

There is no figure for this abstract.

[1457] Outcomes Of Septic Long Bone Nonunions: Which Organisms Are Associated With Poorer Results?

Authors: Kathryn A Barth, **Robert E Bilodeau**, Heather S Haeberle, Mark F Megerian, Craig E Klinger, Gregory V Schimizzi, William M Ricci

Background And Rationale: Management principles for septic long bone nonunions (SLBNU) include eradication of existing infection through surgical debridement, fracture stabilization, and antibiotic treatment.

Study Question: This study assessed the association between cultured organism species and outcomes of septic long bone nonunion treatment.

Methods: Adult patients with septic long bone nonunion repair at a single institution from 2014-2023 were retrospectively reviewed. Septic nonunion was defined as a nonunion associated with either a history of positive nonunion cultures from an outside hospital prior to study site presentation or a positive culture from nonunion surgery at the study site. Patients with incomplete data, < 6-months follow-up without osseous union, or nonunion resulting from osteotomy, fusion, or pathologic fracture were excluded.

Results: 101 patients with septic nonunions were included. Mean age was 52 years (range 18–89) and 73% were male. Mean follow-up from definitive nonunion repair was 22 months (range 1.4-92.5). At final follow-up, 86% achieved radiographic union. Patients with negative index study site nonunion cultures were more likely to have at least one unplanned procedure versus patients with positive nonunion surgery cultures; (60% vs. 30%, p=0.018). Polymicrobial infections (in the 81 with positive index study site nonunion cultures) were associated with double the rate of having at least one or more unplanned operation compared to monocolonized patients (43% vs. 18%, p=0.014) (Table 1). No differences in union rates across bacterial species were observed (p>0.9).

Discussion: Negative cultures at time of index nonunion surgery are associated with an increased rate of unplanned procedures, emphasizing the importance of obtaining accurate culture data to guide antibiotic treatment regimens. A substantial subset of patients acquire a polymicrobial infection over the treatment course, and this is associated with more unplanned procedures to eradicate infection or promote union. Further investigation is needed to understand the etiology of this shift in organism composition.

Conclusion: Organisms cultured from septic long bone nonunions play a significant role in the number of operations necessary to achieve clinical resolution. Those with polymicrobial infections may deserve more aggressive eradication efforts, as this group had a higher rate of unplanned operations to manage infection or to promote union.

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Table 2. Cultured Organisms by OTA/AO Classification

Bone	Location	OTA/AO	N	Cutibacterium acnes	Staphylococcus epidermidis	Staphylococcus aureus	MRSA	Other Staphylococcus spp.	Other gram positive	Gram negative	Fungal
Humerus	Proximal	11	2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Humerus	Shaft	12	14	71.4%	21.4%	7.1%	0.0%	14.3%	0.0%	7.1%	0.0%
Humerus	Distal	13	2	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Humerus	All locations	1	18	72.2%	22.2%	5.6%	0.0%	11.1%	0.0%	5.6%	0.0%
Radius/Ulna	Shaft	2R2,2U2	2	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Radius/Ulna	All locations	2	2	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Femur	Proximal	31	5	40.0%	20.0%	10.0%	0.0%	40.0%	0.0%	20.0%	0.0%
Femur	Shaft	32	12	9.0%	41.7%	8.3%	0.0%	50.0%	8.3%	16.7%	8.3%
Femur	Distal	33	6	33.4%	0.0%	16.7%	0.0%	16.7%	0.0%	33.4%	0.0%
Femur	All locations	3	23	22.7%	26.1%	13.0%	0.0%	39.1%	4.3%	21.7%	4.3%
Tibia	Proximal	41	5	20.0%	80.0%	0.0%	0.0%	40.0%	0.0%	20.0%	0.0%
Tibia	Shaft	42	17	35.3%	11.8%	11.8%	0.0%	29.4%	11.8%	17.6%	5.8%
Tibia	Distal	43	17	11.8%	17.6%	17.6%	23.5%	17.6%	11.8%	29.4%	5.8%
Tibia	All	4	39	20.5%	23.1%	20.5%	18.0%	28.2%	10.3%	28.2%	5.2%
All Bones	All locations	NA	80	32.1%	34.7%	13.1%	4.8%	23.8%	6.2%	18.8%	3.7%

*MRSA=Methicillin-resistant Staphylococcus aureus

[1528] Safety and Efficacy Testing for the First of Its Kind, FDA Approved, Commercially Available Antibacterial Surface Treatment for Permanent Limb Salvage and Spine Stabilization Implants.

Authors: **Celeste Abjornson**

Background And Rationale: Bacterial contamination of implants during surgery remains a challenge despite improvements in OR decontamination methods and protocols. To overcome this barrier, a novel surface treatment technology has been developed with a non-eluting, covalently bound surface modification designed to mechanically disrupt and kill bacteria during surgery.

Study Question: 1. Is the antibacterial surface effective at killing the bacteria most commonly associated with orthopedic device related infections? 2. Does the antibacterial surface pass appropriate in vivo and in vitro safety studies?

Methods: 1. A. Antibacterial testing was perform using 6 strains of bacteria including a MRSA clinical isolate. B. Simulated clinical use bacterial contamination was performed by aerosolizing MSSA and *s. Epidermidis* using a custom built bacterial spray-deposition chamber.
2. An instrumented spine fusion study was performed in sheep to examine local and systemic inflammation, spine fusion rates, bone apposition to pedicle screw surfaces and pullout strength of pedicle screws. Timepoints for the sheep study were 1, 3 and 6 months to allow for evaluation of both the early and late tissue remodeling response.

Results: 1a. Surface reduced bacterial contamination on treated titanium alloy surfaces at least 99.95% on MSSA , *E. coli*, MRSA, *P. aeruginosa*, *C. acnes*, *E. cloacae*. 1b. Aerosol deposition studies demonstrated that the surface reduces *S. epidermidis* and MSSA bacterial contamination 99.9% within 30 minutes of exposure. 2. Sheep safety study results demonstrated no evidence of local or systemic toxicity, no statistically significant change in spine fusion rates, no change in mechanical pullout strength and no change in bone apposition rates.

Discussion: The results of these preclinical studies demonstrate that the antimicrobial surface modification can significantly reduce bacterial contamination without introducing safety risks to the patient.

Conclusion: Reducing bacterial contamination during surgery remains an important goal. This novel, non-eluting surface technology, which is the first of its kind to be approved by FDA, offers an additional tool to help protect the implant surface.

Attachments:

There is no figure for this abstract.

[1574] Negative Pressure Wound Therapy Reduces Deep Infection Rate versus Conventional Wound Dressings for Gustilo Type II/III Open Lower Extremity Fractures: A Meta-Analysis

Authors: **Justin Le**, Nicholas Moscardelli, Zeshan Fahim

Background And Rationale: Open Gustilo type II/III lower limb fractures resulting from high-energy trauma present significant challenges due to a high risk of infection and extensive soft tissue damage. While conventional dressings provide basic coverage, they may be limited in promoting granulation and preventing deep infections. Negative pressure wound therapy (NPWT) has emerged as a promising alternative, enhancing wound healing by reducing edema, removing exudate, and stimulating tissue regeneration. However, the literature has not been updated since 2020 in this regard. This study aims to assess the effect of NPWT on postoperative infection rates in patients with compound lower-limb fractures.

Study Question: Does the use of negative wound pressure therapy improve overall and deep infection rates versus conventional gauze dressings for patients with open fracture wounds?

Methods: A systematic review and meta-analysis of five databases comparing overall infection and deep infection rates within one month in adult patients with traumatic open fracture wounds was performed. Studies were screened in rayyan.ai. All statistics were performed using SPSS with a log Odds Ratio analysis.

Results: Five studies with a total of 1727 patients comparing NPWT to conventional gauze dressings demonstrated no statistically significant difference in overall infection rates (pooled OR = 1.65; 95% CI: 0.55–4.90; $p = 0.37$), with moderate heterogeneity ($I^2 = 61\%$). In contrast, a subgroup analysis of three studies reporting deep infection outcomes found a significant benefit with NPWT (pooled OR = 2.81; 95% CI: 1.46–5.42; $p = 0.002$), and lower heterogeneity was observed ($I^2 = 43\%$).

Discussion: Our analysis demonstrates that NPWT is associated with a significant reduction in deep infection rates compared to conventional gauze dressings, while the improvement in overall infection rates was not statistically significant. These findings suggest a potential benefit of NPWT in preventing more severe infectious complications. Limitations include a small number of studies and variability in follow-up time points. Future research should standardize follow-up and assess outcomes such as time to granulation and wound closure.

Conclusion: NPWT significantly reduces the risk of deep infections in open lower extremity fractures compared to conventional dressings. These findings highlight its potential clinical value in preventing severe infectious complications, warranting further high-quality studies with more standardized outcome reporting.

Attachments:

There is no figure for this abstract.

[1549] Armed to the Teeth – Fight Bite-Associated Native Joint Septic Arthritis of the Hand Differs From Other Forms of Septic Arthritis

Authors: **Lauren Whearty**, Stephen J McBride

Background And Rationale: Human bite injuries to the hands may occur when a closed fist strikes the mouth of another person, referred to as “fight bites”. Up to 25% of human bite injuries become infected. Native joint septic arthritis (NJSA) caused by fight bites (FBSA) is poorly studied.

Study Question: We aimed to describe two cohorts of FBSA and compare these with non-fight bite-associated NJSA (NFBSA) cases.

Methods: FBSA cases were obtained from two retrospective coding-based NJSA cohorts aged ≥16 years from Middlemore Hospital in Auckland, New Zealand from 1 January 2009 to 31 Dec 2014 and from 1 July 2016 to 31st June 2020, and compared with NFBSA cases from the cohorts.

Results: FBSA represented 11% (101/949) of cases, and was associated with younger age (median 26 years) compared to small joint NFBSA (SNFBSA) (49.5) and all NFBSA (54); male gender (87/101, 86%) (SNFBSA (77%, p=0.0521, all NFBSA 77%); higher rates of tobacco use; and lower rates of diabetes, osteoarthritis and renal failure than SNFBSA and all NFBSA. FBSA was more commonly polymicrobial and caused by oral flora, HACEK organisms and anaerobes, and less commonly caused by S. aureus compared to SNFBSA and all NFBSA.
FBSA antimicrobial treatment a median 2 weeks vs. 4 for SNFBSA and 5 for all NFBSA and more commonly used oral antibiotics (89%) (SNFBSA 67%, all NFBSA 38%). FBSA was more commonly managed operatively (95%, SNFBSA 82%, all NFBSA 84%) (P values for comparisons <0.05 except where stated). FBSA was associated with shorter hospital length of stay (median 4 days, SNFBSA 7 days, all NFBSA 10 days), and lower rates of treatment failure and mortality compared with all NFBSA, but not with SNFBSA.

Discussion: FBSA disproportionately impacts those likely to perpetrate assaults, younger males. The lower comorbidity rates in FBSA are likely related to case age. The microbiology of FBSA differs markedly from NFBSA, reflecting mouth flora inoculated into or over joints in fight bites. Antimicrobials recommended by the SANJO Guidelines do not include anerobic cover which is needed for FBSA. FBSA is associated with better outcomes than NFBSA despite shorter treatment duration, likely due to the smaller volume of infection in small joints.

Conclusion: FBSA has different demographics, morbidity, and microbiology compared to NFBSA. It is associated with better outcomes and can be safely managed with shorter, oral antibiotic regimens.

Attachments:

There is no figure for this abstract.

[1526] Can we Validate the Musculoskeletal Infection Society Criteria in Patients Suspected of Infection After Transfemoral Osseointegration Surgery?

Authors: Ashley B Anderson, Julio A Rivera, **Sarah E Rabin**, Jason M Souza, Benjamin K Potter, Jonathan A Forsberg

Background And Rationale: Major complications that may require explant of osseointegration (OI) implants in limb loss patients include peri-implant fracture, severe bone resorption, and deep infections. Peri-implant infection (PII) in patients who undergo OI remains challenging to diagnose and manage. The musculoskeletal infection society (MSIS) developed criteria to identify periprosthetic joint infection (PJI) after total joint arthroplasty.

Study Question: This study aimed to validate the MSIS criteria for OI PII.

Methods: We performed a secondary analysis using data from the transfemoral amputation osseointegration study (TFAOS). MSIS variables on all patients were collected within 30 days of infection diagnosis. We compared patient MSIS criteria in patients with superficial infections (n=18), deep infections (n=7), and patients who underwent OI device explant (n=6). We used t-tests to compare MSIS variables between healthy pre-operative values and those obtained during an infection. We then used generalized linear models to determine if we could validate the MSIS criteria in our oi cohort.

Results: There were 55 unique transfemoral patients and 84 limbs. We found no difference between the pre-operative baseline and superficial infection values for CRP or ESR, or between baseline and deep infection values for CRP, ESR, WBC, and percent PMN. There was no difference between the baseline and those that went on to be explanted for CRP, ESR, WBC, and percent PMN. The MSIS criteria did not correlate with the presence of any infection. Lastly, we found no difference in the MSIS preoperative, intraoperative, and total scores between the superficial infection, deep infection, and explant cohorts.

Discussion: The MSIS criteria were not valid for OI PII. The differences in CRP were potentially clinically useful for deep infection and explant cases, but these were not statistically significant with the patient numbers available. Large-scale studies using multicenter registry data may help improve best practices to address infection, rejection, and/or failure of osseointegrated prosthetic limbs.

Conclusion: A validated, evidence-based algorithm for diagnosing PII in OI would help guide medical professionals through the complex workup of patients with OI and suspected infection, improving clinical practice, comparative research analyses, and potentially reducing healthcare-associated costs.

Attachments:

There is no figure for this abstract.

[1399] Toward Defining Optimal Antibiotic Duration in Spinal Implant Infections: Insights from A Multicenter Study

Authors: **Don Bambino Geno Tai**, Jessica O'neil, Sandra Nelson, Daniela De Lima Corvino, Alaina Ritter, Jenny Aronson, Laura Certain, Alexander Tatara, Aaron Tande, Jessica Seidelman For SPIRIT Study Group

Background And Rationale: Surgical site infections involving hardware are serious complications following instrumented spinal fusions. Spinal implant infections (SII) managed with debridement and implant retention require further antibiotic therapy. However, evidence is lacking to support antibiotic therapies. Given this gap, we aimed to assess the association between antibiotic therapy and patient outcomes.

Study Question: Is the type and duration of antibiotic therapy associated with treatment failure?

Methods: We conducted a multicenter retrospective cohort study of 531 adult patients diagnosed with acute postoperative SII (occurring within 90 days of index surgery) between January 1, 2017, and December 31, 2022. All patients underwent surgical debridement with hardware retention. Treatment failure was defined as unplanned reoperation, clinical recurrence of infection, or death attributable to infection.
We constructed a Cox proportional hazards model with time to failure as the outcome and antibiotic therapy as a time-dependent covariate, adjusting for relevant covariates and including death not attributable to infection as a competing event. To assess the impact of antibiotic duration, a second model was built among those with at least 6 weeks of follow-up, with antibiotic duration (≤6 weeks vs >6 weeks) as the primary predictor.

Results: During a median follow-up of 1,168 days (IQR 576-1,817), 151 patients experienced treatment failure. Demographics of the cohort are described in Table 1. There was a non-significant trend toward decreased hazard of failure while on antibiotics (HR 0.70; 95% CI 0.46–1.05; p=0.087). 363 patients did not fail within the first 6 weeks and had a defined antibiotic duration: 60 (16.5%) received ≤6 weeks of therapy, and 303 (83.5%) received >6 weeks. Antibiotic duration longer than 6 weeks was not associated with a risk of failure (HR 0.75; 95% CI 0.43–1.33; p=0.34).

Discussion: Antibiotic therapy after debridement and implant retention may be protective against treatment failure. There was a trend suggesting that longer duration of antibiotic therapy may reduce the risk of failure. Given the difficulty of retrospectively defining antibiotic duration, these findings highlight the need for trials to better define optimal antibiotic management in SII.

Conclusion: Ongoing antibiotic therapy may reduce the risk of treatment failure in SII.

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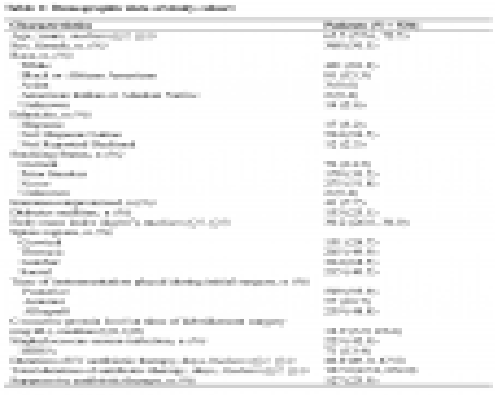

Session III
Hip and Knee 1

[1441] Colonoscopy within 6 Months before TKA May be Associated with Worse Postoperative Outcomes, but not Infection: A National Database Analysis

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas** , Matthew E Deren, Viktor E Krebs , Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: Data on the risk of postoperative infection and complications related to transient bacteremia in patients who underwent colonoscopy prior to primary total knee arthroplasty (TKA) remain limited.

Study Question: We aimed to evaluate the incidence of periprosthetic joint infection (PJI) and other surgical complications in patients who underwent colonoscopy within six months before primary TKA.

Methods: A retrospective cohort study using an all-payer national database (PearlDiver) was conducted between 2010-2020 to identify adult patients who underwent primary unilateral TKA. Inclusion criteria required one year of postoperative follow-up. Patients who underwent colonoscopy within 6 months preceding TKA were identified (n=25,291). These patients were matched in a 1:1 ratio to patients without a history of colonoscopy using propensity score matching. Matching variables included age, gender, body mass index (BMI), smoking status, Elixhauser Comorbidity Index (ECI), hypertension, diabetes mellitus, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), and cancer diagnosis. Outcomes included 90-day, 1- and 2-year PJI, and postoperative healthcare utilization.

Results: There were no significant differences in PJI at 90 days (OR 0.92, p=0.34), 1 year (OR 0.93, p=0.33), or 2 years (OR 0.98, p=0.74) between groups. Patients with prior colonoscopy had higher odds of 90-day ED visits (OR 1.14, $p<0.001$), reoperations (OR 1.14, $p<0.01$), and readmissions (OR 1.12, $p<0.01$), as well as increased 1-year reoperations (OR 1.07, p=0.03). No significant differences were found in rates of 90-day sepsis, surgical site infection (SSI), hematoma, or wound dehiscence ($p>0.05$ for all). Stratified analyses by timing of colonoscopy (0–2, 2–4, 4–6 months preoperatively) showed no significant difference in PJI risk compared to patients without colonoscopy ($p>0.05$).

Discussion: Colonoscopy within six months before TKA was not associated with an increased risk of PJI. However, it was associated with increased risk of readmission, ED visits, and reoperations.

Conclusion: While colonoscopy prior to TKA did not increase the risk of infection, its association with reoperations, readmissions, and ED visits warrants further investigation to better understand potential contributing factors.

Attachments:

There is no figure for this abstract

[1366] Failure Rates Significantly Decrease at 1.2 Years after Two-Stage Exchange for Chronic Periprosthetic Joint Infection of Total Knee Arthroplasty

Authors: **Michael F Shannon**, Scott D Rothenberger, Victoria R Wong, Kenneth L Urish

Background And Rationale: Periprosthetic joint infection (PJI), the most common cause of failure after total knee arthroplasty (TKA), is a significant source of morbidity and healthcare costs. Two-stage exchange is the preferred treatment for chronic PJI to promote biofilm removal. Previous work has evaluated optimal duration of follow-up for TKA PJI after debridement with implant retention, but a gap in knowledge remains surrounding the optimal follow-up period for two-stage.

Study Question: This study aimed to a) determine the length of time that TKA PJI should be monitored after two-stage, and b) find the timepoint by which the majority of two-stage failures occur.

Methods: A retrospective study was performed using data from 16 hospitals in a regional health system. Patients who initiated two-stage revision for chronic PJI between 2005 to 2022 were identified via electronic medical records. Failure was classified using 2019 Musculoskeletal Infection Society Outcome Reporting Tool (MSIS ORT) criteria. Failure was defined as ORT Tier 3 (Sub-tiers 3a-3f) or Tier 4 (Sub-tiers 4a and 4b). If a patient met failure criteria, the date of failure was recorded. For patients with retained antibiotic spacer > 6 months (Tier 3f), failure was defined using patient-centered criteria: the date of symptomatic recurrence was used as the date of failure. Bayesian regression with Monte Carlo Markov chain simulation was used to identify a significant breakpoint in cumulative failure.

Results: Overall, 148 patients met criteria for inclusion in this study. Average patient age was 67.52 ± 9.36 years. Average duration of follow-up was 4.38 ± 2.13 years. Single breakpoint model demonstrated a significant change in failure rate at 1.20 years (95% CI: 1.03-1.47 years). Across the entire cohort, 58.5% of all failures occurred by this break point (Figure 1). The failure rate prior to 1.20 years was estimated to be 5.41 times greater than failure rate after 1.20 years (95% CI: 4.81-6.01, $p<0.001$).

Discussion: In this study, most failures for chronic TKA PJI treated with two-stage occur prior to a point just over one year, with a significant breakpoint in failure rate identified at 1.2 years (approximately one year and 10 weeks). This has prognostic value for anticipating failure.

Conclusion: A postoperative follow-up period of one year is not unreasonable for future clinical studies on patients following two-stage exchange.

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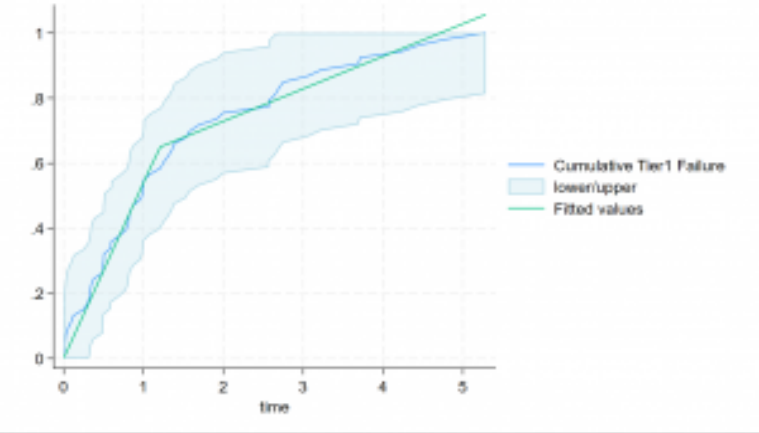

[1410] International Success and Failure of the Treatment Of Periprosthetic Knee Infection – A Preliminary Report

Authors: Carlos A Higuera Rueda, **Jesus M Villa**, Jesse E Otero, Thomas K Fehring, Cade Shadbolt, Craig Aboltins, Yves S Poy Lorenzo, Michelle M Dowsey, Sina Babazadeh, Orthopaedic Device Infection Network (ODIN)

Background And Rationale: Multiple studies have evaluated the success of different surgical modalities for periprosthetic joint infection (PJI), but most reports are limited to data from single centers/countries. Thus, this preliminary report from the Orthopaedic Device Infection Network (ODIN), which is a collaboration of seven organizations across Australia, New Zealand, the Netherlands, Spain and the United States using standardized data collection/centralized analysis, attempts to overcome that barrier and find an answer to the following questions.

Study Question: What is (1) the success rate of knee PJI treatment, and the postoperative rate of (2) amputation or (3) death?

Methods: Data was collected at 4 institutions. Inclusion criteria was knee arthroplasty treated for PJI (n=227). Study period: 2005 to 2023. Demographics, body mass index (BMI), Charlson Comorbidity Index (CCI), and baseline surgical/infection characteristics such as type of index arthroplasty (primary vs. revision), index arthroplasty indication, infection type (i.e., chronic), infecting organisms, and type of surgery (i.e., single-stage) were noted. Success/failure was assessed according to the Musculoskeletal Infection Society (MSIS) outcome reporting tool (Tiers I to III) and a composite outcome (failure: amputation, death, implant revision/removal or infection relapse according to clinician). Postoperative amputations and death were also noted. Follow-up range: 6 weeks to 10 years.

Results: Mean age, BMI, and CCI were 65 years, 32.4 Kg/m2, and 2.6, respectively. Majority of knees treated for PJI were primaries (n=160), most were chronically infected (n=103), and the most common infecting organism was Staphylococcus aureus (n=58). Surgical/infection characteristics are shown in Table 1A. Postoperatively, 54 and 61% of knees were categorized as success according to MSIS (Tiers I/II) and composite outcome tools, respectively. At latest follow-up, six knees (3%) underwent amputation, mortality rate was 15% (n=34) (Table 1B).

Discussion: The reported failure of treatment of PJI after knee arthroplasty is higher than that have been reported in single institution series. The heterogenicity of an international cohort may be more representative of the current PJI treatment outcome.

Conclusion: Only a little more than half of the cases were successfully managed regardless of the success/failure outcome reporting tool utilized. These sobering results call for improvement of strategies to treat knee PJI.

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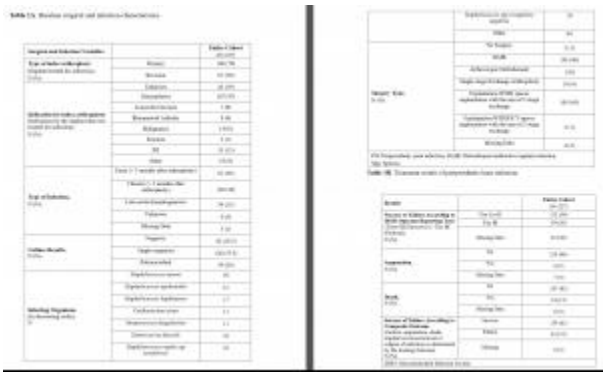

[1409] International Success and Failure of the Treatment of Periprosthetic Hip Infection – A Preliminary Report

Authors: Carlos A Higuera Rueda, **Jesus M Villa**, Jesse E Otero, Thomas K Fehring, Cade Shadbolt, Craig Aboltins, Yves S Poy Lorenzo, Michelle M Dowsey, Sina Babazadeh, Orthopaedic Device Infection Network (ODIN)

Background And Rationale: Multiple studies have evaluated the success of different surgical modalities for periprosthetic joint infection (PJI), but most reports are limited to data from single centers/countries. Thus, this preliminary report from the Orthopaedic Device Infection Network (ODIN), which is a collaboration of seven organizations across Australia, New Zealand, the Netherlands, Spain and the United States using standardized data collection/centralized analysis, attempts to overcome that barrier and find an answer to the following questions.

Study Question: What is (1) the success rate of hip PJI treatment, and the postoperative rate of (2) amputation or (3) death?

Methods: Data for this report was collected at 4 institutions. Inclusion criteria was hip arthroplasty treated for PJI (n=242). Study period: 1995 to 2023. Demographics, body mass index (BMI), Charlson Comorbidity Index (CCI), and baseline surgical/infection characteristics such as type of index arthroplasty (primary vs. revision), index arthroplasty indication, infection type (i.e., chronic), infecting organisms, and type of surgery (i.e., single-stage) were noted. Success/failure was assessed according to the Musculoskeletal Infection Society (MSIS) outcome reporting tool (Tiers I to III) and a composite outcome (failure: amputation, death, implant revision/removal or infection relapse according to clinician). Postoperative amputations and death were also noted. Follow-up range: 6 weeks to 10 years.

Results: Mean age, BMI, and CCI were 65 years, 31.7 Kg/m2, and 3.7, respectively. Majority of hips treated for PJI were primaries (n=170), most were early infections (<90 days, n=119), and the most common infecting organism was Staphylococcus aureus (n=84). Surgical/infection characteristics are shown in Table 1A. Postoperatively, 47 and 60% of hips were categorized as success according to MSIS (tiers I/II) and composite outcome tools, respectively. At latest follow-up, no hip underwent amputation, but mortality rate was 19% (n=46) (Table 1B).

Discussion: The reported failure of treatment of PJI after hip arthroplasty is higher than what have usually been reported in single institution series. The heterogenicity of an international cohort may be more representative of the current PJI treatment outcome.

Conclusion: A little more than half of the cases were successfully managed regardless of the success/failure outcome reporting tool utilized. These humbling results call for improvement of strategies to treat hip PJI.

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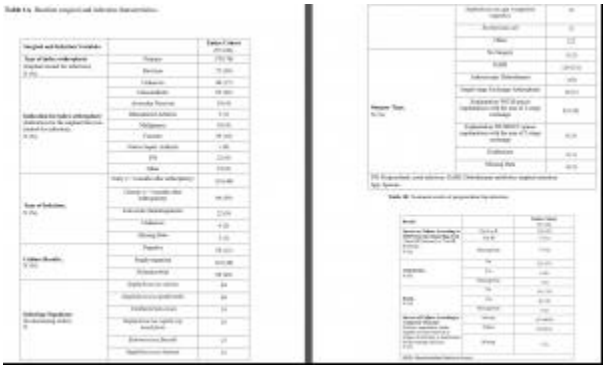

[1564] Early Periprosthetic Joint Infection after Total Joint Arthroplasty is a Risk Factor for New Onset Mental Health Disorders

Authors: Daisuke Furukawa, **Alvaro J Ayala**

Background And Rationale: Preexisting mental health disorders are known risk factors for periprosthetic joint infections (PJI) after total joint arthroplasty (TJA). However, less is known about the incidence of new-onset mental health disorders following PJI.

Study Question: Do patients with early PJI have higher incidence of newly diagnosed anxiety, depression, and stress disorders compared to patients with non-infectious (mechanical) complications and patients with no post-TJA complications?

Methods: Patients who underwent hip or knee TJA between January 2015 and March 2025 were identified using CPT and ICD-9/10 codes from a national dataset comprising de-identified patient records. Patients were grouped based on whether they had revision surgery within 3 months of TJA for early PJI, revision for mechanical complications, or no revision surgery. The incidence of new mental health diagnoses within one year post-TJA was compared across groups. Regression analysis was performed after matching for age and gender.

Results: A total of 25,608 patients were included. Of these, 803 (3.14%) underwent revision for PJI and 201 (0.78%) underwent revision for mechanical complications. Compared to patients with no post-TJA procedures, those with early PJI had higher rates of newly diagnosed anxiety (9.22% vs. 4.17%; odds ratio [OR] 3.60 [95% CI: 2.22–5.86]; $p < 0.001$), depression (8.33% vs. 3.27%; OR 2.52 [95% CI: 1.60–3.96]; $p < 0.001$), and stress disorders (4.73% vs. 1.37%; OR 2.80 [95% CI: 1.50–5.21]; $p=0.001$). There was no difference in the rates of new mental health diagnoses between the PJI and mechanical complication groups (anxiety: 9.22% vs. 5.97%, $p = 0.14$; depression: 8.33% vs. 6.97%, $p = 0.52$; stress disorder: 4.73% vs. 2.99%, $p = 0.29$).

Discussion: Patients who experience early PJI are at increased risk for new-onset mental health disorders compared to those without postoperative complications. However, no differences were observed when comparing PJI-related revisions to mechanical revisions, suggesting that the experience of revision surgery itself—regardless of cause—may contribute to poorer mental health outcomes.

Conclusion: Patients with early PJI had higher incidence of new diagnosis of mental health disorders compared to patients without subsequent revision surgeries but there was no difference in incidence compared to patients with mechanical complications.

Attachments:

There is no figure for this abstract.

[1560] Cost of Antibiotic Loaded Cement (ALBC) to Prevent Prosthetic Joint Infections in Primary Total Joint Arthroplasty (TJA) Procedures.

Authors: Kelly Guerin, Travis Larsen, Michael Henry, Eytan M Debbi, Alberto V Carli, **Elizabeth Robilotti**

Background And Rationale: Annual hospital costs associated with hip or knee prosthetic joint infections (PJI) following total joint arthroplasty (TJA) are projected to reach $1.85 billion by 2030. Strategies to reduce PJI risk have included use of antibiotic loaded cement (ABLC) in primary TJAs despite limited evidence for effectiveness, obvious material costs and concern for engendering antimicrobial resistance.

Study Question:Does the use of ABLC reduce the rate of PJI following primary arthroplasty? Is there a cost benefit for using ABLC? Does the use of ABLC promote resistance in subsequent PJIs?

Methods: Retrospective chart review of primary TJAs performed from 7/2017 through 7/2022 at a single center specialty orthopedic hospital was performed to identify uncemented, cemented and ABLC procedures. PJIs, including causative organisms and antimicrobial resistance were extracted from the electronic health record through 7/2024. Cost estimates for cement and ABLC were derived from Pharmacy and Central Sterile Supply purchasing records.

Results: 41,577 TJAs were performed with 220 PJIs identified. Hazard ratios for PJI among ABLC vs cemented and uncemented procedures for TKA and THA were not significant: TKA, HR cement:1.17 (95% CI: 0.79, 1.7), HR uncemented 0.98 (95% CI: 0.47, 2.1); THA, HR cement:1.36 (95% CI: 0.31, 5.9), HR uncemented 1.39 (95% CI: 0.48, 4.8). The total costs for cement were conservatively estimated to be $2,242,201 for 10,564 unique ABLC TJAs versus $770,071 for 11,459 unique TJAs using plain cement. The estimated cost per primary arthroplasty for ABLC vs plain cement is $212.25 vs. $67.20. The rate of gentamicin resistance amongst tested organisms recovered at subsequent PJI surgeries was significantly higher in the ABLC group compared to others without local antibiotic exposure (20% vs 5.8% p= 0.01) Figure 1.

Discussion: The use of cement without antibiotics has a cost-benefit estimated at ~$145.05 per arthroplasty. In our cohort, avoidance of ABLC would have led to potential cost reduction of $1,532,308.20. This is likely an underestimate of total cost saving from not using ABLC as the opportunity cost of OR time while ABLC setting was not included in the calculation.

Conclusion: High-volume institutions should consider suspending use of ABLC for primary TJAs due to lack of benefit in PJI reduction, cost and contribution to antimicrobial resistance.

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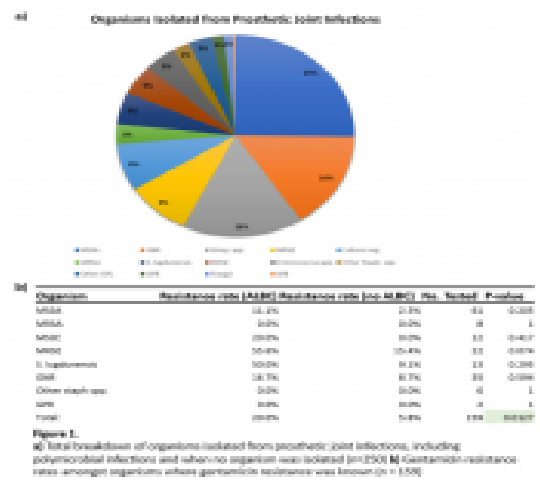

[1520] Antibiotic Loaded Cement Does Not Prevent Periprosthetic Joint Infection in Primary Hip and Knee Arthroplasties.

Authors: Travis Larsen, Joseph Nguyen, Andy Miller, Peter Sculco, Alberto Carli, **Elizabeth Robilotti**

Background And Rationale: Periprosthetic joint infections (PJI) are costly and traumatic. They are a leading cause for revision arthroplasty procedures globally. Antibiotic loaded cement (ALBC) is commonly used in primary arthroplasty to prevent PJI, despite limited evidence of effectiveness.

Study Question: Does ALBC decrease the rate of PJI following primary total hip arthroplasty (THA) or primary total knee arthroplasty (TKA)? Does use of ALBC impact rates of all-cause reoperation or readmission following primary THA or TKA?

Methods: We performed a retrospective review of primary THA and TKA at an orthopedic specialty hospital from 7/2017 to 7/2022. We identified uncemented, cemented and ALBC procedures through operative notes. Patient characteristics and PJIs were extracted from the electronic health record.

Results: Among 20,691 THAs and 20,886 TKAs, 71 THA (0.3%) and 117 TKA PJIs (0.6%) were identified. Cox regression models were constructed for TKA and THA patients to account for factors that may have led to use of cement, and ABLC, in primary procedures, as well as patient risk factors that could confer higher risk for PJI. No benefit for PJI prevention from ABLC in either THA or TKA cohort was identified. Use of cement, including ABLC was associated with higher rate of readmission within 2 yrs for both cohorts: THA HR =1.31 (95% CI; 1.05; 1.63); TKA HR =1.18 (95% CI; 1.02, 1.37) (Figure 1). Among THA and TKA, American Society of Anesthesiologists class (ASA) was a significant indicator of PJI risk (THA HR =5.32 (95% CI ; 1.12, 25.2); THK HR =1.60 (95% CI; 1.01; 2.52).

Discussion: Over 2 years of follow up, use of ALBC was not associated with reduction in PJI among primary THA or TKA. Other patient factors including those codified by ASA level are better predictors of PJI.

Conclusion: Results reinforce prior studies suggesting ALBC does not reduce PJI following primary arthroplasty procedures. Though limited by retrospective design and follow up of 2 years, our data suggest patient characteristics, not intraoperative cement, should be targeted for PJI risk reduction efforts. Abandonment of ALBC due to financial cost, opportunity cost (time in OR), and concern for promotion of antimicrobial resistance is unlikely to lead to an increase in PJI.

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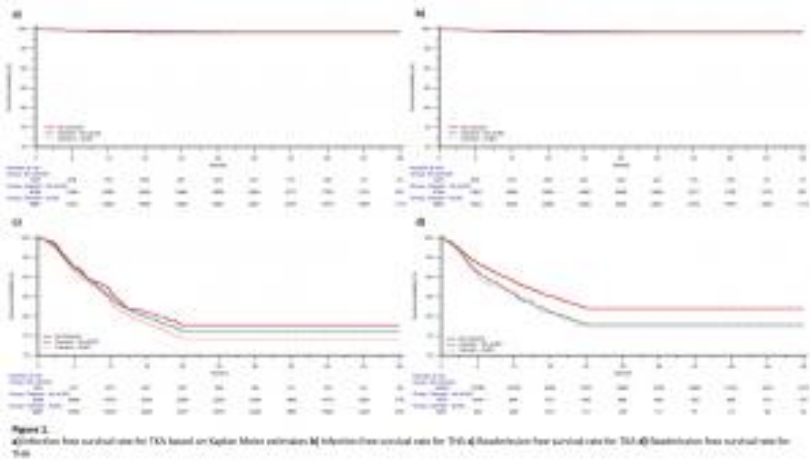

[1538] Resurface it or Respect It? Reassessing Patellar Resurfacing in Two-Stage Revision For PJI

Authors: Josef E Jolissaint, **Andrew L Thomson,** Peter K Sculco, Alberto V Carli

Background And Rationale: The decision to resurface the patella during a two-stage exchange procedure for total knee arthroplasty (TKA) periprosthetic joint infection (PJI) remains controversial. While some studies support resurfacing to improve joint function and reduce complications, others report favorable outcomes and lower fracture risk without resurfacing.

Study Question: 1. How does patellar resurfacing influence the PROMS of patients undergoing reimplantation total knee arthroplasty for periprosthetic joint infection? 2. How does patellar resurfacing influence radiographic outcomes in the aforementioned patient groups?

Methods: All patients who underwent two-stage exchange for PJI following TKA between January 2017 and December 2022 at a single academic institution, were retrospectively reviewed. Inclusion criteria required a minimum of one year of clinical and radiographic follow-up. Patients who underwent patellar resurfacing were compared to those who did not with respect to Patient-Reported Outcome Measures (PROMS), visual analog scale (VAS) for pain, as well as range of motion (ROM). Additionally, radiographic patellar displacement and/or dislocation was assessed by a blinded observer, and the prevalence of these findings was compared between groups. Finally, survival was compared across cohorts.

Results: 106 patients met inclusion criteria. At 1-year postoperatively, there were no statistically significant differences between groups in KOOS ($P = 0.80$), VAS pain scores ($P = 0.18$), or range of motion ($P = 0.73$). The non-resurfaced group demonstrated a significantly higher prevalence of patellar subluxation/dislocation (49% vs. 27%, $P = 0.034$). Furthermore, overall complication rates were higher in the non-resurfaced group (53%) compared to the resurfaced group (29.5%, $P = 0.015$). However, when reinfections were excluded, complication rates were no longer different between groups. Furthermore, the rate of extensor mechanism complications ($P = 0.33$) and reinfections ($P = 0.13$) were similar among groups. Survival was comparable between groups ($P = 0.10$)

Discussion: At 1-year postoperatively, patients who underwent patellar resurfacing at the time of reimplantation had significantly lower rates of patellar subluxation or dislocation compared to non-resurfaced patients in two-stage TKA for PJI. Yet despite these radiographic outcomes, no difference in rom, proms, or vas pain, nor the prevalence in extensor mechanism-related complications were observed

Conclusion: Our findings suggest that resurfacing the patella during a reimplantation procedure is desirable to optimize patellar tracking. However, when confronted with high risk scenarios (poor bone stock, limited range of motion), surgeons should feel assured that ‘respecting’ or leaving the patella alone will not lead to poorer functional outcomes, pain scores, ROM, or survival.

Attachments:

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Session IV
Hip and Knee 2

[1508] Aspirin Leads, Infection Falls: A 12 Review of Changing Antithrombotic Trends and Their Impact on Infection Risk after THA

Authors: Anzar Sarfraz, Benjamin W Padon, Farouk J Khury, Kush Attal, Joshua C Rozell, Ran Schwarzkopf, **Vinay K Aggarwal**

Background And Rationale: Postoperative antithrombotic therapy (ATT) after primary total hip arthroplasty (THA) varies widely. This study aimed to evaluate ATT trends over 12 years and to analyze the association between ATT medication type and incidence of periprosthetic joint infection (PJI) after primary THA at a high-volume academic center

Study Question: 1) what are the temporal trends in postoperative ATT usage following THA? 2) how are different ATT regimens associated with the risk of PJI?

Methods: A retrospective review was conducted of 16,841 primary THAs performed between 2013 and 2025. Outpatient ATT medication prescribed from the date of admission to one-week post-discharge were reviewed and further categorized as either antiplatelet (AP) or anticoagulant (AC). Patients were assessed for PJI by cross referencing with our institutional infection database, which uses the 2018 International Consensus Meeting (ICM) definition of PJI for inclusion. Fisher's Exact test was used to assess the association between ATT medication type and incidence of PJI, with Cramér's V statistics to estimate the effect size

Results: 1) Over 12 years, a shift in ATT use after THA was observed. The percent of patients on aspirin alone or on aspirin with AC rose from 80% by 2017, remaining stable through 2025. Enoxaparin declined from 88% in 2013 to 2% by 2022. Rivaroxaban remained low (~3–5%), while Apixaban rose from 0% to 13% by 2025 2) Use of any AC or AP other than aspirin fell from 97% to 19%. Aspirin use, alone or with other agents, was linked to lower PJI risk (1.0% vs. 1.5%, $p = 0.005$). Warfarin was associated with higher infection risk (6.1% vs. 1.1%, $p < 0.001$), as was enoxaparin (1.7% vs. 1.0%, $p = 0.002$). Other agents, including DOACs, P2Y12 inhibitors, and unfractionated heparin, showed no significant associations. All effect sizes were small (Cramér's $V < 0.05$).

Discussion: Aspirin has become the predominant ATT agent following primary THA over the past decade and is associated with a lower risk of PJI. In contrast, use of warfarin, enoxaparin, or non-aspirin AC or AP regimens has declined over the decade and is associated with higher infection risk, though effect sizes observed were small.

Conclusion: Over last decade increased use of aspirin and decreased use of non-aspirin regimen was associated with decreased infection after THA.

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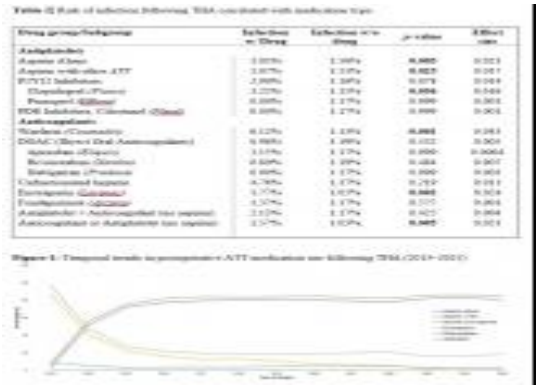

[1506] Antithrombotic Therapy and Their Association with PJI Risk after TKA: A 12-Year Review

Authors: Anzar Sarfraz, Benjamin W Padon, Farouk J Khury, Kush Attal, Joshua C Rozell, Ran Schwarzkopf, **Vinay K Aggarwal**

Background And Rationale: Management of postoperative antithrombotic therapy (ATT) after total knee arthroplasty (TKA) continues to evolve, yet its relationship to infection risk remains unclear. This study evaluated temporal trends in ATT use over a 12-year period and association of different medication types with periprosthetic joint infection (PJI) after primary TKA at a single, high-volume academic center

Study Question: 1) What are the temporal trends in postoperative ATT usage following TKA? 2) How are different ATT regimens associated with the risk of PJI?

Methods: We retrospectively reviewed 20,376 primary TKAs performed from 2013 to 2025. Postoperative ATT medications, prescribed from date of admission through one-week post-discharge, were reviewed and further categorized as either antiplatelet (AP) or anticoagulant (AC) category. Patients were assessed for PJI by cross referencing with our institutional infection database, which uses the 2018 International Consensus Meeting (ICM) definition of PJI for inclusion. Statistical analyses including Fisher's Exact test and Cramer's V were performed to assess for associations between medication type and PJI incidence.

Results: 1) Use of aspirin alone rose from 2% in 2013 to >80% by 2018 and the declined to 55% by 2025. Enoxaparin use sharply declined from 87% to under 1% over 12 years. Apixaban usage increased gradually, reaching 10% by 2025. Overall, non-aspirin ATT use declined from 96% to 16% over the study period. 2) Aspirin alone was associated with a lower risk of PJI compared to non-aspirin regimens (1.11% vs. 1.51%, p = 0.017). In contrast, enoxaparin (2.10% vs. 1.11%, p = 0.0001) and fondaparinux (3.62% vs. 1.22%, p = 0.028) were associated with higher infection risk. Use of any AC or AP regimens without aspirin also showed increased PJI risk (1.72% vs. 1.07%, p = 0.0004). Other agents, including DOACs, P2Y12 inhibitors, and unfractionated heparin, showed no significant associations. Effect sizes were small (Cramér's V < 0.03).

Discussion: Over the past decade, aspirin has emerged as the most commonly used postoperative ATT agent following TKA and is associated with reduced risk of PJI. Conversely, declining use of enoxaparin and other non-aspirin regimens was observed and was also found to be associated with higher infection risk, albeit with small effect sizes.

Conclusion: Increased use of aspirin and decreased use of non-aspirin regimen was associated with decreased infection after TKA.

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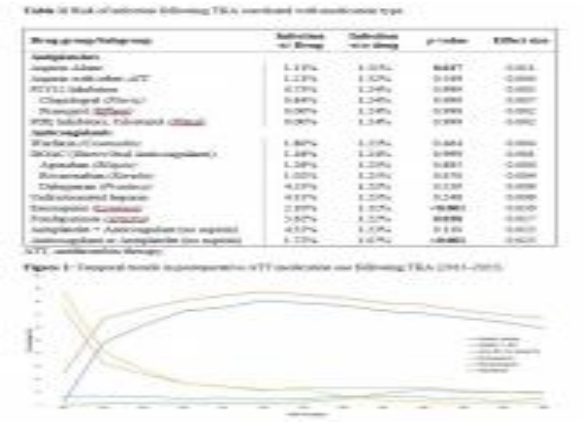

[1536] Surgeon Vs. Center Volume: Who Really Affects Infection Rates In Total Hip Arthroplasty?

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: Total hip arthroplasty (THA) is one of the most common elective procedures in the United States. These procedures and their complications contribute significant costs to the healthcare system and are only expected to rise. Previous literature has demonstrated lower complication rates, including infections, at high-volume centers and with high-volume surgeons. However, it is unclear whether these reduced complications are driven primarily by surgeon experience or by the high-volume center itself. This study aims to evaluate infection rates of high and low-volume surgeons within a high-volume academic orthopedic center to determine if low-volume surgeon outcomes improve in such a setting.

Study Question: 1. Does surgeon volume influence postoperative infection rates in total hip arthroplasty at a high-volume specialized orthopedic institution?

Methods: Prospectively collected surgical site infection (SSI) surveillance data was reviewed for all primary THA procedures performed from January 2018 to November 2024 at a high-volume academic orthopedic medical center. SSI data was defined and collected using National Healthcare Safety Network (NHSN) criteria. Surgeon volume was categorized by annual THA case volume: low volume (250 cases/year).

Results: A total of 30,606 primary THAs were performed by 42 surgeons. Low-volume surgeons (n=10) performed 880 cases, with an average case duration of 98.1 minutes, a 0.34% periprosthetic joint infection (PJI) rate, and 0.45% overall SSI rate. High-volume surgeons (n=27) performed 21,115 cases, with an average duration of 92.35 minutes, a 0.25% PJI rate, and 0.44% SSI rate. Ultra-high volume surgeons (n=5) performed 8611 cases, with an average duration of 78.28 minutes, a 0.17% PJI rate, and 0.44% SSI rate. There were no significant differences in PJI or SSI rates between volume groups (p=0.58, p=0.28, p=0.24).

Discussion: High volume specialized academic orthopaedic medical centers demonstrate low rates of PJI and overall SSI. Low volume THA surgeons at a high volume specialized joint replacement center demonstrate comparable infection rates to high volume and “ultra-high” volume TKA surgeons

Conclusion: This data suggests that the specialization of the center has a greater impact on reducing infection rates than the experience of the surgeon.

Attachments:

There is no figure for this abstract.

[1438] Lower Limb Cellulitis in the 3 Months before Total Knee Arthroplasty Increases Risk Of PJI and Infection-Related Complications

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini , Anabelle Visperas, Matthew E Deren, Viktor E Krebs, Robert M Molloy, **Nicolas S Piuzzi**

Background And Rationale: While surgeons typically defer total knee arthroplasty (TKA) during active lower limb infections such as cellulitis, evidence regarding infection risk in patients with recent cellulitis remains sparse.

Study Question: This study evaluated the association between cellulitis within three months before TKA and the risk of periprosthetic joint infection (PJI) and postoperative complications.

Methods: Using an all-payer administrative database (PearlDiver), we identified all patients who underwent unilateral primary TKA between 2010 and 2022. Patients with less than 90 days of follow-up were excluded. Patients who experienced cellulitis within 3 months before TKA (n=1,657, 0.25%) were matched using 1:3 propensity score matching to those without cellulitis (n=4,971) for age, gender, obesity, Elixhauser Comorbidity Index (ECI), smoking, diabetes, hypertension, and heart failure. Outcomes analyzed included the incidence of PJI at 90 days, 1 year, and 2 years postoperatively, as well as the rate of surgical site infections (SSI), sepsis, reoperations, and readmissions within 90 days postoperatively. Multivariate analyses controlled for age, gender, and comorbidity index.

Results: Cellulitis within three months before primary TKA was significantly associated with increased odds of 90-day PJI (OR 1.83, 95% CI 1.25–2.67; $p<0.01$), 1-year PJI (OR 1.94, 95% CI 1.43–2.64; $p<0.001$), and 2-year PJI (OR 1.93, 95% CI 1.46–2.50; $p<0.001$). Additionally, recent cellulitis was linked to significantly higher odds of SSI (OR 2.10, 95% CI 1.44–3.06; $p<0.001$), reoperations (OR 1.51, 95% CI 1.17–1.94; $p<0.01$), and readmissions (OR 1.50, 95% CI 1.23–1.83; $p<0.001$). There was no statistically significant association found for 90-day sepsis (OR 1.55, 95% CI 0.82–2.80; $p=0.15$).

Discussion: One in 400 patients undergoing primary TKA experienced cellulitis in the 3 months before surgery. Lower limb cellulitis in the 3 months before TKA substantially increases the risk of PJI, SSI, reoperations, and readmissions postoperatively.

Conclusion: These findings highlight the importance of thorough patient evaluation and optimized multidisciplinary management strategies. Additional research exploring cellulitis resolution timing and its influence on postoperative outcomes is needed.

Attachments:

There is no figure for this abstract.

[1440] Lower Limb Cellulitis Three Months Before Total Hip Arthroplasty Increases Risk Of PJI and Infection-Related Complications

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini , Anabelle Visperas , Matthew E Deren, Viktor E Krebs, Robert M Molloy, **Nicolas S Piuzzi**

Background And Rationale: Although surgeons typically avoid performing total hip arthroplasty (THA) during active lower limb skin infections such as cellulitis, data regarding infection risk in patients with recent cellulitis remains limited.

Study Question: This study evaluated the risk of periprosthetic joint infection (PJI) and postoperative complications in patients who experienced cellulitis within three months before THA.

Methods: Using an all-payer administrative database (PearlDiver), all patients who underwent unilateral primary THA for osteoarthritis between 2010-2022 were identified. Patients with

Results: Cellulitis within 3 months before primary THA was associated with significantly increased odds of 90-day PJI (OR 3.18, 95% CI 1.94–5.21; p<0.001), 1-year PJI (OR 2.32, 95% CI 1.27–4.16; p<0.001), and 2-year PJI (OR 2.68, 95% CI 1.81–3.94; p<0.001). Moreover, cellulitis was significantly associated with higher odds of surgical site infection (SSI) (OR 2.73, 95% CI 1.67–4.42; p<0.001), sepsis (OR 4.60, 95% CI 2.45–8.86; p<0.001), reoperations (OR 3.24, 95% CI 1.59–6.58; p<0.001), and readmissions (OR 2.09, 95% CI 1.63–2.68; p<0.001) within 90 days of surgery.

Discussion: One in 800 patients undergoing primary THA experienced cellulitis in the 3 months before surgery. Lower limb cellulitis in the 3 months before THA significantly increases the risk of PJI and postoperative complications, including SSI, sepsis, reoperation, and readmission.

Conclusion: These findings underscore the need for careful patient evaluation and optimized multidisciplinary management strategies. Further research assessing risks based on cellulitis resolution and timing relative to surgery is warranted.

Attachments:

There is no figure for this abstract.

[1507] A Standardized DAIR Protocol Involving Specific Antiseptic Solutions Produces Promising Short-Term Results in Hip and Knee PJI

Authors: Peter Sculco, Allina Nocon, Mark Youssef, Bianca Nakar, David J Mayman, Gwo-Chin Lee, **Alberto Carli**

Background And Rationale: Debridement, antibiotics and implant retention (DAIR) is the most common surgical treatment for periprosthetic joint infection (PJI). Despite its preference as less invasive treatment, DAIR success rates vary considerably due to host status, pathogen virulence, infection chronicity and, in a less understood manner, inconsistency in surgical technique.

Study Question: The purpose of the study was to determine how standardized DAIR protocol involving antiseptic solutions designed to remove biofilm could impact treatment success.

Methods: Hip and knee replacement patients scheduled for DAIR in a single institution from October 2018 to January 2025 were prospectively enrolled. The study was approved by the IRB. Patients presenting with sepsis, hypocalcaemia, severe vascular or neurological disease, uncontrolled diabetes, severe degenerative bone disease, and history of previous DAIR/PJI were excluded. All cases met 2018 ICM definitions for PJI. Acute PJI was defined as occurring < 4 weeks following surgery or symptoms < 4 weeks. Qualifying patients underwent DAIR using the following protocol: 1)excisional debridement of infected tissue, 2)two 3-minute immersions in 10% povidone-iodine separated by 1l saline irrigation, and 3)irrigation with 1l of Bactisure (Zimmer-Biomet) using pulsatile lavage. The primary outcome was 90-day survival free of revision surgery for infection. Survival probability was calculated using the Kaplan-Meier method.

Results: 75 DAIRs [Knees,N=60(81%); Hips, N=15(19%)] qualified for study inclusion. Mean age was (70.8±9.6), BMI (30.1±6.2), and mostly male (64%). Average follow-up was 3.1 years (range 0.26-6.7). 90 day-survival free of infection was 94.6% (95%CI:89%-99%) with 4 failures, all being knees. One patient presented with wound drainage which was managed nonoperatively. However, additional 7 patients were revised after 90 day period. Of those, 70% were revised after their one-year follow-up. Overall, 11(14%) patients had a secondary revision; yielding an 86% success rate.

Discussion: Historically DAIR study explores use of standardized irrigation protocol to improve infection outcomes.

Conclusion: A standardized DAIR protocol using 10% povidone-iodine and Bactisure provides promising short-term treatment outcomes that exceed those reported in contemporary literature.

Attachments:

There is no figure for this abstract.

[1493] Effective Seven-Day Antibiotic Irrigation for Chronic PJI: 12-Month Results from Two Prospective Randomized Comparative Studies

Authors: Bryan D Springer, Carlos A Higuera-Rueda, Brian de Beaubien, Kevin D Warner, Andrew Glassman, Hari Parvataneni, Kenneth Urish, Johannes Plate, Edward Stolarski, **Nicolas S Piuzzi**

Background And Rationale: Periprosthetic joint infection (PJI) is a growing complication after joint arthroplasty, with limited success from current treatments.

Study Question: We aimed to evaluate the efficacy of a novel therapeutic approach combining a cyclic, localized, expedited, antibiotic irrigation regimen (CLEAR) protocol with a temporary porous titanium spacer (VT-X7 spacer) to deliver high concentrations of vancomycin and tobramycin directly to the infected joint as part of a two-stage exchange arthroplasty for chronic PJI.

Methods: Two prospective, multicenter, randomized studies evaluated efficacy of the VT-X7 CLEAR protocol used as part of an exchange arthroplasty (VT-X7 CLEAR) vs two-stage exchange arthroplasty (control) (NCT04662632;NCT05607030). The VT-X7 CLEAR group received 7 days of intra-articular irrigation using 80 mg of tobramycin once daily, followed by hourly irrigation of 125 mg of vancomycin. Both groups received 12 weeks of systemic antibiotics post-stage 2. Outcomes were assessed at 12 months based on the Musculoskeletal Infection Society (MSIS) Tier-1 reporting guidelines. T if they received a permanent implant at stage 2 surgery, survived, had no recurrent PJI, had no re-operation on the index joint, and were not taking antibiotics. A total of 76 subjects were enrolled in each group, and there were no differences in baseline characteristics between the groups.

Results: The proportion of patients meeting MSIS Tier-1 success criteria at 12 months was statistically significantly higher in patients treated with the VT-X7 CLEAR protocol than patients treated with two-stage exchange (71% vs 52%;p=0.01). More VT-X7 CLEAR patients were implanted with a permanent prosthesis by 12 months (100% vs 82.9%;p<0.01). Median time to reimplantation in patients who had Stage 2 surgery was 7 days for VT-X7 CLEAR patients and 98 days for Control patients (p<0.01). There was no statistically significant difference in the incidence of septic failure (VT-X7 CLEAR:7 vs. Control:7;p=1), re-operation (VT-X7 CLEAR:12 vs. Control:11;p=0.82), or death (VT-X7 CLEAR:2 vs Control:5;p=0.24) before 12 months.

Discussion: More patients in the VT-X7 CLEAR protocol received a permanent prosthesis and in a shorter time, with a significantly higher treatment success at 12 months than two-stage group.

Conclusion: These findings support the potential of VT-X7 CLEAR protocol as a treatment modality for chronic PJI.

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There is no figure for this abstract.

Session V
Basic Science

[1392] Proteomic Insight into Immune Pathways and Biomarker Discovery in Periprosthetic Joint Infection

Authors: Nicolas S Piuzzi, Suan Sin Foo, Weiqiang Chen, THAddeus Stappenbeck, **Anabelle Visperas**

Background And Rationale: Periprosthetic joint infection (PJI) is a serious complication of total joint arthroplasty with poorly understood pathophysiology especially related to the immune system.

Study Question: What immune proteins and pathways are activated or suppressed during infection?

Methods: This single-institution study prospectively collected synovial fluid samples during arthroplasty surgeries from August 2023 to September 2024. Samples included three groups: primary TKA (n=9), aseptic revision (n=10), and septic revision (n=14) meeting 2018 ICM criteria for PJI. Proteomic analysis using the 1500 SomaScan assay calculated fold-change as (aseptic or septic expression)/(TKA expression) with log2 transformation. Statistical analysis included Wilcoxon Rank-Sum and Kruskall-Wallis tests, with significant proteins defined by ≥2-fold change and p-values ≤0.05.

Results: In the septic group, 20 upregulated and 126 downregulated proteins were identified compared to control TKA, while the aseptic group showed five upregulated and six downregulated proteins (Figure 1A-B). Among significantly regulated proteins, three upregulated and five downregulated were shared between aseptic and septic groups, indicating revision-dependent expression (Figure 1C). Differential protein analysis revealed marked upregulation in immune pathways, including immune response and regulatory proteins (fold-change septic/aseptic) –VVN2 (12.5, p<0.001), C3 (2.09, p<0.05), HLA-DOB (4.37, p<0.001) and antimicrobial and defense proteins – DEFA4 (5.96, p<0.01), LCN2 (47.03, p<0.001), LTF (2.02, p<0.01), S100A8 (5.33, p<0.001), RNASE3 (4.45, p<0.001), and marked downregulation in immune modulation proteins – LAG3 (-3.91, p<0.001), CD28 (-6.97, p<0.01), CD163 (-7.80, p<0.001), NRP1 (-3.87, p<0.01), IL17-related proteins – IL17RA (-10.64, p<0.001), IL-1RL1 (-2.79, p<0.05), IL-27RA (-4.69. p<0.01) and immune signaling – STAT1 (-5.29, p<0.001) and PRKCA (-4.34, p<0.001) in the septic group only (Figure 1D).

Discussion: These findings highlight previously underexplored immune responses in PJI and may inform future studies aimed at diagnostic biomarker discovery and a deeper understanding of the pathophysiology of joint infection

Conclusion: This study represents the first comprehensive proteomic analysis of synovial fluid in the setting of periprosthetic joint infection, revealing clear differences in protein expression and pathway activation between infected joints and controls.

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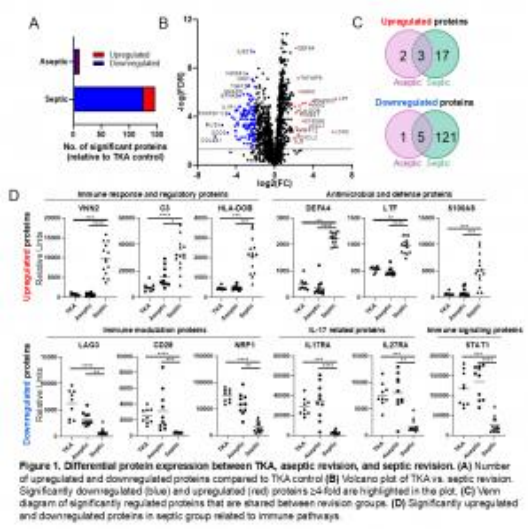

Figure 1. Differential protein expression between TKA, aseptic revision, and septic revision. (A) Number of upregulated and downregulated proteins compared to TKA control **(B)** Volcano plot of TKA vs. septic revision. Significantly downregulated (blue) and upregulated (red) proteins ≥4-fold are highlighted in the plot. **(C)** Venn diagram of significantly regulated proteins that are shared between revision groups. **(D)** Significantly upregulated and downregulated proteins in septic group related to immune pathways.

[1382] The Role of Staphylococcal Host Antibody Inhibition in Orthopaedic Device Infection

Authors: Abhinay V Adlooru, Lauren E Kemp, Walid K Bibi, Antonia F Chen, **Alexander M Tatara**

Background And Rationale: A recently published phase 2b vaccine study to prevent staphylococcus aureus infection following instrumented spinal fusion showed no vaccine efficacy despite significant antibody production [Hassanzadeh Clin Infect Dis 2023]. We recently created a biomaterial-based vaccine that was more effective in a murine model of orthopaedic device infection compared to conventional vaccination, and it was found that the cell-mediated effect was more significant than humoral immunity [Tatara PNAS 2025]. Staphylococcal protein A (SpA) is a virulence factor which inactivates host antibody- how relevant is SpA to infection pathogenesis?

Study Question: Does SpA contribute to infection pathogenesis in a murine model of orthopaedic device infection?

Methods: A stainless steel Kirshner wire was placed into the distal femur of mice on day 0. The distal end of the wire was inoculated with saline (uninfected), 1,000 colony-forming units (CFU) of methicillin-resistant *Staphylococcus aureus* je2, or 1,000 CFU of JE2spa::tn, a mutant with a functional deletion of SpA (n=4-8 per group). Cytokines were measured at day 0, day 7, and day 28. Serology was performed at day 0 and day 28. Mice were euthanized on day 28 and bacterial burden on the implant and surrounding joint was assessed. Flow cytometry was performed on splenocytes and joint tissue on day 28.

Results: Compared to uninfected controls, infected mice had significant weight loss, greater serum inflammatory cytokine concentration (interferon gamma, TNF-alpha, IL-2, IL-6 and IL-17 (Fig. 1A)), increased myeloid infiltration into the joint tissue, and a higher titer of anti-staphylococcal antibodies (Fig. 1B). Comparing JE2 to JE2spa::tn infection, there were no significant differences in the amount of splenic B cells, total antibody titers, or bacterial burden (Fig. 1C) at 4 weeks after infection.

Discussion: Infection using a strain with non-functional spa did not alter significant markers associated with host immune response nor final bacterial burden in a murine model. Spa binds to host antibody and prevents subsequent opsonization and phagocytosis. Our results are consistent with prior human and mouse studies showing that anti-staphylococcal titers do not correlate with improved outcome.

Conclusion: Staphylococcal protein A may not be a significant virulence factor in orthopaedic device infection. The role of humoral immunity in orthopaedic device infection remains unclear.

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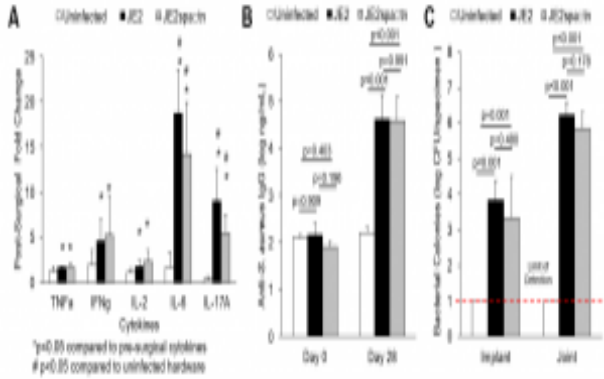

Figure 1. A) Pre- to post-surgical serum cytokine fold change 7 days after infection. B) Antibody titers 28 days after infection. C) Bacterial burden per each implant and surrounding joint tissue 28 days after infection.

[1386] Immunologic Markers of Dormant Infection Predict Infection Free Survival in Total Joint Replacements

Authors: **Derek F Amanatullah**, Robert Manasherob, Shay I Warren, Lyong Heo, Daisuke Furukawa, Stuart Goodman

Background And Rationale: The ability of biofilm-resident bacteria to regulate the immune response coupled with the over reliance current diagnostic criteria for infected joint replacements on the local and systemic neutrophil response means that biofilm-resident bacteria may establish a dormant infection that is misclassified as uninfected.

Study Question: We hypothesize that joint replacements with a prior infection have a high prevalence of dormant infections that can be distinguished from uninfected joint replacements by the inflammatory response in synovial fluid and detecting a dormant infection increases the risk of infection recurrence.

Methods: Proteomic profiling was performed on synovial fluid samples collected from joint replacements had an active infection, joint replacements without an infection, and joint replacements with a prior infection. We used differential expression, hierarchical clustering, principal component, and gene set variation analyses to characterize dormant infections and correlated them to the incidence of infection recurrence at a mean follow-up of 3 years.

Results: Hierarchical clustering categorized 8 of the joint replacements with a prior infection (72%) as infected in the absence of systemic acute phase reactants and synovial neutrophil recruitment defining them as dormant infections. CXCL5 expression, which was expressed in both active and prior infection distinguished these synovial samples from the uninfected joint replacements. Eight synovial proteins had an accuracy and importance that exceeded that of CXCL5 (AUC=0.897, %IncMSE=1.7, Figure). Two dormant infections had an infection recurrence (22%) at a mean follow-up of 3 years, so synovial markers of dormant infection had a high sensitivity (100%) and negative predictive value (100%) but lacked specificity (61%) and positive predictive value (39%) with modest accuracy (AUC=0.64) for recurrent infection.

Discussion: The absence of these candidate biomarkers from synovial fluid was an excellent predictor of infection free survival at 3 years with 100% sensitivity and negative predictive value. Expression of our novel biomarkers provides a culture-free method to monitoring for infection prior to surgery or after antimicrobial therapy.

Conclusion: The immunologic identification of dormant infection means the use of systemic acute phase reactants, like ESR and CRP, as screening tests to rule out infection are inadequate.

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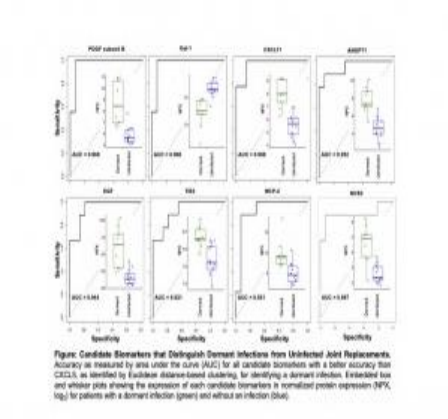

[1422] Probe-Based Ultrasonication Effectively Removes Biofilm from Clinically Relevant Orthopedic Materials: An In-Vitro Proof of Concept

Authors: **Matthew B Shirley**, Sarah Romereim, Bailey Fearing, Thomas K Fehring, Jesse Otero

Background And Rationale: Periprosthetic joint infections (PJI) remain a major clinical challenge, with biofilm formation on implant surfaces contributing to treatment failure. Standard debridement techniques such as DAIR (debridement, antibiotics, and implant retention) often fail to eliminate biofilm. Ultrasonication has shown promise in other industries for disrupting biofilms, but its efficacy on orthopedic implant materials remains unproven. We hypothesized that submerged, probe-based ultrasonication could effectively disrupt biofilms formed on clinically relevant orthopedic materials.

Study Question: Does a submerged ultrasonic probe remove mature staphylococcus biofilm from clinically-relevant orthopedic materials?

Methods: This in vitro study utilized methicillin-sensitive staphylococcus aureus (xen40) cultured on four orthopedic materials: bone cement (BC), polyethylene (PE), rough metal (RM), and smooth metal (SM). After 72-hour incubation, discs underwent one of three ultrasonication protocols (pulse, 20-sec continuous, 60-sec continuous) using a submerged piezoelectric probe. Biofilm presence was quantified by crystal violet staining, optical density of sonication fluid, and colony-forming units (CFUs). Scanning electron microscopy (SEM) was used to visualize structural biofilm changes. Data were analyzed using 2-way ANOVA with Tukey's post-hoc testing.

Results: All ultrasonication protocols significantly reduced biofilm on all materials to levels statistically indistinguishable from negative controls (p0.92). Crystal violet assay, optical density and CFU measurements confirmed robust bacterial detachment, and Cohen's D effect size analysis (minimum D=2.46) demonstrated large treatment effects. SEM imaging revealed that biofilm matrices were eliminated post-treatment, with only sparse, non-matrix-associated bacteria remaining—likely planktonic cells susceptible to antibiotics or irrigation.

Discussion: Submerged probe-based ultrasonication effectively disrupted mature *S. aureus* biofilms from multiple orthopedic materials in vitro. The data strongly support its potential as an adjunctive technique for managing acute and chronic PJI. Future in vivo studies are warranted to assess its translational applicability in surgical settings.

Conclusion: Ultrasonication for biofilm removal should be further investigated in-vivo.

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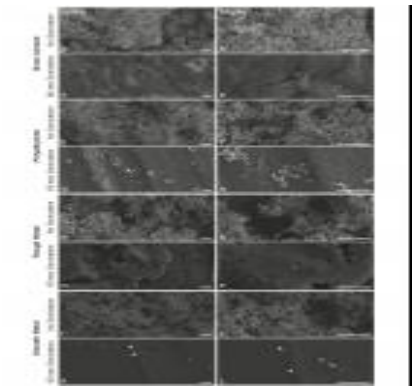

[1532] Halicin Prevents Accumulation of Aminoglycoside-Induced Small Colony Variants of S. Aureus

Authors: Allison J Wintring, **Jason Minnich**, Akira Morita, Roman Natoli, Edward Greenfield

Background And Rationale: *S. aureus* small colony variants (SCVs) contribute to persistent orthopaedic infections through antibiotic tolerance and immune system evasion. Environmental stressors, including biofilm growth and sub-therapeutic antibiotic exposure, induce these small, slow-growth colonies. In previous studies, we demonstrated halicin, a novel broad-spectrum antimicrobial agent, is effective against biofilms induced by s. Aureus on various orthopaedic substrates and that halicin acts synergistically with other antibiotics.

Study Question: We hypothesized that halicin, in combination with conventional antibiotics, would prevent SCV accumulation in biofilms.

Methods: *S. aureus*-xen36 (MSSA, kanamycin-resistant) biofilms were grown on titanium alloy (ti6a14v) discs for 24 hours (less mature) or 7 days (more mature). Biofilms were then treated for 20 hours with, halicin monotherapy, combination therapy with an aminoglycoside (tobramycin or gentamicin) or vancomycin. After a 24-hour recovery period, biofilms were sonicated, freeing remaining bacteria. To prevent wild-type bacterial colony overgrowth, sonicates were plated on agar with 2 μg/ml gentamicin and SCVs (gentamicin-resistant colonies ≤1 mm in diameter) were quantified after 72 hours of incubation.

Results: 41,577 TJAs were performed with 220 PJIs identified. Hazard ratios for PJI among ABLC vs cemented and uncemented procedures for TKA and THA were not significant: TKA, HR cement:1.17 (95% CI: 0.79, 1.7), HR uncemented 0.98 (95% CI: 0.47, 2.1); THA, HR cement:1.36 (95% CI: 0.31, 5.9), HR uncemented 1.39 (95% CI: 0.48, 4.8). The total costs for cement were conservatively estimated to be $2,242,201 for 10, 564 unique ABLC TJAs versus $770,071 for 11,459 unique TJAs using plain cement. The estimated cost per primary arthroplasty for ABLC vs plain cement is $212.25 vs. $67.20. The rate of gentamicin resistance amongst tested organisms recovered at subsequent PJI surgeries was significantly higher in the ABLC group compared to others without local antibiotic exposure (20% vs 5.8% p= 0.01) Figure 1.

Discussion: Due to their small size and slow growth, SCVs are difficult to identify and treat in the clinical setting. Therefore, their emergence should be considered when evaluating antibiotic treatments. This study shows halicin reduces SCV accumulation induced by aminoglycosides. These findings highlight that halicin can either induce or inhibit SCV formation depending on dose and combination with conventional antibiotics. Ongoing studies will determine the effects of halicin on SCV accumulation in in murine models of fracture-related infection.

Conclusion: Halicin reduces tobramycin-induced SCV formation by >100 fold.

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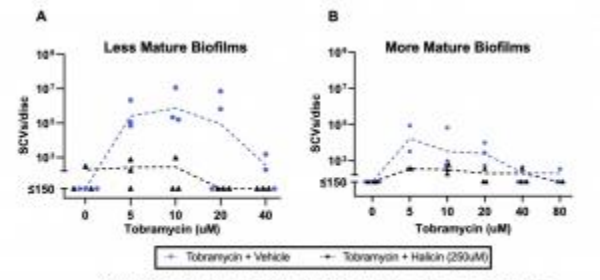

Figure 1: Halicin reduces induction of SCVs by tobramycin in both less-mature (24hr, **1A**) and more-mature (7 day, **1B**) biofilms.

[1384] Inherently Anti-Staphylococcal Bone Cement

Authors: Lauren E Kemp, Ivan Delgado Alvarado, Robert J Tower, **Alexander M Tatara**

Background And Rationale: While bone cement is used as a local antibiotic delivery depot, it has poor release kinetics and no inherent antimicrobial properties itself. We have developed a new formulation of poly(methyl methacrylate) (PMMA)-based cement using a naturally derived, non-toxic antimicrobial porogen (patent pending). This inherently antimicrobial bone cement (IABC) has a porous architecture which facilitates improved antibiotic release as well as inhibits the growth of methicillin-susceptible and methicillin-resistant *Staphylococcus aureus* (MSSA and MRSA) even without the addition of exogenous antibiotics.

Study Question: How does porosity affect the physicochemical properties and antibiotic efficacy of inherently antimicrobial bone cement?

Methods: Formulations of IABC with low porosity, moderate porosity, and high porosity were synthesized and compared to conventional bone cement (PMMA) with or without 3 wt% antibiotics (gentamicin and vancomycin). Devices underwent microcomputed tomography and gravimetric analyses to characterize porosity, mechanical testing per ISO5833 to measure strength and modulus, Kirby-Bauer testing to evaluate antimicrobial efficacy against MSSA, MRSA, and *Pseudomonas aeruginosa* (PsA), and liquid chromatography/mass spectroscopy ((LC–MS)) to analyze antibiotic release.

Results: Formulations resulted in tunable porosity ranging from 5.2-52.4% with conventional PMMA having less than 1% porosity (Fig. 1A). While PMMA had decreasing strength with incorporation of antibiotics, IABC formulations had relative stable mechanical properties with the addition of antibiotics. IABC without antibiotic inhibited MRSA/MSSA (Fig. 1B) but not PsA. By LC/MS, IABC formulations released 3.8-5.4x more antibiotic than PMMA. When loaded with the same amount of antibiotic, IABC formulations inhibited MSSA, MRSA, and PsA more effectively than PMMA.

Discussion: A naturally derived, non-toxic antimicrobial porogen can be incorporated into a polymer backbone to inhibit staphylococci. This incorporation also shielded devices from weakening related to the loading of conventional antibiotics. Water-soluble porogens also increased device surface area permitting greater release of conventional antibiotics.

Conclusion: We extensively characterized 3 formulations of new antimicrobial bone cement (IABC) and compared their properties to current state-of-art. IABC has inherent antimicrobial properties, improved antibiotic release, and decreased loss of mechanical properties from antibiotic loading.

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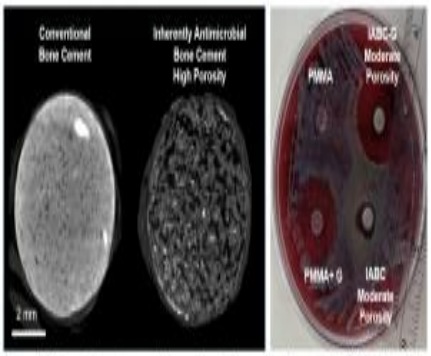

Figure 1. A) Representative microcomputed tomography slice of conventional bone cement (PMMA) and inherently antimicrobial bone cement (IABC) from a high porosity formulation. B) Example of disc diffusion assay against Staphylococcus aureus evaluating PMMA and IABC with and without gentamicin loading (G).

[1499] Ex Vivo Antibacterial Efficacy of MDPB-Coated Cobalt Chromium Implants Against Staphylococcus Aureus and Staphylococcus Epidermidis in Preventing Bacterial Contamination

Authors: **Samuelson Osifo**, Michael F Shannon, Victoria R Wong, Adrian Santana, Kenneth L Urish, Gene Kulesha

Background And Rationale: Periprosthetic joint infection (PJI) is the most common cause of failure in knee and hip arthroplasty. Treatment of PJI is challenging in part due to the potential for an antibiotic-resistant biofilm to quickly become established on an implant. In order to reduce bacterial contamination on implants, a novel polymerizable quaternary ammonium compound, 12-methacryloyloxydodecyl pyridinium bromide (MDPB) has recently received de novo FDA approval for use as an antibacterial implant coating.

Study Question: This preclinical study assessed the ability of surfaces coated with MDPB to prevent bacterial contamination.

Methods: Using a novel spray system to simulate intraoperative airborne contamination, twenty cobalt chromium molybdenum implants were tested, 10 pretreated with MDPB coating and 10 untreated controls. Implants in both groups were sprayed with a bacterial suspension of staphylococcus aureus or staphylococcus epidermidis (5 implants each). Following incubation, colony-forming units (CFU) recovered via sonication and vortexing were compared between MDPB-coated and untreated control implant surfaces.

Results: Control implants exposed to S. aureus demonstrated a mean 1,525 ± 510.7 CFU (95% CI: 891-2,159). In controls exposed to S. epidermidis, a mean 1,904 ± 908.4 CFU (95% CI: 776-3,032) were recovered. No viable bacteria were recovered from any MDPB-coated implants, representing >99.92% bacterial reduction for S. aureus and >99.94% bacterial reduction for S. epidermidis ($p < 0.001$).

Discussion: These results exceeded the ≥90% bacterial reduction benchmark set as the threshold to define antibacterial efficacy. Notably, efficacy was observed across the entire implant surface, including complex geometries.

Conclusion: MMDPB-coating significantly reduces *S. aureus* and *S. epidermidis* contaminants on implant surfaces in a simulated operating room model. These findings support MDPB as a promising antibacterial surface coating to prevent bacteria contamination and adhesion.

Attachments:

There is no figure for this abstract.

[1389] Pretreatment with Vancomycin Prevents Biofilm Formation on Marlex Mesh Utilized in Revision Knee Arthroplasty

Authors: **Christina A Chao**, Tyler D Hoskins, Mohammed Hammad, Suenghwan Jo, Mathias P Bostrom, Alberto Carli

Background And Rationale: Polypropylene (PPE) mesh has gained popularity as a surgical treatment for extensor mechanism disruption in revision knee arthroplasty but has led to a higher frequency of postoperative periprosthetic joint infection (PJI). Pretreating materials with antibiotics has multiple precedents in the surgical literature, but this strategy has yet to be described for PPE mesh.

Study Question: Therefore, the purpose of the current study is to determine if pre-treatment of mesh with vancomycin could be effective in preventing biofilm formation. Furthermore, we investigated if rinsing (often performed by surgeons prior to closure) vancomycin-loaded PPE mesh diminished its biofilm-prevention properties.

Methods: PPE mesh was cut into 10mm diameter circles under sterile conditions. PPE circles were soaked for 20 minutes in one of the following vancomycin concentrations (in saline): 1) 0.625mg/ml, 2) 1.25mg/ml, 3) 2.5mg/ml, 4) 5.0mg/ml, and 5) 10.0mg/ml. PPE circles were weighed before and after the vancomycin treatment to quantify the amount of antibiotic that remained. Pretreated samples were then rinsed with saline 0, 1, 2 or 3 times to simulate surgical irrigation. Nine trials were performed in each experimental group. Rinsed PPE circles were placed in a 48-well plate, inoculated with 105 colony forming units (CFUs) of s. Aureus, cultured in tryptic soy broth (TSB), for 24 hours, rinsed to remove planktonic bacteria, and sonicated in fresh TBS for 30 minutes. Sonicated fluid was plated, serially diluted and CFUs were counted. The finding of zero CFUs was defined as successful infection prevention. Vancomycin treated PPE circles were imaged with scanning electron microscopy (SEM) to determine if vancomycin crystals could be visualized.

Results: Pre-treatment of PPE mesh with 10mg/mL of Vancomycin was the only condition which successfully prevented S. Aureus biofilm formation in all conditions, even after three rinses. High magnification with SEM confirmed that Vancomycin pre-treatment consistently led to antibiotic crystals being deposited on the surface of PPE mesh.

Discussion: Vancomycin pre-treatment of PPE mesh can prevent *S. aureus* contamination and subsequent biofilm formation. However, vancomycin does not rigidly adhere to the PPE surface.

Conclusion: Surgeons should consider pretreating PPE mesh in 10mg/ml of vancomycin for 20 minutes when using PPE in revision knee arthroplasty.

Attachments:

There is no figure for this abstract.

Physical Posters
Friday AM Break

[1411] Debridement, Antibiotics, and Implant Retention (DAIR) Within 48 Hours for Acute Knee Periprosthetic Joint Infection Does Not Improve Success Rate

Authors: **Michael F Shannon**, Victoria R Wong, Andrew J Frear, Robert E Bilodeau, Eduardo Drummond, Kenneth L Urish

Background And Rationale: Periprosthetic joint infection (PJI) is the most frequent cause of failure after total knee arthroplasty (TKA), resulting in significant morbidity. Although debridement, antibiotics, and implant retention (DAIR) is common management for acute PJI, failure remains high. Time to debridement is an important consideration, as delayed intervention may impair chance of success. However, evidence to inform guidelines is limited.

Study Question: This study evaluated the impact of time to DAIR from 1) first contact with the healthcare system and 2) diagnosis with acute PJI on patient outcomes.

Methods: A retrospective study was performed using electronic medical records (EMR) from a regional health system. Patients who underwent DAIR for acute TKA PJI between 2016 and 2022 were identified via searches of the EMR. Time of first contact with the healthcare system and time of diagnosis with using 2018 international consensus meeting (ICM) criteria were obtained from EMR and used to compute time to DAIR for each timepoint. For each timepoint, all patients were stratified between 3 groups: 48 hours. Primary outcome was treatment failure, defined by 2019 MSIS ort criteria. Secondary outcomes included readmissions, 90-day mortality, and need for chronic suppressive antibiotics (>1 year).

Results: Overall, 166 patients were included. No demographic differences were noted between the groups. No significant differences were seen in overall failure (p=0.97) or 1-year failure (p=0.92) between groups for time from first contact. No differences were noted in overall failure (p=0.84) or 1-year failure (p=0.88) between groups for time from diagnosis. Logistic regression demonstrated similar odds of failure regardless of timing. Greater 90-day mortality was observed in patients who underwent debridement

Discussion: Our data suggests that DAIRs in the initial 24 hours have comparable failure rates at a minimum of one year follow-up to those performed beyond 48 hours. Greater mortality in the

Conclusion: It is likely reasonable to allow one to two days for medical optimization before performing DAIR, especially for patients at highest risk for postoperative complications.

Attachments:

Outcomes for Time from First Contact with the Healthcare System				
	< 24h (n = 21)	**24-48h (n = 36)**	**> 48h (n = 109)**	***P*-value**
Overall failure, n (%)	8 (38.10)	15 (41.67)	44 (40.37)	0.97
One-year failure, n (%)	6 (28.57)	9 (25.00)	31 (28.44)	0.92
90-day readmit, n (%)	6 (28.57)	11 (30.56)	41 (37.61)	0.60
90-day mortality, n (%)	2 (9.52)	2 (5.56)	4 (3.67)	0.34
Chronic suppression, n (%)	5 (23.81)	18 (50.00)	41 (37.96)	0.14
Outcomes for Time from Diagnosis with Acute Periprosthetic Joint Infection				
	< 24h (n =66)	**24-48h (n =39)**	**> 48h (n =61)**	***P*-value**
Overall failure, n (%)	27 (40.91)	17 (43.59)	23 (37.70)	0.84
One-year, n (%)	18 (27.27)	12 (30.77)	16 (26.23)	0.88
90-day readmit, n (%)	21 (31.82)	17 (43.59)	20 (32.79)	0.43
90-day mortality, n (%)	8 (12.12)	0 (0.00)	0 (0.00)	**0.001***
Chronic suppression, n (%)	22 (33.33)	20 (51.28)	22 (36.67)	0.17
*<24h significantly greater than 24-48h (p=0.024) and >48h (p=0.006)				

Table 1: Outcomes by Time from First Contact with the Healthcare System or Time from Diagnosis with Acute Periprosthetic Joint infection.

[1416] Choice of Perioperative Antibiotic Prophylaxis Does Not Impact Time to Fracture Related Infection

Authors: Lauren Daddi, David Frumberg, Anne Spichler , **Marjorie Golden**

Background And Rationale: Cefazolin is standard prophylaxis at the time of fracture repair, but may not cover all organisms causing fracture related infections (FRI). Infection may occur at any time, but often within 30-90 days after fracture repair. We evaluated concordance of prophylaxis at fracture repair with organisms causing FRI, looking at time from surgery to development of FRI.

Study Question: Did prophylaxis at time of fracture repair have activity against organisms causing FRI? is time to development of FRI affected by concordant perioperative prophylaxis?

Methods: Retrospective study of patients admitted to a tertiary hospital September 2017 to December 2021 with lower extremity FRI and implants placed for fracture repair. Prophylaxis based on surgical care improvement project (SCIP) guidelines. Demographics, clinical characteristics, prophylaxis, microbiology, and surgical treatment of FRI were abstracted. Statistical analysis and box plots using r (4.2.3) wilcoxon signed-rank test and chi-square test used to analyze continuous and categorical variables.

Results: We reviewed 44 patients with FRI, mean age 51.4, 65.9% Caucasian, 18.2% Black/African American, 61.4% male whose fractures were treated with open reduction internal fixation or placement of intramedullary nail. Prophylaxis included cefazolin (95.4%), cefazolin and gentamicin (2.3%) or clindamycin (2.3%). At time of FRI, culture showed polymicrobial growth (29.5%), MSSA (25%), Enterobacter (11.4%), P. aeruginosa (9.1%) MRSA (9.1%) and CONS (4.5%). Prophylaxis was concordant with causative organism in 19/44 patients (43.2%). No statistically significant difference (p=0.9) was seen in time from index surgery to FRI based on concordance of perioperative antibiotics with causative organisms (Figure 1).

Discussion: In 44 patients with FRI, most received Cefazolin prophylaxis which was concordant with the pathogen in 43.2%. Non-concordant patients had no difference in time from index surgery to FRI. Development of FRI involves a multifactorial interplay between host, fracture type and surgical repair. Our data do not suggest a need to adjust current prophylaxis.

Conclusion: Routine perioperative prophylaxis with Cefazolin appears to be appropriate for patients undergoing fracture repair. No difference was seen to time of FRI, even when causative pathogens were resistant to Cefazolin. In a time of growing antimicrobial resistance, these data may help to inform clinical practice

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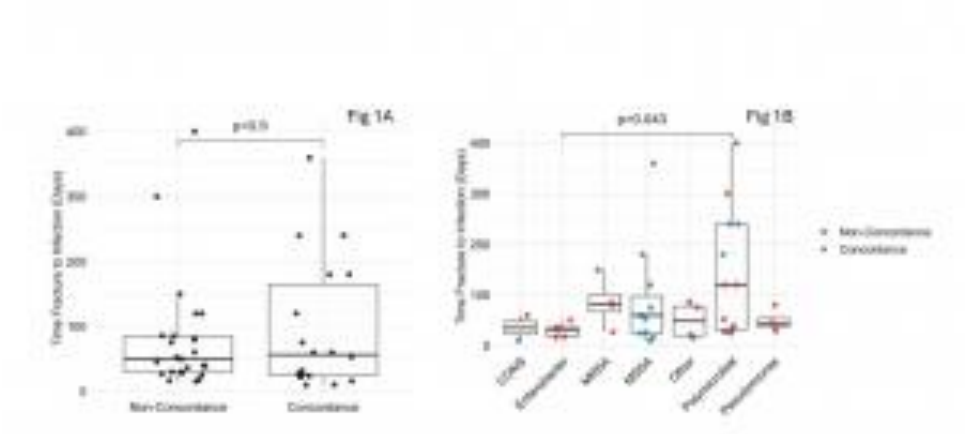

[1437] Vitamin D Deficiency Does Not Increase the Risk of Infection Following Primary Total Knee, but May be Associated with Other Complications

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs, Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: Current evidence on the influence of vitamin d deficiency on postoperative outcomes, including periprosthetic joint infection (PJI) following primary total knee arthroplasty (TKA), remains inconclusive.

Study Question: This study aimed to evaluate whether a diagnosis of vitamin d deficiency within 6 months before surgery is associated with an increased risk of postoperative complications, by comparing matched cohorts of patients with and without vitamin d deficiency.

Methods: Using the PearlDiver all-payer database, patients who underwent primary TKA for osteoarthritis between 2016-2022 were identified. Patients with <90-day follow-up or those who received vitamin D supplementation were excluded. A total of 4,775 patients diagnosed with vitamin D deficiency within 6 months before surgery were matched in a 1:3 ratio to 14,325 patients without deficiency using propensity score matching. Matching variables included age, elixhauser comorbidity index (ECI), sex, diabetes, tobacco use, alcohol use disorder, osteoporosis, obesity, heart failure, and hypertension. Multivariate regression was used to assess risk of 90-day postoperative complications, 1-year reoperations, and PJI.

Results: Patients with preoperative vitamin D deficiency had a significantly higher risk of 90-day urinary tract infections (UTI) (OR 1.33, p0.05 for all). At 1-year follow-up, there were no significant differences in rates of PJI (OR 0.91, p=0.40) or reoperation (OR 1.04, p=0.58) between the two groups.

Discussion: TKA patients with vitamin d deficiency experienced higher risk of uti and overall complications within 90 days of surgery. However, vitamin d deficiency did not increase the risk of infection and reoperation up to 1 year following surgery.

Conclusion: These findings suggest that vitamin d deficiency may not significantly impact surgical outcomes following TKA. Further studies are warranted to clarify whether preoperative correction or supplementation for vitamin d deficiency can improve short- and long-term recovery.

Attachments:
There is no figure for this abstract.

[1450] 30 Day Readmission Following Orthopaedic Hip & Knee Revision: Analysis of Patient, Surgical, and Portal Of Entry Characteristics

Authors: **Ryan J Blake**, Benjamin M Frye, Nick L Hudock, Allison M Lastinger , Vincent K Melemai

Background And Rationale: Arthroplasty constitutes many elective orthopaedic procedures and generally has positive outcomes. However, while major complications are infrequent, minimizing these complications remains a targeted goal, and continuous improvement and quality metrics are often used to monitor the success rate of orthopaedic programs.

Study Question: What are the patient characteristics and reasons for readmission in those readmitted within 30 days of revision surgery?

Methods: A retrospective quality improvement analysis was performed for those readmitted after revision surgery at our institution in 2024. Patient demographics, surgical intervention, portal of entry, surgical urgency, patient involvement with the orthopaedic medical optimization program, and reason for readmission within 30 days of revision surgery were obtained.

Results: A total of 44 patients were included in the analysis (20 males), comprised of 27 hip revisions and 17 knee revisions. The average BMI was 32.3 (±8.11). Prosthetic joint infection was the largest cause for readmission (32%) followed by respiratory-related reasons (8%), abnormal lab values (6%), sepsis (6%), gastrointestinal-related (6%), pneumonia (5%), and venous thromboembolism (5%), with other various causes making up the minority. 20 of the 23 urgent revision cases were not medically optimized whereas all 13 non-urgent patients were. Many intermediately urgent cases were medically optimized (4 of 8 patients). Of the 19 patients with deep infection specifically, 9 were treated urgently whereas only 7 were medically optimized. 20 patients had a portal of entry of our clinic, 12 from our ED, 9 transferred from an outside ED, 2 were in-patient transfers, and 1 was a referral.

Discussion: Urgent joint revision cases due to prosthetic joint infection appear to make up the largest subset of readmitted patients. Patients not medically optimized during urgent surgical hospitalizations appear to be at increased risk of readmission. Most of the patients were initially seen in our clinic, but the portal of entry did not appear to influence readmission.

Conclusion: Patients readmitted due to joint infection, respiratory illness, lab abnormalities, and gastrointestinal complaints comprised the highest percentage of patients not enrolled in the orthopaedic medical optimization program prior to readmission, representing a subset that may benefit from optimization prior to discharge.

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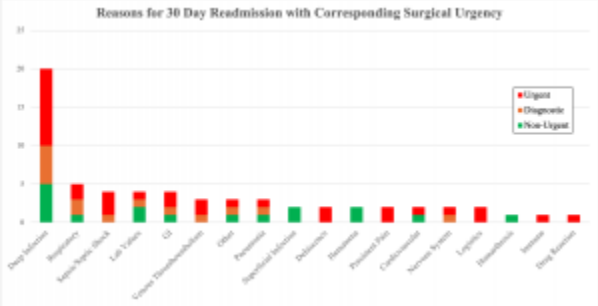

[1462] An Unsustainable Reimbursement Model: A 12-Year Analysis Of Surgeon Compensation For Revision Total Hip Arthroplasty

Authors: Juan D Lizcano, Kaitlin D Bernabe, Jesus M Villa, Nicolas S Piuzzi, Wael K Barsoum, **Carlos A Higuera**

Background And Rationale: Septic revision total hip arthroplasty (R-THA) is a technically complex and resource-intensive procedure. However, physician compensation has not evolved to reflect this complexity. Declining relative value units and the lack of procedure-specific coding continue to obscure the true clinical effort required.

Study Question: Have 90-day episodes of care and physician reimbursement rates for septic and aseptic R-THA increased during the past 12 years in the United States?

Methods: Using the PearlDiver national claims database, we identified patients who underwent aseptic or septic R-THA between 2010 and 2022 using CPT and ICD-9/10 codes. The mean dollar reimbursement was calculated each year and adjusted for inflation using the consumer price index. Patients were grouped by insurance type: 1)commercial, 2)Medicare Advantage (MCR-A), 3)Medicare (MCR). A subgroup analysis compared septic revisions based on procedure type (single vs. Two-stage exchange arthroplasty).

Results: A total of 57,821 aseptic and 17,379 septic procedures were identified. Commercial insurance claims comprised 53.6% and 55% of the aseptic and septic cohorts, respectively. Commercially insured septic procedures showed the highest increase in physician (mean difference [Delta]=$1,525.3, p<0.001) and 90-day (Delta=$529.9, p<0.001) reimbursement during the 12-year period. Although compared to 2010, physician reimbursement in 2022 had a slight increase in the MCR and MCR-A groups, 90-day reimbursement was significantly decreased (MCR Delta=$-2,889.3, p<0.001; MCR-A Delta=$-1,601.3, p<0.001) (Figure 1A-B). Regarding procedure type, single-stage and explant procedures had a constant slight increase in reimbursement, but reimbursement for aseptic revisions and reimplantation procedures remained stagnant throughout the 12-year period (Figure 1C).

Discussion: Physician and facility reimbursement for R-THA has failed to align with procedural complexity—particularly for septic cases. Reimbursement trends in Medicare-based plans, aseptic and septic reimplantation procedures consistently lag behind commercial payers and other septic procedure types.

Conclusion: The current trends in reimbursement for R-THA are unsustainable and discourage both physician and institutional engagement in complex revision care. Policy reform is urgently needed to ensure equitable compensation and safeguard patient access to this critical surgical intervention.

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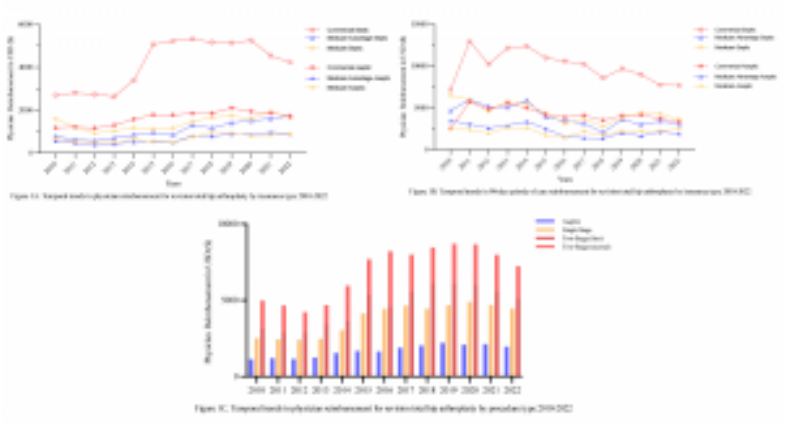

[1463] Intraosseous Vancomycin versus Intravenous Vancomycin in Unicompartmental Knee Arthroplasty

Authors: Kyle M Rako, Andrew S Murtha, Thomas C Sullivan, Anthony Eshareturi, Timothy S Brown, Terry A Clyburn, Stephen J Incavo, **Kwan J Park**

Background And Rationale: Intraosseous vancomycin (IOV) has been shown to decrease periprosthetic joint infection (PJI) when compared to intravenous administration of vancomycin (IVV) in total knee arthroplasty. There have been no studies to date evaluating the use of IOV in unicompartmental knee arthroplasty (UKA).

Study Question: The purpose of this study was to evaluate the effectiveness and safety of using IOV compared to IVV in UKA.

Methods: This is a retrospective cohort study of 562 patients who underwent UKA in a large healthcare system between August 2016 and October 2024. Patients who received IOV were compared to those who received IVV prior to UKA. The primary study outcomes were PJI and wound complications at 30 days, 90 days, and 1 year.

Results: From 2016 to 2024 there were 396 UKA patients that received IVV and 166 that received IOV. Topical vancomycin powder was used more frequently in the IOV group (76.5 versus 43.2%, $P < 0.001$), while vancomycin was added to cement more frequently in the IVV group (19.9 versus 4.8%, $P < 0.001$). There was 1 PJI in the IVV group and no PJIs in the IOV group. There were no statistically significant differences in PJI incidence, wound complications not requiring reoperation, or wound complications requiring reoperation between groups. There was no statistically significant difference in tourniquet time between the two groups (51.8 ± 22.6 minutes IVV group versus 51.6 ± 22.8 minutes IOV group).

Discussion: While the use of IOV in UKA eliminates the logistical hurdles of IVV, there were no significant differences in PJI or wound complications between the IVV and IOV groups in this study.

Conclusion: However, the incidence of PJI in UKA is quite low; therefore a larger sample size may be required to detect a significant difference between IVV and IOV groups.

Attachments:

Table. Post-operative Infection & Wound Complications

Outcome	Post-Operative Time Frame	IVV (N = 396) N (%)	IOV (N = 166) N (%)	P-value
Periprosthetic Joint Infection	30 Day	0	0	1.000
	90 Day	1 (0.3)	0	1.000
	1 Year	1 (0.3)	0	1.000
Wound Complications Not Requiring Reoperation	30 Day	11 (2.9)	1 (0.6)	0.122
	90 Day	15 (4.1)	3 (1.9)	0.298
Wound Complications Requiring Reoperation	30 Day	1 (0.3)	0	1.000
	90 Day	2 (0.5)	3 (1.9)	0.156
	1 Year	2 (0.6)	3 (2.7)	0.109
Cumulative Infection or Wound Complication	30 Day	12 (3.1)	1 (0.6)	0.121
	90 Day	18 (4.9)	6 (3.9)	0.618
	1 Year	18 (5.6)	6 (5.5)	0.944

[1466] Fungal PJI: Attenuated Host Response and Lower Diagnostic Scores

Authors: Jim Parr, Van Thai-Paquette, Eyal Kazin, Krista Toler, Alex McLaren, Yale Fillingham, **Carl Deirmengian**

Background And Rationale: Fungal periprosthetic joint infections (PJI) present unique diagnostic challenges compared to bacterial PJI, with distinctive clinical and laboratory profiles. The low prevalence of fungal orthopedic infections has limited diagnostics research.

Study Question: How do diagnostic characteristics of fungal PJI differ from non-fungal PJI in synovial fluid (sf)?

Methods: A retrospective analysis of synovial fluid samples from a single clinical laboratory was conducted. Inclusion criteria were: a modified 2018 ICM score >2, hip or knee aspirate, and isolation of a single organism. These criteria yielded 18,368 culture-positive samples, with 858 fungal and 17,510 non-fungal specimens. A comparative diagnostic analysis followed.

Results: Common fungal species were Candida parapsilosis (37.9%), albicans (35.0%), glabrata (8.5%), auris (2.6%), and tropicalis (2.3%). Fungal organisms required longer median incubation (32.4 vs 18.0 hours; $p<0.001$) than non-fungal organisms.

Discussion: Fungal PJI is characterized by longer culture incubation times, muted host inflammatory response, lower ICM scores, and higher representation in ICM inconclusive samples. Current PJI definitions, including 2018 ICM criteria, may underperform for fungal infections. Future diagnostic PJI definitions and tools should include the flexibility of using reduced thresholds or points for PJI when fungal organisms are identified.

Conclusion: Fungal PJI reveal longer culture incubation times, reduced host responses, and lower ICM scores compared to bacterial infections.

Attachments:
There is no figure for this abstract.

[1478] Isolation of Multiple Positive Cultures at Resection Arthroplasty is A Predictor of Failure Following Reimplantation

Authors: **Saad Tarabichi**, Jens T Verhey, David G Deckey, Collin Braithwaite, Mark J Spangehl, Zachary K Christopher, Cody C Wyles, Bryan D Springer, Henry D Clarke, Joshua S Bingham

Background And Rationale: Although it is well established that the type of organism can be a risk factor for failure in patients with periprosthetic joint infection (PJI), no study to date has examined the impact of the number of positive cultures on treatment outcomes in patients undergoing 2-stage exchange. The purpose of this multicenter study was to determine the prognostic utility of multiple positive cultures at resection as a predictor of failure following reimplantation.

Study Question: Is the isolation of multiple positive cultures at resection a predictor of failure following reimplantation?

Methods: This retrospective multicenter study identified 437 patients with chronic knee PJI who had undergone 2-stage exchange arthroplasty with a minimum of 1 year of follow-up following reimplantation. PJI was defined with use of the 2013 musculoskeletal infection society (MSIS) criteria. Patients with culture-negative PJI were excluded (n = 138). Treatment failure was defined as either any reoperation for infection or PJI-related mortality. Multivariable regression controlling for risk factors for failure after a 2-stage arthroplasty was performed to determine whether ≥2 positive intraoperative cultures at resection can predict outcomes following reimplantation when compared with a single positive culture.

Results: Two hundred and ninety-nine patients were included. At a mean follow-up of 6.2 ± 2.6 years, 48 patients (16.1%) experienced failure. Patients who had a failure were more likely to have had a longer interstage interval (p = 0.038) and were also more likely to have had ≥2 positive cultures at the time of resection arthroplasty (95.8% versus 75.3%; p = 0.001). On regression analysis, ≥2 positive cultures at resection was the only variable that was identified as a risk factor for failure following reimplantation in both the univariate (odds ratio [OR], 7.55 [95% CI, 2.24 to 47.0]; p = 0.006) and multivariable models (OR, 8.12 [95% CI, 2.31 to 51.9]; p = 0.005).

Discussion: In the current study, we found that almost 96% of patients who experienced treatment failure following reimplantation had ≥2 positive cultures isolated at the time of resection arthroplasty.

Conclusion: We found that the presence of ≥2 positive cultures at resection was an indicator of a poor prognosis and resulted in a greater than eightfold increase in the risk of treatment failure in patients undergoing a 2-stage exchange.

Attachments:

Table 3. Univariate and multivariate analyses to determine the association between different variables and the risk of failure following reimplantation.

	Univariate[1]		Multivariate[1]	
Variable	**Odds Ratio (95% CI)**	**p-value**	**Odds Ratio (95% CI)**	**p-value**
Age (years)	0.985 (0.956 – 1.016)	0.333	0.992 (0.959 – 1.027)	0.644
Sex, Female	0.854 (0.449 – 1.592)	0.622	0.948 (0.481 – 1.843)	0.876
Race, Other	1.268 (0.642 – 2.423)	0.481	1.652 (0.746 – 3.644)	0.212
BMI (kg/m^2)	1.020 (0.979 – 1.061)	0.336	1.016 (0.973 – 1.060)	0.478
ASA score	1.260 (0.718 – 2.125)	0.401	1.322 (0.687 – 2.485)	0.392
Smoking status, Active	2.191 (0.581 – 6.877)	0.201	2.556 (0.609 – 9.460)	0.169
History of failed surgical treatment for PJI	1.151 (0.598 – 2.165)	0.666	1.101 (0.553 – 2.150)	0.779
Organism virulence, High	1.283 (0.629 – 2.505)	0.477	1.128 (0.507 – 2.393)	0.759
Number of intraoperative specimens	0.969 (0.735 – 1.277)	0.827	0.928 (0.686 – 1.252)	0.625
Interstage duration (days)	1.002 (0.998 – 1.006)	0.260	1.004 (0.999 – 1.008)	0.107
Positive culture at reimplantation	0.807 (0.184 – 2.499)	0.734	0.797 (0.173 – 2.682)	0.784
≥ 2 positive cultures	7.545 (2.241 – 47.02)	**0.006**	8.120 (2.311 – 51.91)	**0.005**

[1]Patients with a single positive intraoperative culture were used as a reference group when performing regression analyses.
CI, confidence interval; *BMI*, body mass index; *ASA*, American society of Anesthesiologists; *PJI*, periprosthetic joint infection.
Bold values indicate statistical significance (p<0.05).

[1487] From Evidence to Action: The Prepare Trial'S Impact on Antiseptic Practice

Authors: **Ashley Levack**, Insup Hong, Gerard Slobogean, Nathan O'Hara

Background And Rationale: Practice changing results from the prepare trial demonstrated that 0.7% iodine povacrylex (ip) in 74% isopropyl alcohol for preoperative skin antisepsis reduced the odds of surgical site infection by 26% in patients with closed fractures compared to the use of 2% chlorhexidine gluconate (CHG) in 70% isopropyl alcohol.

Study Question: The purpose of this study was to report on changes in institutional antiseptic practices following dissemination efforts to promote the rapid uptake of trial results.

Methods: Information regarding the prepare trial was disseminated at a tertiary care level i academic trauma center following publication in February 2024. An attending orthopaedic trauma surgeon provided trial education via email to orthopaedic surgeons, a one-time "in-service" training session for operating room (or) nurses, and a posted flier in orthopaedic trauma ORs. The OR managing staff were asked to ensure that IP was stocked in key storage areas for accessibility. All dissemination efforts occurred between 2/1/2024 and 2/28/2024.
Patients who underwent definitive fixation of an extremity fracture were identified retrospectively using surgical CPT codes. The type of surgical skin prep used was determined using electronic medical record queries. We compared rates of skin antisepsis use prior to, during, and after dissemination efforts using a log-binomial model.

Results: From 1/1/2020 to 1/31/2024, 15043 extremity fracture surgeries were identified, in which IP alone was used for 0.3%, CHG alone was used in 92%, and a combination of both was used in 0.2%. During the transitional month of February 2024, 227 cases were performed. 4.4% of cases used IP, 90.8% used CHG, and 4% used a combination. From 3/1/2024 to 8/9/2024, 1357 cases were identified, in which iodine povacrylex alone was used for 73.1%, CHG was used for 16.2%, and a combination was used for 7.6% (IP change, 80.2% (78.1% to 82.3%) p

Discussion: Actionable changes from landmark clinical trials is slow to reach clinical practice, and strategies to disseminate information to relevant health care providers can impact the rate of trial result uptake. While the decision regarding skin antisepsis was at the discretion of the treating surgeon, dissemination efforts resulted in an increase in iodine povacrylex usage from 0.5% to 81% in all fracture surgeries.

Conclusion: Surgical antisepsis practices drastically changed with education surrounding the prepare trial results.

Attachments:
There is no figure for this abstract.

[1535] Posterior vs. Direct Anterior Approach in Revision THA: Equivalent Infection Rates — Patient Risk Profile and Surgeon Comfort Should Drive Approach Selection

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: The choice of surgical approach in revision total hip arthroplasty (THA) significantly impacts surgical complexity and outcomes. While the posterior approach (PA) has traditionally been the standard, the direct anterior approach (DA) has gained popularity due to its potential benefits in certain patient populations. However, concerns persist regarding infection risk associated with the anterior approach, particularly in the revision setting where surgical exposure and wound healing can be challenging. This study compares surgical site infection (SSI) and prosthetic joint infection (PJI) rates between the posterolateral and direct anterior approaches in revision THA.

Study Question: 1. Do SSI and PJI rates differ between the posterior approach and direct anterior approach in revision total hip arthroplasty?

Methods: Prospectively collected SSI surveillance data was reviewed for all revision THAs performed from January 2018 to November 2024 at a high-volume academic orthopedic center. Patient demographics, surgical approach, procedure type, and operative times were analyzed for each patient. SSI was defined and collected as outlined by the national healthcare safety network (NHSN) criteria.

Results: A total of 2,247 revision THAs were performed between January 2018 and November 2024. Of these, 2,132 revisions were performed with the posterior approach and 115 via the direct anterior approach. Direct anterior revisions were more likely to be partial revisions (92.2% vs. 46.6%), while both-component revisions were more common with the posterior approach (53.4% vs. 7.8%). SSI rates were similar: 1.7% for posterior and 1.8% for direct anterior (p=0.56). The rate of prosthetic joint infection in DA revision THA was 0.86% and 1.8% in PA revision THA (p=0.72). Operative times were comparable (138.7 vs. 134.1 minutes).

Discussion: In this large cohort of revision THA patients, there was no difference in 90 day SSI or PJI +7rates between revisions performed through the posterolateral and direct anterior approaches.

Conclusion: These findings suggest that approach selection in revision THA should be guided by patient-specific factors — such as risk of instability and wound complications — as well as surgeon comfort, rather than concerns over infection risk.

Attachments:
There is no figure for this abstract.

[1556] Clinical Characteristics of Patients with Bone and Joint Surgical Specimens with Nontuberculous Mycobacteria Isolates Considered Non-Infections, From One Center 2019-2023

Authors: Patrick Passarelli, **Sonal S Munsiff**

Background And Rationale: Nontuberculous mycobacteria (NTM) bone and joint infections (BJI) are rare. They occur typically after direct inoculation via penetrating and non-penetrating trauma, surgery, or injections. NTM isolated from a surgical specimen is usually considered in need of treatment. However, we notived several recent patietns who were not treated for them.

Study Question: We identified clinical features of people with isolation of NTM from bone and joint sites but who were not treated for the NTM (i.e. Non-infection cases) to help clinicians make informed decisions on management.

Methods: The microbiology laboratory identified patients from January 1st, 2019 thru December 31st, 2023. We reviewed their records for clinical data from six months prior to index culture through dec 31st, 2024 or time of death if it occurred before this date

Results: We identified nineteen patients with positive NTM bone/joint sample cultures; nine, all from operative joint cultures, were not treated for NTM. Age of patients ranged from 12 to 88 years (Table). Eight isolates were rapidly growing mycobacteria (five were M. abscessus); one was M. avium complex. Eight had other bacterial isolates from site of infection and were managed with antibiotics targeting those organisms; clinical cure was seen in all. Two NTM grew along with Staphylococcus epidermidis in patients with prosthetic knee injection; one was the only organism cultured in a patient with knee arthroplasty mechanical hardware failure without clinical concern for infection. Two were from patients on immunosuppressive therapy. Two grew from grossly contaminated wounds after trauma, from which multiple other organisms were isolated. One was recovered during toe amputation.

Discussion: Isolation of mycobacteria from operative culture raises concern, as treatment is difficult and prolonged. We present cases with NTM isolated from normally sterile body sites, but the clinical scenario did not suggest infection with these organisms. Clinical cure was achieved by targeting the other organisms that were also isolated.

Conclusion: The source of NTM remains unclear except for two patients who had traumatic injuries with gross contamination from environmental debris. There was no known laboratory or hospital outbreak at the time, and the cases were separated by months to years, which suggests against iatrogenic contamination.

Attachments:

[1565] Assessing Sterility of the Surgical Field During Septic and Aseptic Revision Arthroplasty

Authors: **Andrew Thomson**, Mia Fowler, Alberto Carli

Background And Rationale: Turning over the sterile field during revision knee arthroplasty (RTKA) has been suggested as a means of preventing periprosthetic joint infection (PJI). The rationale behind changing drapes, instruments and gowns is that bioburden, either from the operative room/team or from the wound (in infected procedures) can deposit in the sterile field and can be transferred into the surgical wound prior to closure. To date, no comprehensive evaluation of the sterile field for evidence of viable bioburden has been performed.

Study Question: 1. Following implant removal during RTKA, do various sites within the sterile field become contaminated with viable pathogens? Is such contamination more common during RTKA procedures for infection?

Methods: Eight patients undergoing both component RTKA (3 due to PJI, 5 due to aseptic indications) were prospectively consented. Following debridement and component removal, 5 locations within the sterile field were swabbed: 1) incise drapes, 2cm away from the wound, 2) drape directly underneath the knee, 3) plantar aspect of the foot, 4) the mayo stand where surgical instruments were placed, 5) the chest area of the surgeon's gown. Swabs were separately sent for metagenomic sequencing (bacterial dna/rna was detect using established thresholds) and immediate ATP testing using a luminometer to identify that viable organisms were present.

Results: Bacterial DNA/RNA was detected on 80% (9 of 15) of surfaces in PJI cases and 76% (19 of 25) in aseptic cases. The organism causing PJI was also found within the sterile field in 1 of 3 PJI cases (S. aureus). In both infected and aseptic cases, the presence of C. acnes, P. aeruginosa, and low reads of E. coli were detected. ATP testing detected high activity across septic and aseptic procedures, with no difference between the two ($p=0.37$). The surgeon's gown, mayo stand, and patients' foot were the most common sites for positive bacterial DNA/RNA (7 out of 8 samples, 87.5%).

Discussion: Bacterial DNA/RNA is present in multiple locations within the sterile field during RTKA surgery, with positive ATP activity suggesting that the pathogens are viable. The clinical implications of these findings remain unclear.

Conclusion: Turning over the sterile field during RTKA may be prudent to reduce bioburden and subsequent infection risk.

Attachments:
There is no figure for this abstract.

Physical Posters
Friday PM Break

[1465] The Shrinking Value of Septic Total Knee Revision Arthroplasty: 12 Years of Trends in Physician Reimbursement

Authors: Juan D Lizcano, Kaitlin D Bernabe, Jesus M Villa, Nicolas S Piuzzi, Jorge Manrique, **Carlos A Higuera Rueda**

Background And Rationale: Revision total knee arthroplasty (R-TKA) is a highly complex procedure, often demanding extended operative time, higher complication risks, and considerable effort from the surgical team. Despite its complexity, physician compensation as measured in relative value units and reimbursement dollars has shown a concerning downward trend over time

Study Question: Have 90-day episodes of care and physician reimbursement rates for septic and aseptic R-TKA increased during the past 12 years in the united state

Methods: We conducted a retrospective analysis using the PearlDiver national claims database. Patients who underwent septic and aseptic R-TKA procedures from 2010 to 2022 were identified based on ICD 9-10 and CPT codes. The yearly mean reimbursement in dollars was calculated and adjusted for inflation using consumer price indices. Patients were grouped by insurance type: 1) commercial, 2) Medicare Advantage (MCR-A), 3) medicare (MCR). A subgroup analysis compared septic revisions based on procedure type (single vs. Two-stage exchange arthroplasty)

Results: A total of 87,644 aseptic and 33,013 septic procedures were identified. Commercial insurance claims comprised 58.9% and 54% of the aseptic and septic cohorts, respectively. Commercially insured septic procedures showed a limited increase in physician reimbursement (mean difference [delta]=$1,938.38, $p<0.001$) during the 12-year period, followed by MCR-A (Delta=$803.5, $p<0.001$) and MCR (Delta=$179.4, $p<0.001$) (Figure 1A). Although compared to 2010, physician reimbursement in 2022 had a slight increase, 90-day reimbursement significantly decreased (Commercial delta=$-764; MCR delta=$-1,510.7; MCR-A delta=$-1,554.7, $p<0.001$) (Figure 1B). Regarding procedure type, overall reimbursement for aseptic revisions and reimplantation procedures remained stagnant throughout the 12-year period (Figure 1C).

Discussion: The decrease in 90-day reimbursement fees not only represents low physician fees but also an overall decrease in facility reimbursement. Medicare insurances, aseptic revisions, and septic reimplantation procedures showed the smallest increase in professional fee reimbursement

Conclusion: Reimbursement trends for R-TKA are not aligned with procedural complexity and are financially unsustainable. Without reform, these patterns risk disincentivizing surgeons from performing these critical procedures and could reduce patient access to revision knee arthroplasty

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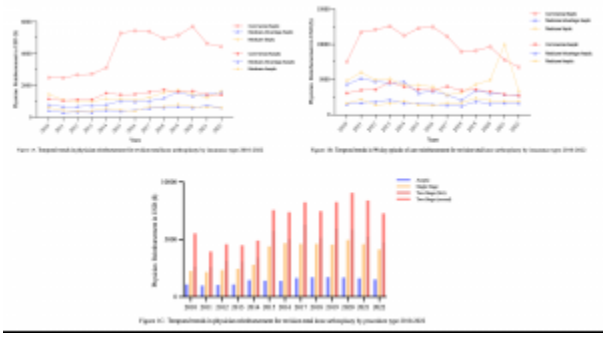

[1491] Is There Any Correlation between Elevations of Serum C-Reactive Protein and Synovial White Blood Cell Count and Differential?

Authors: Audrey C Wimberly, Allina Nocon, Kathleen W Tam, Friedrich Boettner, Peter K Sculco, Alberto Carli, **Gwo-Chin Lee**

Background And Rationale: Serum c-reactive protein (CRP) is used to screen and diagnose periprosthetic joint infections (PJI). According to the AAOS clinical practice guidelines (CPG), joint aspiration is strongly recommended when there is any abnormality in CRP. However, this recommendation is predominantly based on expert opinion, consensus, and aspirations can be associated with costs, risk and discomfort to patients.

Study Question: The purpose of this study is to 1) evaluate the correlation of elevation of serum CRP to increased synovial white blood cell count and differential and 2) to determine an optimal CRP threshold for triggering joint aspiration.

Methods: We retrospectively reviewed records of 2249 patients undergoing revision TKA at our institution between January 2017 and December 2022. Acute PJI and patients with synovial WBC>10000 cells were excluded. 1918 patients who had serum markers within 30 days and synovial aspirations prior to revision were analyzed. Patients were divided into those with serum CRP1.0 mg/dl and 2.0 mg/dl. Sensitivity analysis was performed by varying synovial white blood cell count from 2000-3000 cells and the polymorphonuclear cell differential from 60-75% to determine positive and negative predictive values of each CRP threshold. Finally, a serum CRP threshold predictive of synovial WBC>3000 and PMN differential>70% was calculated.

Results: Serum CRP3000 cells and PMN differential>70%. Elevated CRP2000 and PMN differential>60% and 16.46% for WBC>3000 and PMN>70% respectively. Finally, CRP>=2.0mg/dL was associated with positive predictive value of 47.22% for WBC>2000 and PMN differential>60% and 44.44% for WBC>3000 and PMN>70%. CRP3000 and PMN>70% is >=2. All PMN thresholds tested had low sensitivity but >=2 had the best specificity regardless of WBC cutoff.

Discussion: CRP can be insufficient for generalizable diagnostics, AAOS CPG suppported.

Conclusion: Serum CRP is a useful screening tool for PJI however not specific. Diagnosis of PJI requires an elevated index of suspicion and should be patient specific.

Attachments:

Table 1

Sensitivity and Specificity of WBC > 2000 with variations of PMN differentials

	SENS	SPEC
PMN differential > 60%		
Suspicious+ [>1 <2]	17.09%	85.04%
Concerning [>=2]	35.47%	91.68%
PMN differential > 65%		
Suspicious+ [>1 <2]	17.19%	85.09%
Concerning [>=2]	36.15%	91.67%
PMN differential > 70%		
Suspicious+ [>1 <2]	17.49%	85.09%
Concerning [>=2]	36.51%	91.55%

Sensitivity and Specificity of WBC > 300 with variations of PMN differentials

	SENS	SPEC
PMN differential > 60%		
Suspicious+ [>1 <2]	21.60%	85.49%
Concerning [>=2]	44.99%	92.09%
PMN differential > 65%		
Suspicious+ [>1 <2]	22.41%	85.53%
Concerning [>=2]	46.26%	92.12%
PMN differential > 70%		
Suspicious+ [>1 <2]	23.83%	85.59%
Concerning [>=2]	47.87%	92.02%

[1496] Does an Isolated Elevated ESR Value Warrant Further Work-Up for Periprosthetic Joint Infection Following Total Hip Arthroplasty?

Authors: **Sophia S Antonioli**, Mitchell Kennedy, Anzar Sarfraz, Farouk Khury, Vinay K Aggarwal, Ran Schwarzkopf, Matthew Hepinstall

Background And Rationale: Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are screening tools for periprosthetic joint infection (PJI) after total hip arthroplasty (THA). When both inflammatory markers are elevated, the probability of PJI is increased, prompting further diagnostic workup. In cases where clinical suspicion is low, the significance of an isolated, elevated ESR remains unclear. This study aimed to evaluate the incidence of PJI in THA patients with this specific serologic profile.

Study Question: What is the incidence of periprosthetic joint infection in patients with an isolated, elevated ESR drawn for PJI screening?

Methods: A retrospective study of 2,778 primary, elective THAs between 2012 and 2022 identified 253 cases with elevated ESR (≥30mm/hr) and normal CRP (≤10mg/l) ≥90 days postoperatively. Data collected through chart review included presenting symptoms, inflammatory markers, and PJI diagnoses.

Results: Of the 2,778 pTHAs included, 253 (9.1%) had an isolated, elevated ESR ≥90 days postoperatively. Of these 253 patients, one (0.4%) was already undergoing treatment for PJI and three (1.2%) were subsequently diagnosed with PJI. Of these three, two (0.8%) had clinical findings highly suspicious for PJI such as a large effusion and sudden-onset swelling. These two patients did not represent cases where a surgeon would encounter uncertainty regarding whether to pursue further testing. Leaving one patient—representing 0.4% of those with an isolated, elevated ESR—who was eventually diagnosed with PJI despite limited clinical concern beyond nonspecific pain. There was no significant difference in average ESR between the infected and non-infected cohorts, however the infected cohort had a significantly higher average CRP (P=0.003).

Discussion: An elevated ESR and normal CRP more than 90 days post-operatively is common after primary THA (9.1%). This finding was associated with an extremely low risk of occult PJI.

Conclusion: an elevated ESR with normal CRP more than 90 days after THA does not mandate further PJI-workup in the absence of specific clinical concerns. Significant weight should be given to the presence or absence of additional PJI symptoms when deciding whether to pursue further testing.

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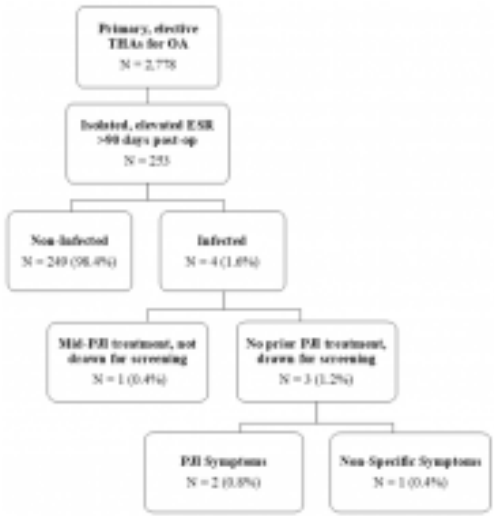

[1501] Reduced Reinfection Rate with Intraosseous Vancomycin Administration at Reimplantation in Two-Stage Exchange Knee Arthroplasty

Authors: **Kwan J Park**, Jennifer S Liu, Colin A McNamara, Thomas C Sullivan, Austin E Wininger, Timothy S Brown, Terry A Clyburn, Stephen J Incavo

Background And Rationale: Recurrent periprosthetic joint infection (PJI) after two-stage exchange knee arthroplasty is a devastating outcome that can lead to additional surgeries, amputation, or mortality. Recent publications in aseptic total knee arthroplasty (TKA) have shown that intraosseous Vancomycin (IOV) can reduce PJI rates after primary and revision surgeries.

Study Question: The purpose of this study was to investigate if IOV administration at the second stage of two-stage exchange knee arthroplasty for PJI reduces the rate of recurrent infection after reimplantation compared to intravenous (IV) antibiotics alone.

Methods: This was a retrospective cohort study of 257 infected total knees who underwent two-stage revision TKA at a single-institution from march 2016 to october 2024. One-stage exchanges and fungal PJIs were excluded. Reinfection rates of patients who received IOV at stage-two reimplantation in conjunction with standard IV antibiotics compared to those that received only IV antibiotic prophylaxis were compared at 30-days, 90-days, 1-year, 2-year, and 3-year follow-up.

Results: There was a non-significant reduction in rate of PJI after reimplantation in the IOV group compared to the IV antibiotic group at 30-day (0 versus 3.2%, P = 0.160), 90-day (3.2% versus 7.2%, P = 0.259), and 1-year (6.2% versus 12.4%, P = 0.140) follow-up. However, the difference became significant with longer follow-up, as the IOV group had a lower rate of recurrent PJI at 2-year (9.9% versus 21.6%, P = 0.037) and 3-year (15.8% versus 32.4%, P = 0.022) follow-up. There were no complications related to the IO infusion.

Discussion: Intraosseous Vancomycin administration during the second stage of two-stage revision TKA was safe and led to a reduced rate of recurrent PJI at two- and three-year follow-up compared to IV antibiotic prophylaxis alone.

Conclusion: The addition of IOV at the time of stage-two reimplantation for infected TKA led to improved outcomes with a reduced rate of recurrent PJI. There is a role for intraosseous Vancomycin as part of an arthroplasty surgeon’s armamentarium when treating septic TKA and future studies should continue to investigate this role.

Attachments:
There is no figure for this abstract.

[1502] The Fate of Patients with Retained Spacers Following First Stage of Revision for Periprosthetic Joint Infection

Authors: Anzar Sarfraz, Hadi H Aziz, Sarah Koljaka, Farouk J Khury, Ran Schwarzkopf, Vinay K Aggarwal

Background And Rationale: Prolonged retention of antibiotic-loaded articulating spacers after the first stage of a two-stage revision for periprosthetic joint infection (PJI) can be due to patient preference or medical reasons preventing the planned second stage. This study assesses patients who did not undergo reimplantation after articulating spacer placement for hip or knee PJI

Study Question: What is the complication risk in patients who retain articulating spacers without proceeding to second-stage in joint arthroplasty?

Methods: We reviewed all patients undergoing index first-stage revision utilizing articulating spacers due to chronic PJI after primary hip or knee arthroplasty (2011 and 2023). All cases were chart reviewed for demographic and procedural information as well as to ensure they met 2018 international consensus meeting criteria for chronic PJI. Of the 263 patients reviewed, we identified 16 hip and 27 knee patients who did not proceed to a second-stage reimplantation procedure. Outcomes assessed via chart review of the electronic medical record as well as telephone calls to patients where appropriate included pre and post spacer ambulation status, spacer associated complications, and mortality. The range of time from first stage spacer placement to final followup was 1.2-12.5 years, and the mean overall follow up was 6.4 years for hips and 4.1 years for knees

Results: The incidence of persistent infection was 19% (5/27) in the knee group and 0% in the hip group. The risk of implant fracture was 12% of hips (2/16) and 4% of knees (1/27). There was one case each of implant loosening (7%) and prosthetic dislocation in the hip group (7%). Compared to pre-spacer ambulation status, more patients in the hip group became reliant on a wheelchair (20% pre-spacer vs. 31% at final followup) and less patients walked unassisted (25% pre-spacer vs 12% at final followup) after spacer implantation. There was no change in ambulatory status in the knee group. Mortality risk was 19% for both hip (3/16) and knee (5/27) groups at one-year post-implantation.

Discussion: While prolonged retention of antibiotic spacers is uncommon, some patients are unable to undergo reimplantation due to the high mortality rate of chronic PJI.

Conclusion: Surgeons should counsel patients who prefer to avoid a second surgery that functional ambulation status may suffer, close monitoring is required to mitigate the risk of spacer failure.

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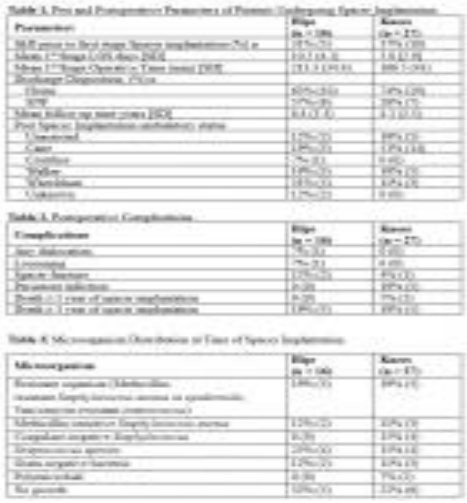

[1504] Research Culture Methods Improve Microbial Detection in Periprosthetic Joint Infections, Identifying 31% more Microbes than Clinical Workflows

Authors: **Anabelle Visperas**, Qiuhe Lu, Bethany Lehman, Suan Sin Foo, Wieqiang Chen, Thaddeus Stappenbeck, Nicolas Piuzzi

Background And Rationale: Periprosthetic joint infection (PJI) remains one of the most challenging complications of total joint arthroplasty, with diagnosis often hindered by the limitations of standard culturing methods. Clinically, up to 20%-50% of cultures are deemed culture negative which can lead to suboptimal treatment strategies where patients may be undertreated or overtreated.

Study Question: The purpose of this study was to assess the completeness and accuracy of state-of-the-art clinical culture identification methods compared to research laboratory techniques to 1) assess whether clinical culture methods can completely identify microbes in PJI, and 2) if identification of novel microbes would have altered the antibiotic treatment course.

Methods: Patients were recruited from a single academic institution undergoing surgical interventions for diagnosed PJI per the 2018 ICM definition between August 2023 and September 2024. A total of 13 patients were included in this study. Synovial fluid, periprosthetic tissues, and implant swabs were taken during surgery and split for standard clinical laboratory workflow and research laboratory workflow within the same institution for cultures. Results from clinical laboratory workflow and treatment course were manually chart reviewed and all results were shared with infectious disease for their treatment input.

Results: Overall, major microbial pathogens were observed in both clinical and research techniques. Differences were apparent in anaerobic culture conditions where laboratory techniques were able to detect additional microbes (p=0.013). Additionally, the research techniques demonstrated the ability to detect a similar percentage of culturable bacteria while requiring fewer collected samples (57.1% vs. 58.8%; p=0.963). Although additional anaerobic microbes were detected, these did not alter antibiotic treatment plan for most patients due to broad-spectrum antibiotic use (Figure 1).

Discussion: While these findings may not always alter antibiotic treatment plans when broad-spectrum antibiotics are used, they highlight the need to refine diagnostic techniques to improve pathogen identification and optimize treatment planning.

Conclusion: This study shows that current state-of-the-art clinical culture techniques may not fully detect all microbes in PJI, specifically anaerobic bacteria.

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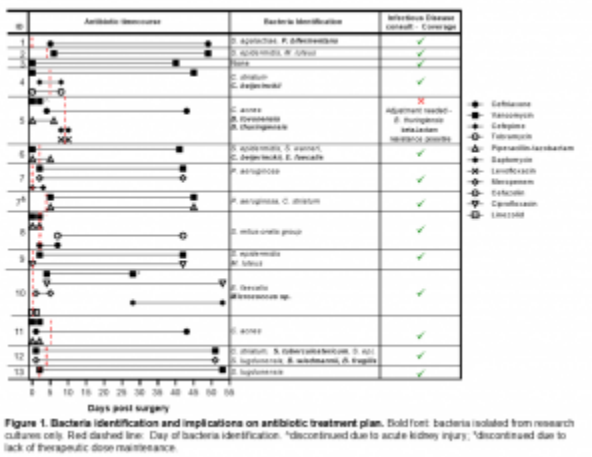

Figure 1. Bacteria identification and implications on antibiotic treatment plan. Bold font: bacteria isolated from research cultures only. Red dashed line: Day of bacteria identification. *discontinued due to acute kidney injury; †discontinued due to lack of therapeutic dose maintenance.

[1519] Incidence and Timing of Periprosthetic Joint Infection after Primary Total Hip and Knee Arthroplasty

Authors: **Erik R Nakken**, Mihir Surapaneni, Emmanuel R Arhewoh, Zhaorui Wang, Michal Jandzinski, Michael M Kheir

Background And Rationale: Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are among the most commonly performed orthopaedic procedures, with annual volumes steadily increasing. Periprosthetic joint infection (PJI) complicates approximately 1–2% of these cases, with 39–58% reported to occur within the first postoperative year. By 2030, the projected annual healthcare cost of PJI in the United States is estimated at $1.85 billion. Notably, the five-year mortality associated with PJI exceeds that of several malignancies, including breast cancer, melanoma, and Hodgkin lymphoma.

Study Question: What is the temporal distribution of periprosthetic joint infection (PJI) following primary total hip or knee arthroplasty, and how might these data inform surveillance practices and clinical decision-making?

Methods: A retrospective review was conducted using institutional records and the Michigan arthroplasty registry collaborative quality initiative (MARCQI) database, identifying patients who underwent primary THA or TKA between 2000 and 2023 and were subsequently treated for PJI. Cases were verified through manual chart review. PJI was defined according to the 2018 musculoskeletal infection society (MSIS) criteria. Demographics, treatment details, and time to infection were analyzed. Minimum follow-up was one year.

Results: Among 12,940 primary arthroplasties performed, 168 cases of PJI were identified in 164 patients, yielding an overall infection rate of 1.3%. Temporal distribution of PJI diagnoses was as follows: 32% within 3 months, 53% within 6 months, 62% within 1 year, 74% within 2 years, 88% within 5 years, and 97% within 10 years postoperatively.

Discussion: The observed PJI rate aligns with national estimates. These findings underscore the critical importance of heightened surveillance in the early postoperative period, with over half of PJIs occurring within 6 months and nearly two-thirds within the first year.

Conclusion: The diminishing incidence of PJI over time supports current prophylactic and diagnostic practices while highlighting the need to optimize early detection strategies. These data may inform evidence-based recommendations for the duration and intensity of postoperative monitoring and antimicrobial stewardship in primary arthroplasty patients.

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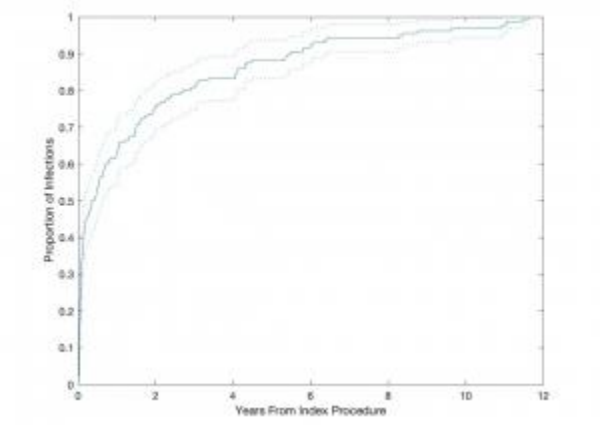

[1525] Histological Transition from Acute to Chronic Periprosthetic Joint Infection Occurs by Day 14 in A Mouse Arthroplasty Model

Authors: **Mohammed Hammad**, Christina A Chao, Mathias P Bostrom, Alberto V Carli

Background And Rationale: Periprosthetic joint infection (PJI) presents significant clinical challenges due to its heterogeneous presentation, ranging from acute, rapidly progressing infections to chronic, biofilm-associated conditions. Accurate staging is critical, as DAIR success rates fall from 74% within 30 days to 44% once chronic infection is established. Current staging primarily relies on symptom duration rather than objective histological criteria, prompting calls for better-defined markers.

Study Question: What are the clear histological markers that characterize the inflammatory progression and acute-to-chronic transition in a load-bearing murine tibial implant model of periprosthetic joint infection?

Methods: Twenty c57bl/6 mice underwent unilateral proximal tibial implantation and inoculation with 3×10^4 CFUS of staphylococcus aureus. Animals were euthanized at 48 hours and days 7, 10, 14, 18, 21, and 28. Radiographs and serum inflammatory markers were assessed. Limb sections were stained (H&E) and graded (0–3) for neutrophils, macrophages/lymphocytes, edema/fibrin, and bone necrosis. Acute infection required neutrophils ≥2 and macrophages/lymphocytes ≤1; chronic infection required macrophages/lymphocytes ≥2 with fibrosis or necrosis ≥1. Slides were reviewed by a board certified pathologist.

Results: Histological examination identified acute peak neutrophil infiltration and edema/fibrin (grade 3) occurred at day 7, with microabscess formation. By day 14, acute markers decreased significantly (grades 0–1), replaced by macrophage/lymphocyte infiltration and fibrosis (grades 2–3). Bone necrosis appeared after day 18.

Discussion: Histological shifts from neutrophil-driven acute inflammation at day 7 to macrophage-dominant chronic inflammation by day 14 reflect similar patterns in human periprosthetic membranes. Identifying this critical transition window aids in developing timely therapeutic interventions.

Conclusion: In a mouse tibial implant model of PJI, acute inflammation peaks at day 7 and transitions to chronic inflammation by day 14. Defining this window guides clinical intervention strategies to prevent chronic PJI.

Attachments:
There is no figure for this abstract.

[1534] Direct Anterior THA: Does Surgeon Volume or Surgical Center Drive Infection Risk

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: The direct anterior (DA) approach for total hip arthroplasty (THA) has gained popularity for its benefits, such as faster recovery, reduced soft tissue disruption, and decreased dislocation rates. However, concerns remain that less surgeon experience and lower case volume may increase the risk of infection. While high-volume surgeons generally have better outcomes in joint arthroplasty, it is unclear whether low-volume DA THA surgeons have higher rates of surgical site infection (SSI) or prosthetic joint infection (PJI). This study evaluates the association between surgeon volume and infection risk in DA THA, and to assess the potential influence of institutional factors in mitigating infection risk for low-volume surgeons.

Study Question: 1. Does the volume of direct anterior (DA) total hip arthroplasty (THA) cases performed by a surgeon influence the rates of surgical site infection or prosthetic joint infection (PJI) at a high volume specialized joint replacement center?

Methods: Prospectively collected data was reviewed for all primary DA THA cases performed between January 2018 and November 2024 at a high-volume, orthopaedic-only academic medical center. Patient demographics, SSI and PJI rates, surgeon volume, and operative times were collected. SSI was defined using national healthcare safety network (NHSN) criteria. Surgeon volume was categorized by annual DA THA caseload: low-volume surgeons performed fewer than 50 DA THA per year, while high-volume surgeons performed greater than 50.

Results: A total of 7,984 DA THA cases were performed by 18 surgeons: 7 low-volume surgeons performed 212 cases, while 11 high-volume surgeons performed 7,772 cases. Low-volume surgeons had longer average operative times compared to high-volume surgeons (109.4 vs. 94.1 minutes). However, there was no significant difference in SSI (0.47% vs. 0.57%, p =0.86) or PJI rates (0.47% vs. 0.15% p=0.26).

Discussion: At a high-volume, specialized orthopaedic center, there was no significant difference in SSI or PJI rates between low and high-volume DA THA surgeons. Institutional factors, including standardized protocols, perioperative care, and consistent or teams, may help mitigate infection risk regardless of individual surgeon volume and experience. These findings highlight the importance of institutional practices in optimizing surgical safety and outcomes regardless of individual surgeon experience.

Conclusion: Low volume DA THA surgeons demonstrate comparable infection rates to high volume DA THA surgeons at a high volume specialized joint replacement center

Attachments:
There is no figure for this abstract.

[1542] Upholding the Standard: Cephalosporins in Perioperative Prophylaxis for Arthroplasties. A Systematic Review and Meta-Analysis.

Authors: **Rita Igwilo-alaneme**, Elie Berbari, Jack McHugh, Francesco Petri, Takahiro Matsuo, Fabio Borgonovo, Said El Zein, Aaron Tande

Background And Rationale: The number of arthroplasty procedures and infection-related complications, including prosthetic joint infections (PJIs) and surgical site infections (SSIs), are increasing. While some studies report a reduced incidence of PJIs and SSIs with cephalosporins compared to non-cephalosporin antibiotics for arthroplasty prophylaxis, others have found no difference. Thus, we conducted a systematic review and meta-analysis comparing outcomes of PJIs and SSIs associated with single-agent cephalosporin prophylaxis versus single-agent non-cephalosporin prophylaxis in arthroplasties.

Study Question: Is the use of non-cephalosporin antibiotics for perioperative prophylaxis during arthroplasties associated with increased risk of PJIs and SSIs compared with cephalosporin antibiotics.

Methods: We searched Cochrane, Embase, Medline, Scopus, and web of science databases for studies published up to January 2025 comparing cephalosporin with non-cephalosporin prophylaxis in adults undergoing primary arthroplasty. Depending on the number of studies that reported an outcome, a random-effects or fixed-effects model meta-analysis was used to estimate odds ratios and confidence intervals.

Results: We included 23 studies (7 randomized controlled trials, 16 comparative cohort studies, 191,527 arthroplasties in the cephalosporin arm, 20,058 arthroplasties in the non-cephalosporins arm). The odds of PJI were lower with cephalosporins than non-cephalosporins (OR 0.59; 95% CI, 0.46–0.75). For SSI, there was no statistically significant overall difference (OR 0.70; 95% CI, 0.36–1.36) except in a subgroup analysis that suggested a beneficial effect of Cefazolin in studies published after 2013. The cephalosporin arm was associated with lower odds of Gram-negative bacteria and methicillin-resistant Staphylococcus spp. on PJI/SSI cultures. The certainty of evidence was graded as ‘moderate’ for PJI and SSI outcomes.

Discussion: Our results indicate that cephalosporins are associated with a significantly lower risk of PJI and SSI compared to non-cephalosporin agents. Sensitivity analyses and subgroup assessments further reinforced these findings, with Cefazolin demonstrating the most pronounced effect.

Conclusion: For primary arthroplasties, the use of cephalosporins, in particular, Cefazolin, as the perioperative prophylactic agent is associated with lower rates of prosthetic joint infections and surgical site infections.

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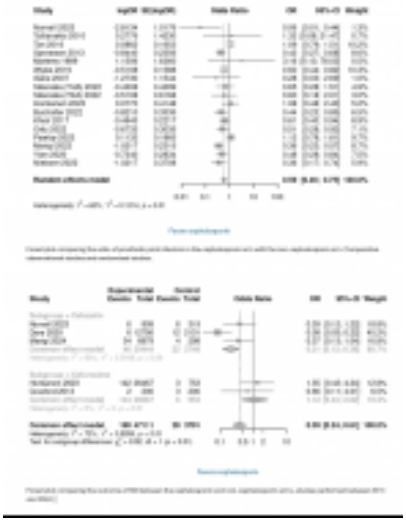

[1586] Treatment of Infected Femoral Shaft Non-Unions Using Ultrathin Silver-Polysiloxane-Coated Implants (Refect-Study)

Authors: Karl-Heinz Frosch, Rita Schoop-Schmetgens, Craig E Klinger, Celia M Niclassen, **Maximilian M Mueller**

Background And Rationale: While the anti-infective effect of a silver-polysiloxane coating has been described in individual case reports, case series or comparative studies have not yet been published.

Study Question: Does the use of an ultrathin silver-polysiloxane-coating on implants improve the success rate in treatment of infected femoral shaft non-union?

Methods: This retrospective, controlled study included patients with a minimum follow-up of one year who were treated for infected femoral shaft non-union from 2013 to 2024 either with an uncoated or silver-polysiloxan-coated implant. Clinical, radiological and biochemical follow-up were performed at 3, 6 and 12 months (2- and 5-years pending). The primary endpoint was defined as successful treatment (no re-infection, bony consolidation, and full weight-bearing).

Results: The mean follow-up of the 70 included patients was 3.7± 2.8 years (8 coated, 62 uncoated; mean age 49±14 years; median age 44 vs. 50 years; 75% male). With a median bone defect size of 4.1 respectively 5cm (circular), successful treatment at 1-year follow-up was achieved significantly more often in the silver-coated group (100% vs. 61.3%, p= 0.04). In the first postoperative year, in 19 cases (30.6%) after conventional treatment (39% at final follow-up) either re-infection or persistent non-union was found. At final follow-up, successful treatment was achieved in 91.2% of cases after conventional treatment. The serum silver ion concentration reached a maximum of 0.014 mg/l without clinical signs of argyria. An improvement in lower extremity function (WOMAC, p= 0.3; LEF-S, p= 0.1) and quality of life (EQ-VAS, p

Discussion: This study presents comprehensive short-term and mid-term data on treatment of patients with infected femoral shaft non-union. The study found a high success rate using a novel implant coating, highlighting its potential as an effective treatment strategy.

Conclusion: Application of a silver-polysiloxane coating on implants for internal stabilization resulted in a significantly higher treatment success rate of infected femoral shaft non-unions at the 1-year follow-up compared to conventional therapy.

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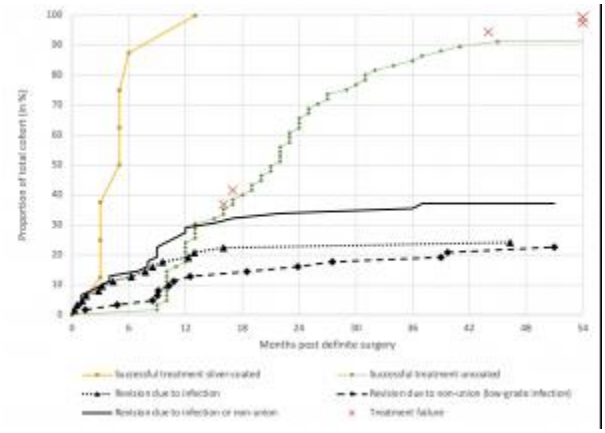

Physical Posters
Saturday AM Break

[1385] Higher Opioid Use Associated With Two-Stage Exchange for PJI

Authors: Calvin C Chandler, Michael A McHugh, Stephen D Graham, Brian Curtin, Thomas K Fehring, Keith Fehring, Jesse E Otero

Background And Rationale: Periprosthetic joint infection (PJI) remains a major complication following total joint arthroplasty. As one-stage exchange emerges as an alternative to traditional two-stage treatment, understanding differences in opioid consumption between approaches is critical for surgical decision-making.

Study Question: Is there a difference in total perioperative opioid consumption between one-stage and two-stage exchange surgeries for PJI?

Methods: This post hoc analysis examined opioid use from a randomized clinical trial comparing one-stage versus two-stage exchange for PJI. Patients meeting MSIS criteria with known organisms were randomized 1:1 between 2015-2021. Primary outcome was total opioid consumption in milligram morphine equivalents (MME) through 12-months postoperatively. Prescription data was cross-referenced with state monitoring programs.

Results: Of 119 patients (58 one-stage, 61 two-stage), total MME was significantly higher in two-stage versus one-stage: 1162.5 vs 732.5 (p=0.0485). No significant differences were found at 3-months (635.0 vs 612.5, p=0.9274) or 1-year (1125 vs 950.01, p=0.4448) postoperatively. Preoperative opioid users had higher 3-month MMEs than opioid-naïve patients (835 vs 500, p=0.0159), regardless of surgical approach. One-year MMEs for preoperative opioid users vs non-users were 1417.5 vs 810.0 (p=0.1479).

Discussion: Two-stage revision significantly increased total opioid burden compared to one-stage exchange, primarily attributable to the interval between surgeries. This finding has important implications given the risks of higher cumulative opioid exposure, including dependence and worse outcomes. The continued opioid use at 1 year (64.7%) starkly contrasts with primary arthroplasty literature (7.6%), highlighting the unique challenges of pain management in the PJI population. The association between preoperative opioid use and higher postoperative consumption aligns with previous studies but manifests more prominently in this cohort, potentially reflecting complex pain profiles and higher preoperative opioid prevalence (52.9%) compared to primary arthroplasty populations (17.1-38.6%).

Conclusion: Two-stage exchange for PJI is associated with significantly higher total opioid consumption than one-stage procedures, though postoperative opioid requirements at specific timepoints are comparable.

Attachments:

Table: Comparison of Perioperative Opioid Prescriptions of Patients Who Underwent One-Stage vs Two-Stage Exchange

Variable	N	One-Stage N = 58 (%)	N	Two-Stage N = 61 (%)	Overall N = 119 (%)	P-value
Preop Total MME, Median (IQR)	31	420 (200, 1200)	32	573.8 (300, 1882.5)	500 (200, 1700.1)	0.2423
Between Stage Total MME, Median (IQR)	0	–	46	750 (380, 1550)	750 (380, 1550)	
3 Month Total MME, Median (IQR)	34	612.5 (421, 1100)	50	635 (384, 1100)	625 (375, 1057.5)	0.9274
1 Year Total MME, Median (IQR)	36	950.1 (206.3, 2192.5)	26	1125 (400, 4050)	1006.4 (300, 3440)	0.4448
Total MME, Median (IQR)	58	732.5 (480, 1945.1)	61	1162.5 (690, 3135.1)	1105 (530, 2582.5)	0.0485
Preoperative Opioids						
Yes		31 (53.4)		32 (52.5)	63 (52.9)	0.9199
No		27 (46.6)		29 (47.5)	56 (47.1)	
Opioids Between Stages						
Yes		0 (0)		48 (78.2)	48 (40.3)	
No		58 (100.0)		13 (21.8)	71 (59.7)	
Opioids at 3 Months						
Yes		54 (93.1)		50 (82.0)	104 (87.4)	0.0673
No		4 (6.9)		11 (18.0)	15 (12.6)	
Opioids at 1 Year						
Yes		42 (72.4)		35 (57.4)	77 (64.7)	0.0882
No		16 (27.6)		26 (42.6)	42 (35.3)	

MME = milligram morphine equivalents

[1394] Reinfection Patterns Following Two-Stage Exchange for Periprosthetic Joint Infection

Authors: Andrew Clair, Rory Metcalf, Stephen Graham, Bryan Springer, Thomas Fehring, Susan Odum, Taylor Rowe, Jesse Otero

Background And Rationale: Periprosthetic joint infection (PJI) is a challenging complication following total joint arthroplasty. Two-stage exchange has been the gold standard in treatment in PJI. However, when this fails to control infection, further treatment options become limited. In patients who fail two-stage exchange, the reinfecting organism is different from the original in 50-80% of occurrences. This study aims to understand reinfection patterns in an attempt to better predict reinfecting organisms to improve management of PJI.

Study Question: What are the reinfection patterns for patients that fail two-stage exchange revision arthroplasty for PJI?

Methods: A retrospective query of our institution's PJI registry identified 185 patients (188 procedures, 110 knees, 78 hips) who underwent first-time two-stage exchange for confirmed culture-positive chronic PJI of total knee and hip arthroplasties from January 2010 to December 2020. Patients with polymicrobial infections, culture-negative results, or fungal infections were excluded. The primary outcome variable was reoperation for reinfection and comparing the index organism to the reinfecting organism.

Results: Of the 188 procedures, 31 (16.5%) failed due to reinfection. Among reinfections, 30 (96.8%) were gram positive, with staphylococcus aureus species accounting for 22 (71.0%) of cases. The most common organisms cultured were MSSA, MRSA, coagulase negative staphylococcus, and streptococcus. Further analyses demonstrated that 19 (61.3%) had a different organism, 8 (25.8%) had the same organism, and 4 (12.9%) were culture negative. Patients experiencing reinfection were significantly younger ($p=0.012$) but no other patterns or predictors of reinfecting organisms were identified.

Discussion: The majority of reinfections following two-stage exchange for PJI occur with a different organism than the index infection. In our study, we did not find a reliable method to predict the reinfecting organism based on the initial infecting organism alone. However, interestingly, the same four gram positive organisms were the most frequently encountered in both the primary infection and the reinfection. Further research is required to understand factors contributing to reinfection and help guide prevention strategies.

Conclusion: Our study found four common gram-positive organisms in both primary and repeat PJI infections, highlighting the need for improved prevention.

Attachments:
There is no figure for this abstract.

[1398] Systemic Inflammatory Disease is Associated with Early Failure after Two-Stage Exchange Arthroplasty of the Hip and Knee

Authors: Evan Dugdale, Kayla Hietpas, Stephen Graham, Jesse Otero

Background And Rationale: While numerous risk factors have been associated with failure following two-stage exchange for periprosthetic joint infection (PJI), little prior research has evaluated specifically when failure tends to occur postoperatively.

Study Question: When do patients fail following two-stage exchange for chronic PJI and are any patient- or organism-specific risk factors associated with early failure?

Methods: From our institutional total joint registry, we identified 589 two-stage exchanges performed for PJI of the hip or knee from 2010 – 2021. After excluding patients for lack of failure (n=357) and inadequate chart information (n=142), we were left with 90 (15% of 589) total joint arthroplasties (56 knees and 34 hips) in 90 patients that failed following two-stage exchange. These 90 patients were divided into two groups based on timing of failure: early (within 5 years postoperatively) and late (>5 years postoperatively). Potential patient- and organism-specific risk factors for failure were compared between these groups.

Results: Median time to failure was 579 days (IQR, 204-1246 days). The cumulative percentage of patients who failed within 1 year, 5 years, and 10 years following reimplantation were 40%, 84%, and 98%, respectively. The only patient-specific risk factor found to be associated with early failure was systemic inflammatory disease (n=21 early failures v. n=0 late failures; p=0.03). A resistant organism identified intraoperatively trended towards being significantly associated with early failure (n=16 early failures v. n=0 late failures; p=0.10).

Discussion: These data may guide surgeons and patients regarding follow-up monitoring and duration of suppressive antibiotic therapy.

Conclusion: The majority of failures following two-stage exchange (84%) occurred early, within 5 years following reimplantation. Patients with systemic inflammatory disease and/or a resistant organism identified intraoperatively were most at risk for early failure.

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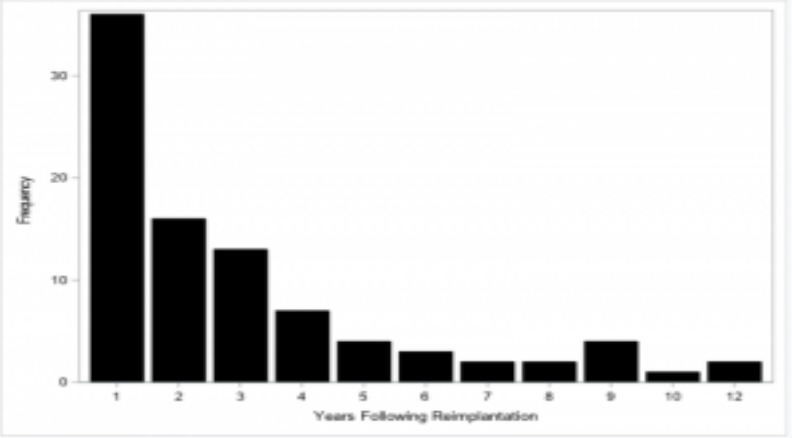

Figure 1: Histogram Showing Frequency of Patients Failing at Each Postoperative Year Following Reimplantation

[1445] The True Fate Of The 2-Stage Exchange For Infection

Authors: Victor Carlson, Carl L Herndon, Rory Metcalf, Taylor Rowe, Kayla Hietpas, Stephen D Graham, Thomas K Fehring, Jesse E Otero

Background And Rationale: The gold standard for treatment of chronic periprosthetic joint infection (PJI) in the United States remains two-stage revision arthroplasty. After resection and placement of an antibiotic delivery device, the proportion of patients that go on to complete the second-stage revision has been reported at 60%-82%. The overall success rate of 2-stage revision arthroplasty has been shown to vary from 60% to 90%. However, these rates are based on small case series and usually do not report on patients who fail to complete the second stage, and therefore may overestimate the effectiveness of this treatment. The purpose of this study was to determine the true fate of two-stage exchange for PJI.

Study Question: What is the true fate of patients undergoing two-stage exchange revision arthroplasty for PJI?

Methods: A retrospective review of a PJI registry was performed from a single institution from January 2010 through December 2021. 359 patients were identified having undergone a two-stage exchange after primary or revision total knee arthroplasty (TKA) and total hip arthroplasty (THA) for PJI defined by musculoskeletal infection society criteria. Perioperative variables and tiered outcome at final follow up were collected.

Results: Of the 188 procedures, 31 (16.5%) failed due to reinfection. Among reinfections, 30 (96.8%) were gram positive, with 22 (71.0%) caused by Staphylococcus aureus. The most common organisms were MSSA, MRSA, coagulase-negative staphylococcus, and streptococcus. Of these, 19 (61.3%) had a different organism, and 8 (25.8%) had the same organism. A total of 280 patients (184 TKA, 96 THA) were included, with a median follow-up of 2.4 years (IQR 1.3, 3.7). Of these, 145 (51.4%) had successful two-stage revision without suppressive antibiotics, 39 (13.9%) retained their prosthesis with suppressive antibiotics, and 76 (27.1%) underwent revision, amputation, or spacer retention. 20 (7.1%) passed away during the study.

Discussion: At 2.4 years after surgery, approximately 50% of two-stage exchanges for PJI result in retained prosthesis without use of suppressive antibiotics. The remaining half of this population remain on suppressive antibiotics, undergo additional surgery, or have passed away.

Conclusion: After two-stage revision arthroplasty for PJI, 50% of patients retain their prosthesis at 2.4 years without antibiotics, while the rest require further treatment or have passed away.

Attachments:
There is no figure for this abstract.

[1510] PJIs Over a Decade: Are Organism Profiles Changing at US Referral Centers?

Authors: Anzar Sarfraz, Benjamin W Padon, Farouk J Khury, Sarah Koljaka, Ran Schwarzkopf, **Vinay K Aggarwal**

Background And Rationale: Understanding the microbiological profile is important for successful treatment of periprosthetic joint infection (PJI). This study aimed to report on the distribution of infecting organisms in total hip (THA) and knee (TKA) arthroplasties as well as the types of procedures performed for PJI at a high-volume center in the U.S.

Study Question: Has the distribution of common infecting organisms in PJI changed over time within the U.S.?

Methods: A retrospective analysis of 962 patients (223 hips and 739 knees) who underwent revision procedures for PJI between 2011 and 2023. PJI was defined as per the ICM-18 criteria. Procedures performed included debridement-antibiotics-and implant retention (DAIR), two-stage revision arthroplasty, and resection arthroplasty. Preoperative aspirate and intraoperative tissue cultures were analyzed and compared for microorganism distribution over the study period.

Results: A majority of the patients in the hip cohort underwent two-stage exchange procedure (62.8%), followed by DAIR (29.1%) and resection arthroplasty (8.1%). Similarly, in the knee cohort the majority of the patients underwent two-stage exchange revision (73.6%), followed by a DAIR (23.9%), and resection arthroplasty (2.5%). Staphylococcus aureus was the most commonly identified organism isolated in both hip (21%) and knee (16%) cohort, followed by coagulase-negative Staphylococcus (8% in hips, 12% in knees). The percentage of methicillin-resistant Staphylococcus aureus (MRSA) declined from 17% in 2012 and 2013 to 10% in 2022 and 2023. Negative culture results were observed in 43% of hips and 49% of knees overall. Concordance between preoperative synovial aspiration and intraoperative tissue cultures was observed in 76% of hips and 72% of the knees.

Discussion: The most commonly identified causative organism species in PJI was staphylococcus (29%), and there was significant concordance between preoperative and intraoperative culture results in our study cohort. Although the incidence of methicillin resistance seems to be decreasing in PJI over the study period, a substantial proportion of samples remained culture-negative (43-49%), emphasizing the need to improve diagnostic methods for organism identification and treatment.

Conclusion: Staphylococcus remain predominant in PJI, but the high rate of culture-negative cases and declining MRSA prevalence highlight both progress and new gaps in diagnostic precision over the past decade.

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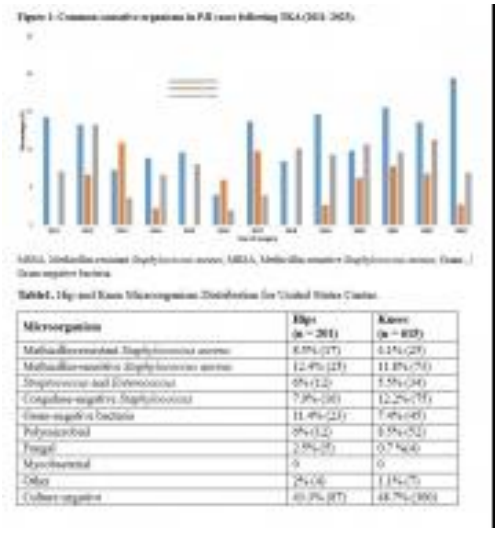

Microorganism	Hips (n = 201)	Knees (n = 835)
Methicillin-resistant Staphylococcus aureus	8.5% (17)	6.1% (29)
Methicillin-sensitive Staphylococcus aureus	12.4% (25)	11.8% (74)
Streptococcus and Enterococcus	6% (12)	5.5% (34)
Coagulase-negative Staphylococci	7.9% (16)	12.2% (75)
Gram-negative bacteria	11.4% (23)	7.4% (45)
Polymicrobial	6% (12)	8.5% (52)
Fungal	2.5% (5)	0.7 %(4)
Mycobacterial	0	0
Other	2% (4)	1.1% (7)
Culture-negative	43.3% (87)	48.7% (301)

[1539] Low Volume Total Knee Arthroplasty Surgeons & Infection Rates: Is it the Surgeon or the Center?

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: Total knee arthroplasty (TKA) is one of the most common elective procedures in the U.S. And complications associated with them are significant costs to the healthcare system. Previous literature has demonstrated a clear link between both surgeon and hospital volume and complications associated with total joint arthroplasty. This evidence demonstrates that high-volume surgeons and high-volume centers demonstrate the lowest risk of intraoperative and postoperative complications such as infection, however it is unclear whether it is the high-volume surgeon or center that drives the lower complication rate.

Study Question: This study examines infection rates among both high and low-volume joint arthroplasty surgeons at a high-volume specialized center to investigate if the higher infection rate of lower-volume surgeons is mitigated by a high-volume specialized center.

Methods: We analyzed prospectively collected surgical site infection (SSI) data and case duration data for primary TKA cases performed from January 2018 to November 2024 at a high-volume academic orthopedic medical center. Surgical site infection (SSI) were defined and collected using criteria as outlined by the national healthcare safety network (NHSN). Surgeon volume was categorized by the amount of total knee arthroplasties performed by each surgeon per year from 2016 to 2024. Surgeons were categorized based on annual TKA volume: low (250).

Results: A total of 33,586 primary TKA were performed by 52 surgeons. Low-volume surgeons performed 1,962 cases (110.6 min avg. case duration) with 0.25% periprosthetic joint infection (PJI) and 0.41% SSI rates. High-volume surgeons performed 21,292 cases (95.6 min duration), with 0.27% PJI and 0.38% SSI rates. Ultra-high-volume surgeons performed 10,332 cases (88.0 min duration), with 0.19% PJI and 0.32% SSI rates. No significant differences in infection rates were found across surgeon volume groups ($p=0.88$, $p=0.58$, $p=0.18$).

Discussion: High volume specialized academic orthopaedic medical centers demonstrate low rates of PJI and overall SSI. Low volume TKA surgeons at a high volume specialized joint replacement center demonstrate comparable infection rates to high volume and “ultra-high” volume TKA surgeons.

Conclusion: This data suggests that the specialization of the center has a greater impact on reducing infection rates than the experience of the surgeon.

Attachments:
There is no figure for this abstract.

1546] DMARD Use is Not Associated with an Increased Risk of Revision in Patients with Rheumatoid Arthritis Undergoing DAIR for PJI

Authors: **Mia J Fowler**, Andrew L Thomson, Patricia Friedmann, Michael Henry, Alberto V Carli, Andy O Miller, Geoffrey H Westrich

Background And Rationale: Debridement, antibiotic, and implant retention (DAIR) procedures, when successful, can effectively treat prosthetic joint infections (PJI) following total joint arthroplasty. Diagnosis of rheumatoid arthritis (RA) is associated with an increased risk of DAIR failure. Additionally, many of these patients are on disease modifying anti-rheumatic drugs (DMARDs), a class of immunosuppressive medications which could theoretically influence DAIR success. This study intends to determine the impact of DMARDS on DAIR success by comparing PJI recurrence in patients with RA who are on DMARDs versus not.

Study Question: 1. Does the use of DMARDs in patients with RA impact the success rate of the DAIR procedure in the treatment of prosthetic joint infections?

Methods: Patients with RA who had DAIR performed between 2009 and 2021 were retrospectively identified using institutional registries and stratified based on DMARD use at the time of admission for DAIR procedure. DMARDs included traditional DMARDs and biologics, while non-DMARD groups included patients on no medication or corticosteroids. All patients on DMARDs at the time of surgery were managed according to American College of Rheumatology/American Association of Hip and Knee Surgeons guidelines. Kaplan Meier survival curves were plotted with revision for PJI as the endpoint, and log rank test was used for differences in survival experience between cohorts.

Results: In total, 56 patients with RA who underwent a DAIR procedure were identified. There were no significant differences in demographics between the two groups. 24/56 patients were on DMARD medications at the time of DAIR, while 32/56 were not. Reoperation rates were similar between each group (46% for DMARDs versus 47% for non-DMARD, p=0.938). Readmission rates were modestly higher for the non-DMARDs group but did not differ significantly (50% for DMARDs versus 59% for non-DMRADs, p=0.485). Infection free survival was 50% at 16-months, and while infection free survival time was slightly longer in the DMARDs group (median survival was 18.8 months for the DMARDS group versus 11.1 months non-DMARDs), this was not significant (log rank test, p=0.71).

Discussion: Our study found that DMARD use did not significantly increase revision risk in patients with RA who undergo DAIR for PJI.

Conclusion: The decision to perform a DAIR procedure in a patient with RA should be made utilizing their global clinical picture. Patients should be counselled appropriately on DAIR success.

Attachments:
There is no figure for this abstract.

[1551] Musculoskeletal Infection Pathway Implementation Improves Blood Culture Rates in Pediatric Acute Hematogenous Osteomyelitis

Authors: **Connor C Park**, Nicholas B Williams, Jessica D Burns

Background And Rationale: Blood culture collection rates for pediatric musculoskeletal infection significantly lag behind recommended standards. At Phoenix Children's Hospital from 2009 - 2018, only 58.0% cases of septic knee or hip had blood cultures obtained. Furthermore, administration of antibiotics prior to blood collection can occur in up to 27% of cases without implementation of a multidisciplinary infection pathway. Previous pathways have demonstrated an ability to improve patient outcomes and limit length of stay in the hospital.

Study Question: Does a musculoskeletal infection pathway improve the rate of blood culture collection prior to antibiotic administration in cases of AHO? Secondarily, does implementation of a pathway lead to improved patient outcomes with AHO?

Methods: All patients diagnosed with AHO from January of 2018 to January of 2025 were evaluated. Included patients were under 18 years of age and had complete medical records.

Results: 62/109 patients were analyzed following pathway implementation. Blood culture rates collected before antibiotic administration significantly improved from 85.6% to 97.9% (OR =7.81; CI [0.95 ; 64.01]; p=0.041). The median length of stay was 4 days for the pathway group and 5 days for the pre-pathway group (p=0.665). There was no difference in central line placement, which was required in 25.5% of patients. There was also no difference in number of required trips to the operating room. Related readmission occurred at a rate of 9.1% in patients in pathway patients and 14.3% in patients prior to the pathway (p =0.733). Median length of antimicrobial treatment was 43 days in pathway patients and 38.5 days in non-pathway patients (p=0.169).

Discussion: The observed increase in culture rates prior to antibiotic administration after pathway adoption illustrates the effectiveness of structured clinical protocols in the early identification and management of pediatric AHO. However, there were no significant changes in several patient outcome parameters. Retrospective studies demonstrating more substantial improvements in pediatric patient outcomes were conducted on earlier cohorts, during periods when more comprehensive modifications to the standard of care had been implemented—likely contributing to the greater observed effect.

Conclusion: Pediatric patients with suspected AHO benefit from an implemented pathway with improved collection of blood culture prior to antibiotics.

Attachments:
There is no figure for this abstract.

[1553] Outcomes of One-Stage Infected Humerus Nonunion Repair in Patients with Prior Operative Fracture Fixation

Authors: Alona Katzir, Robert E Bilodeau, Adam H Kantor, Adam Schlauch, Craig E Klinger, Brian J Page, William M Ricci

Background And Rationale: Infected humeral nonunion after an initial fixation surgery is a relatively complex orthopedic challenge. Treatment often requires multiple operations, along with infection eradication through debridement and long-term antibiotic therapy.

Study Question: What are the clinical outcomes of one-stage repair of infected humeral nonunion following failed prior operative fracture fixation?

Methods: This retrospective study included patients with infected humeral fracture (OTA/AO 11-13) nonunion after prior fixation, who underwent one-stage surgical repair between 2016 and 2023. Outcome measures included union, unplanned reoperations and recurrent infection.

Results: Fifteen patients were included (80% male) with a mean age of 48.1 years (range 26.3–70) and mean follow-up of 66.2 months (range 5.7–234.4). Twelve (80%) index fractures were closed and 3 (20%) open. The most common initial fixation method was plate and screws (n=11, 73.3%). A one-stage infected nonunion repair was planned for all cases (100%), with the preferred fixation construct being plate and screws (n=13, 86.7%), followed by intramedullary nailing (n=2, 13.3%). Bone graft was used in 13 cases (86.7%). Local antibiotics were used in two cases (13.3%). C.acnes grew in 80% of cultures, followed by S.aureus (13.3%) and S.epidermidis (6.7%). Thirteen patients (86.7%) achieved union at last follow-up, 33.3% had unplanned re-operations to promote union or treat infection, 13.3% had recurrent infection with positive cultures, and one patient (6.7%) with a recalcitrant nonunion and no proven recurrent infection was placed on suppressive oral antibiotics [Table 1].

Discussion: This study found that union rates were high (86.7%) for one-stage infected humeral nonunion repair after prior failed osteosynthesis, with only 13.3% resulting in recalcitrant nonunion. The complication rate was substantial, with 1 in 3 patients requiring unplanned reoperation due to recurrent infections or recalcitrant nonunion. Infection eradication can be challenging, requiring long-term antibiotic treatment and several unplanned interventions when dealing with recurrent infections, but it is usually achievable.

Conclusion: One-stage repair of infected humeral nonunion after failed osteosynthesis resulted in a high union rate (86%) but was associated with a 33% of unplanned reoperation. Infection eradication is challenging but generally achievable.

Attachments:

[1568] Do Synovial Fluid Parameters Predict DAIR Failure?

Authors: Alberto V Carli, Michael Henry, Andy O Miller, Veronica Marval, **Andrew L Thomson**, Elizabeth Robilotti

Background And Rationale: Synovial fluid white blood cell (WBC) count and polymorphonuclear neutrophil percentage (PMN%) are used to diagnose periprosthetic joint infection (PJI), but their prognostic value for treatment outcomes is less well described. Staphylococcus aureus (SA), a common and virulent pathogen, has been linked to higher failure rates following debridement, antibiotic, and implant retention (DAIR) procedure and may also influence WBC count at diagnosis among pre-procedure synovial samples. Knowledge of infecting organism or extent of WBC elevation may be used to optimize choice of initial surgical management strategies for primary PJI cases.

Study Question: 1. Is the extent of initial synovial WBC elevation associated with increased risk for reoperation following DAIR? 2. What is the impact of recovery of SA at time of PJI diagnosis on risk for reoperation?

Methods: We conducted a retrospective review of patients undergoing primary hip or knee DAIR for PJI at a single center orthopedic specialty hospital from 2017 to 2022. Evaluable patients were assessed for PJI reoperation over at least 24 months of follow-up. Cox regression modeling was used to assess relationship between synovial fluid WBC counts, organism type, and reoperation within two years.

Results: Increased WBC count was significantly associated with reoperation within 24 months (HR 1.04; 1.01, 1.08). Patients infected with SA at diagnosis were more likely to undergo re-operation over the follow-up period compared to those with other causative organisms, including culture negative PJI (Figure 1). Infection with SA incurred a HR of 3.11 (95%CI 1.74, 5.55) among TJA patients undergoing DAIR compared to other organisms when controlling for co-variates.

Discussion: Synovial fluid parameters such as WBC count and the identity of the infecting organisms influence the success of DAIR procedures. While WBC elevation may be triggered by the pathogen or reflect host-immune response, these easily obtainable data points can be used to guide treatment selection of initial PJI management. This may reduce the need for subsequent surgical procedures, particularly in cases of SA PJI, which was associated with higher reoperation rates and likely indicated more aggressive infections.

Conclusion: Pre-operative knowledge of WBC count and infecting organism may help surgeons optimize management strategies for the treatment of primary PJI, especially among patients infected with SA.

Attachments:

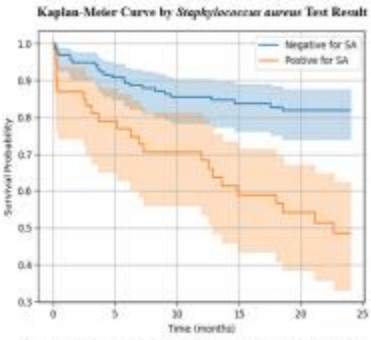

Figure 1. Kaplan-Meier curve of re-operation free survival based on recovered pathogen from primary PJI.

[1585] Racial Disparity Affect the Incidence of Periprosthetic Joint Infection after Total Knee Arthroplasty

Authors: **Daisuke Furukawa**, Conner W Pike, Derek F Amanatullah

Background And Rationale: Racial disparity exists in arthroplasty-related outcomes. However, there is little known about racial disparity in incidence and management of periprosthetic joint infections (PJI).

Study Question: Are there racial differences in incidence of PJI after total knee arthroplasty (TKA) and in the incidence of above knee amputation (AKA) after TKA-PJI?

Methods: Patients with a TKA-PJI were identified using ICD-10 and CPT codes from the Apollo dataset on the Atropos evidence network, a national dataset with medical record data and linked claims. Primary outcomes were incidence of TKA-PJI and incidence of AKA after TKA-PJI stratified by race. 175,205 patients who underwent TKA were included in the cohort, of which 152,270 (86.9%) were non-Hispanic white, 4,259 (2.4%) were Hispanic, 10,712 (6.1%) were non-Hispanic black, and 7,964 (4.5%) were non-Hispanic other. High dimensional propensity score matched analysis to non-Hispanic white patients was used to evaluate the effect of race on TKA-PJI and AKA incidence controlling for confounding factors with alpha error set to 5%.

Results: Compared to non-Hispanic White patients, non-Hispanic Black patients had a higher incidence of PJI after TKA (Hazard ratio [HR] 1.29, 95% Confidence interval [CI] 1.18-1.42, $p<0.001$) in the unadjusted model, but there was no difference in incidence after propensity score matching (HR 1.11, CI 0.97-1.27, $p=0.119$). There were no differences in incidence of TKA-PJI for non-Hispanic Other (HR 1.08, CI 0.92-1.28, $p=0.350$) and Hispanic patients (HR 0.99, CI 0.80-1.24, $p=0.950$) after propensity score matching. In the sub-group of patients with TKA-PJI, there was no difference in the incidence of AKA across race, but male sex was associated with higher incidence of AKA (HR 1.09, CI 1.09-3.43, $p=0.023$) after propensity score matching.

Discussion: Racial disparity exists in the incidence of TKA-PJI. However, this observed difference was lost after propensity score matching, suggesting that comorbidities drive the observed difference, not race as an independent factor.

Conclusion: Addressing comorbidities may independently mitigate the racial disparity observed in the TKA-PJI incidence. Racial disparity does not affect the incidence of AKA after TKA-PJI.

Attachments:
There is no figure for this abstract.

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[1486] Diagnostic Accuracy of Sonication Fluid Culture in Acute and Chronic Periprosthetic Joint Infection

Authors: **Markus Luger**, Irene K Sigmund

Background And Rationale: Sonication of explanted components has become a valuable adjunct in the diagnosis of periprosthetic joint infection (PJI). However, the optimal diagnostic cut-off remains a topic of ongoing debate.

Study Question: What is the diagnostic accuracy and optimal cut-off value of sonication in acute and chronic PJI?

Methods: From 2015 to 2023, a consecutive series of patients undergoing revision surgery after total hip and knee arthroplasty were included in this retrospective cohort study. PJI was diagnosed based on the EBJIS definition. The diagnostic performance of sonication was assessed with receiver-operating-characteristic curves (ROC) and their respective area-under-the-curve (AUC).

Results: In total, 432 patients with available culture results were included, of whom 232 (53.7%) were identified as septic. Diagnostic estimates are listed in Table 1. The calculated optimal cut-off of 4 colony-forming-units (CFU)/mL showed a statistically significantly better performance compared to the established cut-off of 50 CFU/ml (AUC 4 vs AUC 50, $p<0.001$). In acute infections, sonication fluid culture demonstrated a better accuracy compared to those in chronic infections ($p<0.0001$). Interestingly, the optimal cut-off value of 4 CFU did not change for acute and chronic infections. Overall agreement between culture results (synovial fluid and tissue) and sonication was 77.5%, with partial agreement in an additional 4.4%. In 10.6% of cases, sonication culture yielded more microorganisms, and in 8.2% (19/232) of otherwise culture-negative infections, the causative microorganism could be identified by sonication alone (median 9 CFU, low-virulent microorganisms in 52.6%, 10/19). Sonication showed lower AUCs in cases with preoperative antibiotic use, compared to cases without ($p<0.001$). In all other parameters, no significant difference was found.

Discussion: Overall agreement between sonication and cultures is moderate, lower cut-off values performed better in our analysis, without compromising ideal specificity at ≥16 CFU. Culture yield was increased using sonication. The established cut-off of >50 CFU was only reached in 45.5% of acute and 37.4% of confirmed chronic infections.

Conclusion: Sonication culture proved to be a valuable diagnostic tool in PJI, however, the currently used cut-off value of 50 CFU might be too high in a certain number of cases, especially in chronic infections and low-virulent microorganisms.

Attachments:

[1571] Residual Bacterial Positivity after Implantation Does Not Impact Infection Control in PJI: Evidence from a Novel Intraoperative Culture Strategy

Authors: **Wenbo Mu**, Javad Parvizi, Li Cao

Background And Rationale: Intraoperative debridement in periprosthetic joint infection is presumed to eliminate most viable bacteria before prosthesis implantation. However, persistent infections raise concerns about undetected residual pathogens. This study introduces a novel intraoperative strategy to assess residual bacterial burden and explores its impact on infection control under standard antimicrobial protocols.

Study Question: Can viable bacteria still be detected after direct in vivo sonication and chemical debridement in PJI surgery? Do positive post-implant cultures affect infection outcomes?

Methods: A prospective study was conducted on 87 patients undergoing DAIR or single-stage revision for PJI. After mechanical debridement, direct in vivo sonication was performed using a sterile low-intensity probe applied to periprosthetic tissue and bone surfaces. This was followed by irrigation with 3% hydrogen peroxide and 0.5% povidone-iodine or saline. After implant placement, 100–150 ml saline was instilled into the joint cavity, soaked for 5 minutes, and aspirated into blood culture bottles. Culture results were compared to infection control rates defined by MSIS criteria.

Results: Post-implant cultures were positive in 41/87 patients (47.1%). However, infection control rates did not differ significantly between culture-positive and culture-negative groups ($P = 0.218$). Sinus tract presence (OR = 5.464, $P < 0.001$) and low BMI (OR = 0.859, $P = 0.009$) independently predicted culture positivity. Other clinical variables showed no significant association.

Discussion: Nearly half of patients showed residual bacterial positivity despite thorough debridement and prosthesis implantation. The lack of impact on infection control suggests that postoperative intravenous plus intra-articular antibiotic therapy may compensate for incomplete intraoperative sterilization. These findings reveal a blind spot in PJI surgery and validate the importance of robust postoperative antimicrobial strategies.

Conclusion: Residual bacteria can persist in PJI surgical fields even after direct sonication and chemical debridement. However, when combined with systemic and local antibiotic protocols, this does not impair infection control. This intraoperative culture strategy provides a practical tool for microbiological assessment and supports current multimodal treatment pathways

Attachments:
There is no figure for this abstract.

[1477] Diagnostic Yield is Low for Atypical Cultures in Revision Total Joint Arthroplasty

Authors: **David H Jung**, Vincent Buckman, Fatima Bouftas, Christopher Johnson, Nicholas H Maassen

Background And Rationale: In revision total joint arthroplasty (TJA), surgeons routinely obtain intraoperative cultures to identify infection. While aerobic and anaerobic bacteria are common culprits, atypical organisms like acid-fast bacilli (AFB) and fungi are rare. Despite low prevalence, many institutions reflexively order AFB and fungal cultures in all revision cases, including presumed aseptic failures. These tests are resource-intensive and may not provide clinically useful information in most patients. Understanding their diagnostic yield is critical for developing cost-conscious, evidence-based protocols for infection workup in revision arthroplasty.

Study Question: Do routine AFB and fungal cultures in revision hip, knee, and shoulder arthroplasty provide sufficient diagnostic yield to justify their use?

Methods: A retrospective chart review was conducted on patients aged 18 or older who underwent revision TJA (hip, knee, or shoulder) between 2016 and 2021 at a single academic center. Intraoperative tissue samples were submitted for aerobic, anaerobic, AFB, and fungal cultures. Standard incubation protocols were followed, and cultures were monitored for up to 60 days. Microbiological techniques were used to identify pathogens. The rates of culture positivity were analyzed across joint types and pathogen categories.

Results: The cohort included 488 patients (200 hip, 222 knee, 66 shoulder revisions). Aerobic/anaerobic cultures were positive in 45.0% of hip, 50.5% of knee, and 43.9% of shoulder cases. Coagulase-negative Staphylococcus and Cutibacterium acnes were the most common isolates. In contrast, AFB cultures were positive in only 2.0% of hip and 0.5% of knee revisions. Fungal cultures were positive in 1.0% of hip and 0.9% of knee revisions. No atypical pathogens were identified in any shoulder cases.

Discussion: The markedly low positivity rates for AFB and fungal cultures across all revision joints suggest that routine use of these tests in the absence of specific clinical suspicion may be low-yield. In comparison, standard aerobic/anaerobic cultures had significantly higher diagnostic value. Given the cost, time, and resource burden associated with atypical cultures, a more selective testing strategy based on individual risk factors and intraoperative findings is warranted.

Conclusion: Routine AFB and fungal cultures in revision TJA have limited diagnostic value.

Attachments:
There is no figure for this abstract.

[1572] Diagnostic Accuracy of Synovial Fluid pH in Differentiating Periprosthetic Joint Infection from Aseptic Failure

Authors: **Wenbo Mu**, Javad Parvizi, Li Cao

Background And Rationale: Periprosthetic joint infection and aseptic failure are the two most common indications for revision arthroplasty. While inflammatory markers such as erythrocyte sedimentation rate and c-reactive protein are widely used to distinguish these entities, the diagnostic utility of synovial fluid pH remains unclear. Previous in vitro findings suggest that infection-related acidosis may be detectable in synovial aspirates, yet its performance in clinical practice remains unvalidated.

Study Question: Can synovial fluid pH independently differentiate PJI from AF? How does its diagnostic accuracy compare with ESR and CRP?

Methods: This multicenter study prospectively enrolled 96 patients undergoing revision arthroplasty, including 43 with confirmed PJI and 53 with AF. Synovial fluid was aspirated preoperatively, and pH was measured at three intervals: fresh, after 4 hours, and after 1 week. ESR and CRP were also recorded. Between-group comparisons used non-parametric testing. Area under the roc curve (AUC) was used to assess diagnostic accuracy of pH alone and in combination with ESR and CRP.

Results: Synovial fluid pH was significantly lower in the AF group than in the PJI group at both the fresh (6.29 vs. 7.18, $p < 0.01$) and 4-hour (6.37 vs. 7.32, $p < 0.01$) time points. However, the standalone diagnostic performance of pH was limited, with an estimated area under the curve (AUC) below 0.70. While the combination of fresh pH with ESR and CRP achieved a high AUC of 0.9008, the ESR + CRP model alone yielded a comparable AUC of 0.8919. Additionally, models combining pH with either ESR or CRP showed lower AUCs (fresh pH + CRP: 0.8338; fresh pH + ESR: 0.8661), indicating that the independent contribution of pH was minimal. No statistically significant improvement was observed when pH was added to standard biomarkers.

Discussion: Although synovial fluid pH demonstrated statistically significant differences between PJI and AF, its diagnostic accuracy was inferior to traditional markers. The data suggest that pH measurement may reflect underlying inflammatory states but lacks sufficient discriminative power when used alone.

Conclusion: Synovial fluid pH differs between PJI and AF, but its standalone diagnostic value is limited. It is less accurate than ESR and CRP and should be interpreted cautiously if used in clinical settings.

Attachments:
There is no figure for this abstract.

[1429] Evaluating the Association of Vitamin D Deficiency with Infection and Postoperative Complications after Aseptic Revision Total Knee Arthroplasty

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini , **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs, Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: The role of preoperative vitamin d deficiency in influencing postoperative outcomes following aseptic revision total knee arthroplasty (rev-TKA) remains uncertain.

Study Question: This study aimed to determine whether a diagnosis of vitamin d deficiency within 6 months before surgery is associated with increased risk of postoperative complications by comparing matched cohorts of patients undergoing aseptic rev-TKA with and without vitamin d deficiency.

Methods: Using the PearlDiver all-payer administrative database, patients who underwent aseptic rev-TKA between 2012-2022 were identified. Patients <90-day follow-up or who received vitamin D supplementation were excluded. A total of 1,483 patients diagnosed with vitamin D deficiency within 6 months before surgery were matched in a 1:3 ratio to 4,449 patients without deficiency using propensity score matching. Matching variables included age, elixhauser comorbidity index (ECI), sex, diabetes, tobacco use, alcohol use disorder, osteoporosis, obesity, heart failure, and hypertension. Multivariate regression was used to assess the risk of 90-day postoperative complications, 1-year reoperations, and periprosthetic joint infection (PJI).

Results: There were no statistically significant differences in any of the evaluated 90-day complications between vitamin D-deficient and non-deficient patients. This included rates of acute kidney injury (OR 0.92, p=0.62), urinary tract infection (OR 1.09, p=0.48), pneumonia (OR 0.98, p=0.95), deep venous thrombosis (OR 0.78, p=0.32), pulmonary embolism (OR 0.57, p=0.22), transfusion (OR 1.33, p=0.11), hematoma (OR 0.93, p=0.82), surgical site infection (OR 1.04, p=0.8), or reoperations (OR 0.89, p=0.35). Additionally, there were no significant differences in the composite outcome of any 90-day complication (OR 1.07, p=0.34). At 1-year follow-up, no differences were found in the incidence of PJI (OR 0.94, p=0.65) or reoperation (OR 1.01, p=0.85).

Discussion: We found no significant differences between patients undergoing aseptic rev-TKA with and without VD deficiency in terms of postoperative complications, reoperations, and infection up to 1 year following surgery.

Conclusion: Vitamin d deficiency may have a limited impact on short-term surgical outcomes in the aseptic rev-TKA population. However, studies should explore the relationship between VD level and postoperative outcomes.

Attachments:
There is no figure for this abstract.

[1428] Evaluating the Association of Vitamin D Deficiency with Infection and Postoperative Complications after Aseptic Revision Total Hip Arthroplasty

Authors: Khaled A Elmenawi , Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs, Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: The impact of preoperative vitamin d (VD) deficiency on postoperative outcomes following aseptic revision total hip arthroplasty (rev-THA) remains unclear.

Study Question: Are patients with VD deficiency before aseptic rev-THA at a higher risk of infection and complications following surgery?

Methods: Patients undergoing aseptic rev-THA between 2012-2022 were identified using a national administrative database (PearlDiver). Those with a diagnosis of VD deficiency within 6 months prior to surgery were compared to controls without VD deficiency. Patients receiving VD supplementation or with less than 90-day follow-up were excluded. A total of 905 VD-deficient patients were matched in a 1:3 ratio to 2715 non-deficient controls using propensity score matching based on age, sex, body mass index (BMI), Elixhauser comorbidity index (ECI), and year of surgery. Multivariate logistic regression was used to assess 90-day complication rates and 1-year outcomes.

Results: There were no statistically significant differences in 90-day complications between VD-deficient and non-deficient patients. This included rates of acute kidney injury (OR 0.89, p=0.51), urinary tract infection (OR 1.25, p=0.08), pneumonia (OR 0.88, p=0.59), deep vein thrombosis (OR 1.32, p=0.20), pulmonary embolism (OR 0.57, p=0.37), periprosthetic joint infection (PJI) (OR 1.05, p=0.64), transfusion (OR 1.23, p=0.12), hematoma (OR 1.26, p=0.38), surgical site infection (OR 1.26, p=0.15), or reoperation (OR 0.86, p=0.22). The composite outcome of any 90-day complication was also not significantly different (OR 1.14, p=0.11). At 1-year follow-up, no significant differences were observed in the rates of PJI (OR 1.07, p=0.50) or reoperation (OR 0.91, p=0.38).

Discussion: In this matched cohort of patients undergoing aseptic rev-THA, preoperative vitamin d deficiency was not associated with an increased risk of short-term complications, PJI, or reoperation at 90 days or 1 year.

Conclusion: VD deficiency did not increase the risk of infection and postoperative outcomes up to 1 year following aseptic rev-THA. As such, the value of screening and correcting VD deficiency remains controversial.

Attachments:
There is no figure for this abstract.

[1522] Surgical Stress and Physiologic Reserve Interact to Drive Postoperative Outcomes after Arthroplasty: A Data-Driven Framework for Risk Stratification

Authors: **Kole P Joachim**, Adrian Lin, Brandon S Gettleman, Christopher D Hamad, Sumin Jeong, Amanda Perrotta, Alexandra Stavrakis, Alexander B Christ

Background And Rationale: Postoperative outcomes following total joint arthroplasty (TJA) vary widely, even among similar patients. Existing models often fail to integrate two key factors: surgical stress (procedural burden) and physiologic reserve (the patient's inherent capacity to withstand stress). We developed a data-driven framework to quantify both and assess their combined impact on outcomes.

Study Question: Does a quadrant model integrating both surgical stress and physiologic reserve improve prediction of postoperative complications following TJA?

Methods: We analyzed 334,825 TJA cases from NSQIP (2019–2023). Using principal component analysis, we derived two indices: a hemodynamic stress index (HSI, incorporating operative time, RVUs, transfusions, bleeding, BMI, and urgency) and a physiologic reserve score (PRS, based on age, albumin, creatinine, dialysis, function, and comorbidities). Patients were stratified into four quadrants: high stress/low reserve (HS/LR), high stress/high reserve (HS/HR), low stress/low reserve (LS/LR), and low stress/high reserve (LS/HR). Multivariable regression assessed complications (LS/HR as reference).

Results: Among the 334,825 patients included, 90,943 patients were classified as HS/HR, 76,469 as HS/LR, 76,460 as LS/HR, and 90,953 as LS/LR. HS/LR patients had the worst outcomes: longer LOS (1.88 vs. 1.06 days, $p<0.001$), higher readmission (3.6% vs. 2.8%, $p<0.001$), and increased return to the operating room (1.7% vs. 1.1%, $p<0.001$). They also had elevated risks of superficial surgical site infection (SSI) (OR 1.13, $p=0.006$), deep SSI (OR 1.57, $p<0.001$), pneumonia (OR 1.53, $p<0.001$), and sepsis (OR 1.92, $p<0.001$). LS/HR patients had the lowest risk (Figure 1).

Discussion: Infection prediction, particularly through the identification of HS/LR patients, enables targeted interventions such as optimized antimicrobial prophylaxis or enhanced postoperative monitoring to mitigate surgical site infections and sepsis. This is clinically significant given the HS/LR group’s >50% increased odds of deep SSI and near-double sepsis risk compared to the reference group. This risk stratification framework can be integrated into preoperative decision-making and resource allocation while reducing the burden of preventable complications.

Conclusion: The quadrant model captures synergistic risk not apparent when considering surgical or physiologic factors in isolation.

Attachments:
There is no figure for this abstract.

[1430] Vitamin D Status Does Not Correlate with Infection Following Primary Total Hip Arthroplasty

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs, Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: The impact of preoperative vitamin d deficiency on postoperative outcomes following primary total hip arthroplasty (THA), including periprosthetic joint infection (PJI), remains unclear.

Study Question: This study aimed to evaluate whether a diagnosis of vitamin d deficiency within 6 months before surgery is associated with an increased risk of postoperative complications and infection by comparing matched cohorts of patients undergoing THA with and without vitamin d deficiency.

Methods: Using the PearlDiver all-payer database, patients who underwent primary THA for osteoarthritis between 2016 and 2022 were identified. Patients with < 90-day follow-up or who received vitamin D supplementation were excluded. A total of 2,872 patients diagnosed with vitamin D deficiency within 6 months before surgery were matched in a 1:3 ratio to 8,481 patients without deficiency using propensity score matching. Matching variables included age, Elixhauser Comorbidity Index (ECI), sex, diabetes, tobacco use, alcohol use disorder, osteoporosis, obesity, heart failure, and hypertension. Multivariate regression was used to assess the risk of 90-day postoperative complications, 1-year reoperations, and PJI.

Results: Patients with vitamin D deficiency had significantly higher odds of 90-day urinary tract infections (UTI) (OR 1.44, $p<0.001$), hematoma formation (OR 2.57, $p=0.01$), and overall complications within 90 days of surgery (OR 1.30, $p<0.001$) compared to those without deficiency. No significant differences were observed in rates of acute kidney injury, pneumonia, deep vein thrombosis, pulmonary embolism, PJI, transfusion, surgical site infection, or reoperations within 90 days ($p>0.05$ for all). At 1-year follow-up, there were no significant differences in rates of PJI (OR 0.99, $p=0.96$) or reoperation (OR 1.02, $p=0.86$) between the two groups.

Discussion: A diagnosis of VD deficiency did not increase the risk of infection, complications and reoperations but was associated with a higher risk of UTI and hematoma within 90 days following primary THA surgery.

Conclusion: These findings suggest that vitamin D deficiency may influence early postoperative recovery, though its impact on long-term surgical outcomes remains limited. Further research is needed to determine whether preoperative correction or supplementation for vitamin D deficiency can improve outcomes after THA.

Attachments:
There is no figure for this abstract.

[1518] Analysis of Staphylococcus Species Distribution and Antimicrobial Resistance in Orthopedic Isolates at a Tertiary Care Center

Authors: **Khalid F Abu-Zeinah**, Omar M Abu Saleh, Christina G Rivera

Background And Rationale: Orthopedic infections have increased with the rise in surgeries and implanted devices. Staphylococcus species remain the most common pathogens in these infections. Shifting pathogen distributions and antimicrobial resistance highlight the need for updated susceptibility data to guide therapies.

Study Question: What are the staphylococcus species distributions and antimicrobial resistance patterns for orthopedic infections at our institution, and how do these compare to the general inpatient antibiogram?

Methods: Antibiogram data from hip, knee, and spine specimens (2023–2024) were compared to the 2023 general inpatient antibiogram, which includes all positive cultures. Analysis was performed in r.

Results: Figure 1 shows the antibiogram for orthopedic isolates. Orthopedic specimens had higher proportions of coagulase-negative staphylococci (CONS) (48% vs 42%) and S. lugdunensis (6% vs 3%), and a lower proportion of S. aureus (46% vs 55%) compared to general inpatient isolates ($p<0.05$). Among CONS, orthopedic isolates had higher susceptibility to TMP/SMX (72% vs 56%) and levofloxacin (79% vs 67%) compared to general inpatient isolates ($p<0.05$). MSSA and MRSA susceptibilities did not significantly differ between orthopedic and general inpatient isolates. Oxacillin susceptibility among CONS was lower in hip specimens (37%) than knee (56%) and spine (55%) ($p < 0.05$). MRSA rates among S. aureus complex isolates were higher in hip specimens (34%) than in knee (19%) and spine (15%) ($p<0.05$)

Discussion: Orthopedic staphylococcus isolates showed high susceptibility to rifampin and tetracyclines. High rifampin susceptibility, with its biofilm-penetrating properties, supports its role in prosthetic joint infections (PJI). Similarly, tetracycline susceptibility supports their use in both acute and suppressive PJI therapy. Significant non-susceptibility (ns) rates in daptomycin were seen among cons and MRSA, warranting caution against its use before confirming phenotypic susceptibility. Clindamycin presents similar concerns due to high ns rates. Higher MRSA rates in hip isolates may be related to proximity to groin colonization sites, older patient demographics, or longer hospital stays—established MRSA risk factors.

Conclusion: Orthopedic infections show distinct staphylococcus species patterns and resistance profiles. Site-specific antibiograms should guide precise empiric and targeted therapy.

Attachments:

Figure 1: Staphylococci Species Antibiogram (Hip, Knee, and Spine Specimens)

Microorganism (Number Tested)	Oxacil lin	Vancom ycin	TMP/S MX	Linezo lid	Minocyc line ≤4	Doxycycl ine ≤4	Levoflaxa cin ≤1	Rifamp in ≤1	Clindamy cin ≤0.5	Daptomy cin ≤1
Staphylococcus aureus complex (257)	78	100	98	99	97	95	82	99	82	98
Methicillin-susceptible Staphylococcus aureus (MSSA) complex (202)	100	100	99	99	98	98	96	100	84	99
Methicillin-resistant Staphylococcus aureus (MRSA) complex (55)	R	100	94	100	94	87	33	95	75	96
Coagulase-negative staphylococci (265)	50	100	72	100	96	86	79	97	70	92
Staphylococcus lugdunensis (32)	96	100	100	100	100	100	100	100	90	100

[1444] Incidence, Predictors, and Cost of Sepsis Following Septic TKA Revisions

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs , Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: Limited data exist on the incidence of sepsis following septic revision total knee arthroplasty (TKA).

Study Question: We aimed to estimate the incidence, predictors, and cost of sepsis within 90 days of revision of TKA for periprosthetic joint infection (PJI).

Methods: A retrospective analysis of first-time both-component revision TKA for PJI (n=16,535) using a national all-payer database between 2016-2022 was performed. Patients were divided into those who developed sepsis within 90 days of revision TKA for PJI (n=2365) and those who did not (n=14,170). The overall and annual incidence of sepsis were estimated. Multivariate regression was performed to predict risk of 90-day sepsis following surgery. The average 90-day reimbursement per patient was compared between patients with and without sepsis after propensity score matching.

Results: Overall, 166 patients were included. No demographic differences were noted between the groups. No significant differences were seen in overall failure (p=0.97) or 1-year failure (p=0.92) between groups for time from first contact. No differences were noted in overall failure (p=0.84) or 1-year failure (p=0.88) between groups for time from diagnosis. Logistic regression demonstrated similar odds of failure regardless of timing. Greater 90-day mortality was observed in patients who underwent debridement <24 hours from diagnosis (p<0.001). Otherwise, time to debridement from diagnosis or first contact did not significantly affect secondary outcomes.

Discussion: Approximately 14% of revision TKA PJI patients developed sepsis within 90 days. Male gender, renal failure, tobacco use, morbid obesity, higher ECI, and hypoalbuminemia independently increased the risk of sepsis.

Conclusion: 1 in 7 patients undergoing revision TKA for PJI develop sepsis within 90 days. Given the high cost of treatment and associated mortality, optimizing modifiable risk factors such as smoking may help reduce the incidence and associated cost of sepsis following revision TKA for PJI.

Attachments:
There is no figure for this abstract.

[1387] Use of Circulating Bacteriophage DNA To Rule Out Staphylococcal Infections

Authors: **Derek F Amanatullah**, Robert Manasherob, Tony Chang, William Maloney, Naomi L Haddock, Daisuke Furukawa

Background And Rationale: Diagnosing periprosthetic joint infections (PJI) is challenging, often requiring invasively obtained specimens to identify the offending pathogen. We previously reported on using bacteriophage sequences in cell-free DNA (CFDNA) in plasma to diagnose bacterial pathogens in sepsis.

Study Question: We hypothesize that bacteriophage CFDNA in plasma can diagnose and track clearance of PJI.

Methods: Bacteriophage sequences were identified in CFDNA from plasma of 3 distinct patient cohorts: patients with a current staphylococcal PJI, prior PJI, and no PJI. The presence of staphylococcus bacteriophage as a binary variable was also analyzed for its diagnostic performance in identifying staphylococcal PJI. Fisher's exact test was used in the contingency table analyses as it is more precise in calculations in smaller sample sizes. Alpha error was set to 0.5, and all analyses were done in graphpad prism 10.2.3.

Results: Thirty-five plasma samples (10 current PJI, 12 prior PJI, 13 no PJI) were included in the analysis. There were no differences in the distribution of bacterial CFDNA among the three cohorts (p=0.597). The current PJI cohort had a significantly higher proportion of Staphylococcus bacteriophage compared to no PJI (12% vs 5%, p-value=0.040) but there was no difference in proportion of Staphylococcus bacteriophage between current PJI and prior PJI (12% vs 2%, p- value=1.00) or between prior PJI and no PJI (2% vs 5%, p-value=0.147). Staphylococcus phage was present in 6/10 (60%) samples in current PJI, 7/12 (58%) samples in prior PJI, and 1/13 (8%) samples in no PJI (Figure 2). The difference in proportion was significant between current PJI and no PJI (p=0.019, Figure) and between prior PJI and no PJI (p=0.011, Figure), but there was no difference between current PJI and prior PJI (p=1.00, Figure). The presence of Staphylococcus phage had a sensitivity and specificity of 60% and 92%, respectively, for identifying a Staphylococcal PJI.

Discussion: We observed a disruption in the plasma phageome with an increase in proportion of staphylococcus bacteriophage in patients with staphylococcal PJI. The presence of staphylococcus bacteriophage persisted in patients with prior PJI, which may indicate subclinical persistent infection that is not detected through conventional diagnostic methods.

Conclusion: Bacteriophage CFDNA may be a promising diagnostic tool to non-invasively diagnose staphylococcal PJI.

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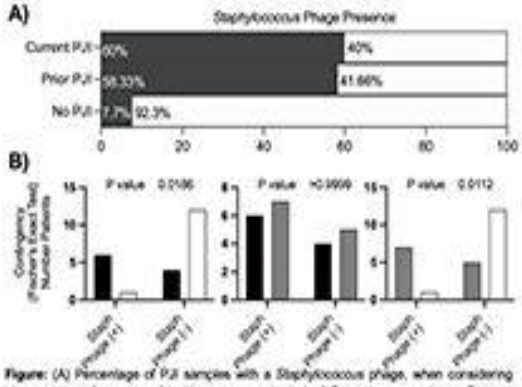

Figure: (A) Percentage of PJI samples with a *Staphylococcus* phage, when considering binary status of presence (black) or absence (white) of *Staphylococcus* phage. Patients with a current or prior PJI had a similar percent of *Staphylococcus* phage, whereas those with no history of PJI were less likely to have *Staphylococcus* phage, in their circulating cell-free DNA (cfDNA). (B) Contingency graphs showing correlation between circulating *Staphylococcus* phage cfDNA and the diagnosis of a PJI (black), prior PJI (grey), and no PJI (white). Fischer's Exact test demonstrates a correlation with presence of circulating *Staphylococcus* phage cfDNA and the presence of an active of prior PJI.

[1540] Robotics and Navigation in TKA: Enhancing Precision without Compromising Infection Rates

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: The adoption of robotic and navigated techniques in primary total knee arthroplasty (TKA) has increased in recent years, with the potential to enhance surgical precision. However, concerns remain regarding their impact on operative duration, surgical site infections (SSIs) and periprosthetic joint infections (PJIs).

Study Question: This study aims to evaluate the outcomes of these advanced technologies by analyzing SSI and PJI rates in a large cohort of primary TKA procedures performed at a high-volume academic orthopedic center, comparing robotic and navigated methods to traditional manual techniques.

Methods: Prospectively collected SSI surveillance data was reviewed for all primary TKA procedures performed from January 2018 to November 2024 at a high-volume academic orthopedic medical center. Patient demographics, case duration, and use of technology was evaluated. SSI data was defined and collected using national healthcare safety network (NHSN) criteria.

Results: A total of 31,712 primary TKAs were performed, with 17,507 using manual techniques and 16,381 using robotic or navigated techniques. The robotic cases included 9,671 OrthAlign, 3,734 Mako, 893 Cori, 475 Velys, 443 Rosa, 230 Intellijoint, and 935 Orthosensor. There were no significant differences in SSI or PJI rates between manual and robotic/navigated techniques ($p=0.75$, $p=0.19$, $p=0.52$, $p=0.64$, $p=0.35$, $p=1.0$, $p=0.19$). When combined, robotic and navigated techniques showed no significant difference in PJI (0.21% vs. 0.28%, $p=0.18$) or SSI rates (0.31% vs. 0.41%, $p=0.12$). Robotic or navigated techniques were associated with an equivocal operative time compared to manual techniques (93.6 vs. 95.0 minutes).

Discussion: In this large cohort study the use of robotic and navigated techniques was not associated with an increased risk of surgical site infection (SSI) or periprosthetic joint infection (PJI). Concerns regarding potential infection risks due to increased operative time or added instrumentation in technology-assisted TKA may be unfounded. Operative times were equivocal with an average difference of 1.4 minutes, which is unlikely to be clinically meaningful.

Conclusion: Robotic and navigated techniques in primary total knee arthroplasty do not increase the risk of SSI or PJI. These findings support the safe use of advanced technologies in TKA to enhance surgical precision without adversely affecting short-term infectious outcomes.

Attachments:
There is no figure for this abstract.

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Monitor 2

[1375] Acute Local Irritation Potential of a Novel Citrate-Based Irrigation Solution for Total Joint Arthroplasty: An In Situ Evaluation in a Rabbit Model

Authors: Farideh Najafi, Beverly Lundell, **Jon Minter**

Background And Rationale: Periprosthetic joint infections (PJIs) remain a significant complication in total joint arthroplasty (TJA), largely due to bacterial biofilm formation. A novel citrate-based irrigation solution (EXPERIENCE™, XP) has shown promise in disrupting biofilms and reducing planktonic bacteria without cytotoxic effects.

Study Question: This study evaluates the acute local irritation potential of XP on rabbit tissues in situ to assess its safety for intraoperative use.

Methods: Adult rabbits underwent surgical exposure of articular cartilage, cranial dura mater, mesentery, and pericardium tissues. Tissues were irrigated with either XP or a control solution (3% hypertonic saline) for 10–11 minutes. Histopathological evaluations were conducted at 30 minutes, 24 hours, and 7 days post-irrigation to assess tissue response, including inflammation, necrosis, neovascularization, and fibrosis.

Results: XP was classified as non-irritating compared to the control solution across all tissues and time points. When compared to naïve tissues, XP was a non-irritant at 30 minutes and 24 hours post-irrigation and a slight irritant at 7 days for articular cartilage, cranial dura mater, and mesentery. For the pericardium, XP was a non-irritant at 30 minutes, a slight irritant at 24 hours, and a moderate irritant at 7 days. Tissue responses were attributed primarily to surgical procedures rather than the irrigation solution.

Discussion: XP demonstrates minimal acute local irritation when applied to rabbit tissues in situ, supporting its safe use as an intraoperative irrigation solution without the need for rinsing. These findings contribute to the growing evidence of XP's biocompatibility and efficacy in preventing PJIs.

Conclusion: Under the conditions of this study, the novel citrate-based irrigation solution XP demonstrated a non-irritating profile when applied to rabbit articular cartilage, cranial dura mater, mesentery, and pericardium tissues in situ. The slight tissue responses observed were primarily attributed to surgical procedures rather than the irrigation solution itself. These findings suggest that XP is a safe irrigation solution with minimal acute local irritation potential, supporting its use in surgical settings without the need for rinsing.

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[1543] Fewer Infections, Fewer Returns: Glp-1 Agonists Improve Outcomes in Joint Arthroplasty

Authors: **Alexis R Chow**, Justin Le, Christopher Femino, Michael Abaskaron

Background And Rationale: Obesity is a well-known risk factor for postoperative complications in total joint arthroplasty patients including periprosthetic joint infections (PJI) and hospital readmissions. Glucagon-like peptide-1 receptor agonists (GLP-1RAs) are increasingly used for weight loss and glycemic control, but limited data exists on their effect on post-operative complications following total joint arthroplasty. In this study, we investigate the association between preoperative GLP-1RA use and postoperative infection and readmission rates in patients undergoing primary total hip or knee arthroplasty.

Study Question: How does GLP-1RA use affect PJI and readmission incidence?

Methods: A systematic review and meta analysis of 5 databases (Cochrane, Embase, Pubmed, Scopus, Web of Science) was performed on studies comparing rates of infection and readmission in patients taking GLP-1RAs to controls. Studies were screened in rayyan.ai. Odds ratios were calculated using SPSS.

Results: Six retrospective studies were included based on inclusion criteria. In hip arthroplasty patients (n=29,894), GLP-1RA patients were 23% less likely to have PJI, but results were not statistically significant (p=0.25). Similarly, in knee arthroplasty patients (n=56,491), GLP-1RA use was associated with a 20% reduction in PJIs, but results were not statistically significant (p=0.26). Hip arthroplasty patients taking GLP-1 agonists had 15% lower odds of readmission compared to the control group, but the results were not statistically significant (p=0.14). There was a statistically significant difference between readmission in knee arthroplasty patients taking GLP-1RAs compared to the control group, with a 31% decrease in readmission in the GLP-1RA group.

Discussion: Our results reveal that GLP-1 agonist use is associated with lower rates of PJI and hospital readmission after hip and knee arthroplasty; however, most findings were not statistically significant. Notably, there was a significant reduction in readmission observed among knee arthroplasty patients, suggesting potential clinical benefit for using glp-1 agonists prior to surgery.

Conclusion: GLP-1RA use significantly reduced readmissions following knee arthroplasty and showed a trend towards lower PJI rates, suggesting a potential role in improving postoperative outcomes. These findings support further exploration of GLP-1 therapy in reducing post-operative complications in total-joint arthroplasty patients.

Attachments:

There is no figure for this abstract.

[1482] Impact of Organism Profile on Ideal Timing of Reimplantation in Patients Undergoing Two-Stage Exchange Arthroplasty

Authors: **Saad Tarabichi**, Jens T Verhey, Collin Braithwaite, David G Deckey, Zachary K Christopher, Cody C Wyles, Bryan D Springer, Henry D Clarke, Mark J Spangehl, Joshua S Bingham

Background And Rationale: No study to date has examined the association between organism profile and ideal interstage duration in patients undergoing two-stage exchange arthroplasty. The purpose of this study was to evaluate the impact of the type of infecting organism on the optimal timing of reimplantation in this patient population

Study Question: What is the impact of the type of infecting organism on the optimal timing of reimplantation?

Methods: This retrospective study identified 576 patients with chronic periprosthetic joint infection (PJI) of the knee that underwent two-stage exchange arthroplasty with a minimum 1-year follow-up. PJI was defined using the 2013 Musculoskeletal Infection Society (MSIS) criteria. Patients with a time to reimplantation >180 days from resection arthroplasty (n=76) and those that underwent spacer exchange were excluded (n=49). Treatment failure was defined as any reoperation for infection or PJI-related mortality. Receiver operator characteristic (roc) curve analyses were used to identify whether the optimal interstage duration differed by infecting organism. Multivariate regression analyses were performed to identify risk factors for failure.

Results: 451 patients with a mean follow-up time of 5.8 □ 3.6 years were included. Of these, 71 (15.7%) patients experienced failure and 380 (84.3%) experienced success. Roc curve analyses demonstrated that the optimal interstage duration was longest for patients infected with “high-virulence” pathogens (129 days), followed by those with mssa (117 days), culture negative pji (98 days), and coagulase-negative staphylococci (86 days). After controlling for co-variates, regression analyses showed that an interstage duration above the identified cutoff for each pathogen group was a predictor of treatment failure (all $p<0.05$).

Discussion: Greater awareness of this data may help guide the optimal timing of reimplantation in this patient population.

Conclusion: We found that the ideal interstage varied considerably by the type of infecting organism in patients undergoing two-stage exchange.

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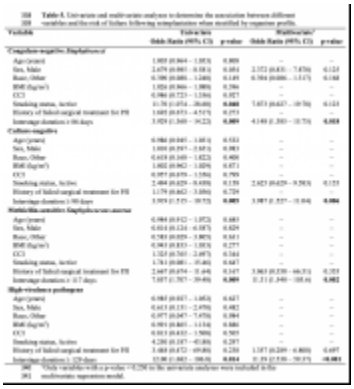

[1480] Time to Reimplantation: Waiting Longer May Increase the Risk of Subsequent Failure

Authors: **Saad Tarabichi**, Jose M Iturregui, Paul Van Schuyver, David G Deckey, Cody C Wyles, Bryan D Springer, Henry D Clarke, Mark J Spangehl, Joshua S Bingham

Background And Rationale: To date, few studies in the orthopaedic literature have evaluated the association between the time from resection arthroplasty to reimplantation and subsequent outcomes following completion of a two-stage exchange. The purpose of this study was to evaluate the impact of time to reimplantation on the risk of failure in two-stage exchange patients.

Study Question: What is the impact of time to reimplantation on the risk of failure in patients undergoing two-stage exchange arthroplasty?

Methods: This retrospective study identified 576 patients with chronic periprosthetic joint infection (PJI) of the knee that underwent two-stage exchange arthroplasty with a minimum 1-year follow-up. PJI was defined using the 2013 Musculoskeletal Infection Society (MSIS) criteria. Patients with a time to reimplantation >180 days from resection arthroplasty (n=76) and those that underwent spacer exchange were excluded (n=49). Treatment failure was defined as any reoperation for infection or PJI-related mortality. Multivariate regression analyses were performed to identify whether time from resection to reimplantation was a risk factor for failure.

Results: 451 patients with a mean follow-up time of 5.8 □ 3.6 years were included. Of these, 71 (15.7%) patients experienced failure and 380 (84.3%) experienced success. Using multivariate analyses, we found that there was a 23% increase in the risk of failure for every 10-day increase in time to reimplantation. Furthermore, when stratifying the cohort into tertiles based on their interstage duration, there was no difference in baseline health status or infecting organism between the three groups (all p>0.05). After controlling for co-variates, regression analyses demonstrated that a time to reimplantation of < 76 days (OR, 0.23 [95% CI, 0.05 to 0.75]; p=0.031) was an independent predictor of treatment success.

Discussion: We found that for every 10-day increase in the time to reimplantation, there was a 23% increase in the risk of treatment failure after completion of a two-stage. Furthermore, patients with an interstage duration of < 76 days were more than 3-times less likely to fail a two-stage exchange.

Conclusion: After controlling for co-variates, time to reimplantation appears to increase the risk of failure following completion of a two-stage exchange.

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Table 4. Univariate and multivariate analyses to determine the association between different variables and the risk of failure following reimplantation in the sub analysis.

Variable	Univariate		Multivariate	
	Odds Ratio (95% CI)	**p-value**	**Odds Ratio (95% CI)**	**p-value**
Age (years)	0.989 (0.966 – 1.013)	0.343	0.999 (0.949 – 1.053)	0.989
Sex, Male	1.129 (0.676 – 1.911)	0.646	1.302 (0.598 – 2.941)	0.512
Race, Other	0.717 (0.369 – 1.310)	0.299	0.717 (0.271 – 1.724)	0.476
BMI (kg/m^2)	1.005 (0.979 – 1.027)	0.668	0.987 (0.934 – 1.039)	0.631
CCI[†]	0.966 (0.806 – 1.159)	0.704	0.824 (0.574 – 1.198)	0.297
Smoking status, Active	3.989 (1.666 – 9.200)	**0.001**	9.297 (2.128 – 43.69)	**0.003**
History of failed surgical treatment for PJI	1.312 (0.789 – 2.193)	0.296	1.145 (0.527 – 2.467)	0.729
Organism virulence, High	1.763 (0.724 – 4.004)	0.203	1.470 (0.551 – 3.668)	0.421
10-day increase in time to reimplantation	1.105 (1.020 – 1.195)	**0.012**	1.231 (1.094 – 1.397)	**0.001**

CI, confidence interval; *BMI*, body mass index; *ASA*, American society of Anesthesiologists; *PJI*, periprosthetic joint infection; CCI, Charlson comorbidity index.
Bold values indicate statistical significance (p<0.05).

[1503] DAIR with Chronic Suppression versus Two-Stage Exchange with Complex Revision Components for Knee Periprosthetic Joint Infection

Authors: **Andrew Gordon**, Michael F Shannon, Victoria R Wong, Niosha Parvizi, Christian Cisneros, Akeem A Williams, Andrew J Frear, Kenneth L Urish

Background And Rationale: Periprosthetic joint infection (PJI), the most common cause of failure after total knee arthroplasty (TKA), is associated with severe morbidity and cost. Repeat failure is not uncommon and results in the use of complex revision components. In this setting, possible interventions include two-stage exchange and debridement, antibiotics, and implant retention (DAIR). When complex revision components are involved, repeat two-stage exchange may result in worse outcomes compared to DAIR. The optimal approach for recurrent PJI in the setting of complex revision remains unclear.

Study Question: This study compared outcomes between repeat two-stage exchange with complex instrumentation and DAIR with chronic antibiotic suppression in patients who previously failed two-stage revision.

Methods: This retrospective study included patients treated for recurrent TKA PJI between 2011-2022. Electronic records identified eligible cases and captured relevant data. Complex revision was defined as any procedure involving a metaphyseal sleeve, trabecular metal cone, or structural allograft. Patients were stratified into two-stage/complex revision or DAIR based on their subsequent management. The primary outcome was failure, defined as reoperation for PJI within 3 years. Kaplan-Meier analysis was used to assess failure rates.

Results: In total, 40 patients met inclusion criteria: 27 underwent DAIR, and 13 had repeat two-stage revision. Mean follow-up was 25.2 ± 14.2 months for DAIR and 34.8 ± 31.0 months for two-stage/complex revision. Survival analysis revealed no significant difference in overall failure between DAIR and two-stage/complex revision (63.0% vs 38.5% respectively, p=0.54). Difference in failures were not significant at 1 year (34.4% vs 44.1%, p=0.33) or 3 years (80% vs 64.1%, p=0.14); however, 2-year failure was significantly greater in the DAIR group (68.9% vs 44.1%, p=0.03).

Discussion: Though we found no difference in overall failure between DAIR and two-stage/complex revision in patients with recurrent PJI after prior two-stage exchange. Significantly greater failure at 2 years suggests DAIR may fail more rapidly. The disparity in group size may reflect surgeon preference in managing recurrent PJI with complex components.

Conclusion: While the overall failure for two-stage/complex revision was 23% lower, the study was underpowered. Larger studies are needed to clarify optimal management.

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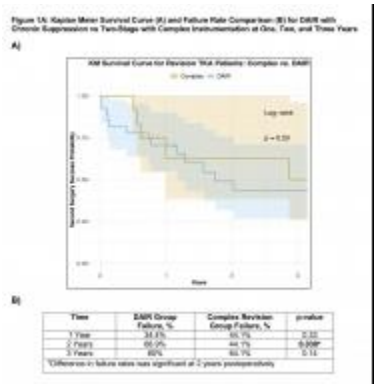

[1578] Clinical Characteristics and Outcomes of Salmonella Osteomyelitis: A Systematic Review and Meta-Analysis of Individual Cases

Authors: **Ashley Ungor**, Molly Courtright, Affan Faisal, Meredith Schade, Talha Riaz

Background And Rationale: Salmonella osteomyelitis is a rare but serious extraintestinal manifestation of invasive salmonella infection. Characterization of its clinical presentation, risk factors, imaging findings, and treatment strategies remains limited, particularly in distinguishing vertebral from non-vertebral cases.

Study Question: What diagnostic and treatment strategies are effective in the management of salmonella osteomyelitis?

Methods: We systematically searched the Scopus, Pubmed and Embase databases for case reports and case series describing salmonella osteomyelitis in adults, including both vertebral and non-vertebral infections, published through 1994-2024. From eligible articles, we extracted demographics and risk factors, clinical manifestations, microbiologic data, imaging findings, antimicrobial regimens (intravenous, oral, and step-down therapy), and patient outcomes. Data were summarized using descriptive statistics.

Results: Among 136 patients, the median age was 45 years, and 62.7% were men (Fig. 1). Vertebral involvement was observed in 53% (72/136), commonly in the lumbar (28%) and thoracic (19%) regions. Non-vertebral infections affected the femur (11%), tibia (10%), and hip joint (8%). The most common symptoms were localized pain (84%) and fever (74%). Risk factors included age >50 years (44%), diabetes (27%), corticosteroid use (20%), and hemoglobinopathies (15%). Blood cultures were positive in 59%, while bone (93%) and abscess (94%) cultures were highly positive. Non-typhoidal Salmonella (S. Enteritidis and S. Typhimurium) was most common, with MRI revealing osteomyelitis (38%), discitis (23%), and abscesses (28%). Most patients (69%) received a combination of intravenous and oral antibiotics, with ceftriaxone and fluoroquinolones being most common. Surgical intervention was required in 73%. Among 134 patients with outcome data, 7 (5.2%) died.

Discussion: Clinicians should maintain a high index of suspicion of osteoarticular salmonellosis among patients with diabetes, advanced age and immunosuppression.

Conclusion: Salmonella osteomyelitis, though uncommon, often presents with vertebral involvement and requires medical and surgical management. Prompt imaging, microbiologic diagnosis, and combination of antimicrobial and surgical intervention is essential to optimize outcomes and reduce morbidity.

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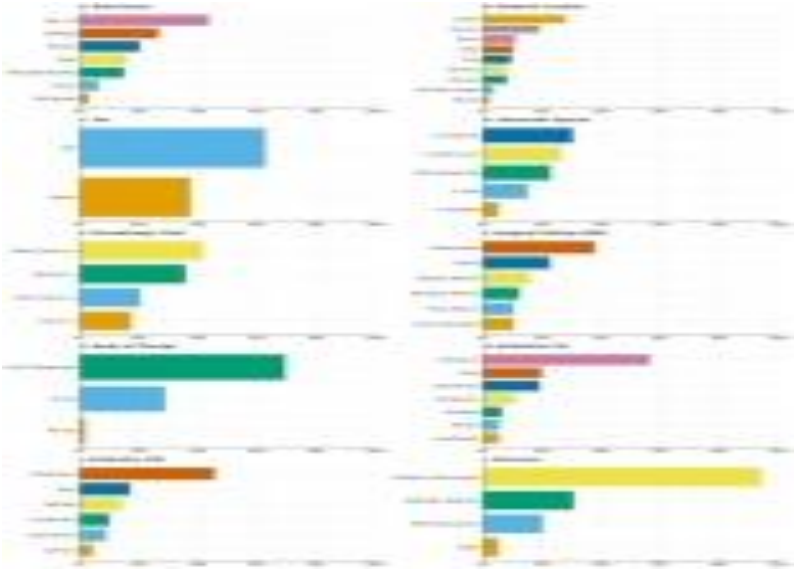

[1580] A Comparative Evaluation of Complication Rates after Total Knee Arthroplasty Across BMI Ranges

Authors: **Tarek Haj Shehadeh**, Elie Ghanem

Background And Rationale: Body mass index (BMI) is significant risk factor for periprosthetic joint infection (PJI) after total knee arthroplasty (TKA) with a weak association questioning the relevance of cut-off values routinely implemented in screening patients for surgery. Furthermore, many articles that tackled BMI were dichotomous in nature and analyzed outcomes based on BMIs of 30 and 35 without detailing the higher BMI categories in depth

Study Question: Compare the rate of complications between various BMI ranges to better understand which BMI categories constitute a “hard no” for surgeons

Methods: We queried the Trinetx database for patients with primary knee osteoarthritis undergoing TKA, grouping them into cohorts based on BMI ranges as follows: <20 kg/m2 (1,748 patients) [group 1], 20 to<25 kg/m2 (16,715 patients) [group 2], 25 to<30 kg/m2 (45,533 patients) [group 3], 30 to<35 kg/m2 (43,151 patients) [group 4], 35 to<40 kg/m2 (23,238 patients) [group 5], 40 to<45 kg/m2 (8,886 patients) [group 6], 45 to<50 kg/m2 (2,139 patients) [group 7] and ≥50 kg/m2 (848 patients) [group 8]. We collected demographic data and characteristics. Our outcomes of interest were PJI at 90-days, 1 year and 2 years post-TKA, and 90-day, VTE, sepsis, and cellulitis rates. We compared the rates with reference to the control group of BMI (20 to < 25 kg/m2) (group 2)

Results: At 90 days post-surgery, there was a statistically significant increase in the rates of PJI in Group 6 (1%, OR=1.594), Group 7 (1.4%, OR=2.167), and Group 8 (2.6%, OR=4.058) compared to the control group (0.7%). There was a significant increase in rates of VTE in Group 4 (2.05%, OR=1.232), Group 5 (2.09%, OR=1.256), Group 6 (2.375%, OR=1.433), Group 7 (2.945%, OR=1.788), and Group 8 (4%, OR=2.461). Similarly, rates of cellulitis increased significantly with Group 4 (1.33%, OR=1.415), Group 5 (1.7%, OR=1.821), Group 6 (1.947%, OR=2.081), Group 7 (2.57%, OR=2.766), and Group 8 (4.127%, OR=4.511) vs the control group (0.945%). We did not observe a significant difference in 90-day rates of sepsis. We noted similar significant trends for PJI at 1 and 2 year after TKA

Discussion: The risk of PJI and other major complications including VTE, demonstrates a steep increase in groups with BMI ≥ 45 across time from 90 days postoperatively to 2 years highlighting a compounding effect of BMI over time.

Conclusion: A BMI of 45 could be a more appropriate cutoff for patients undergoing TKA.

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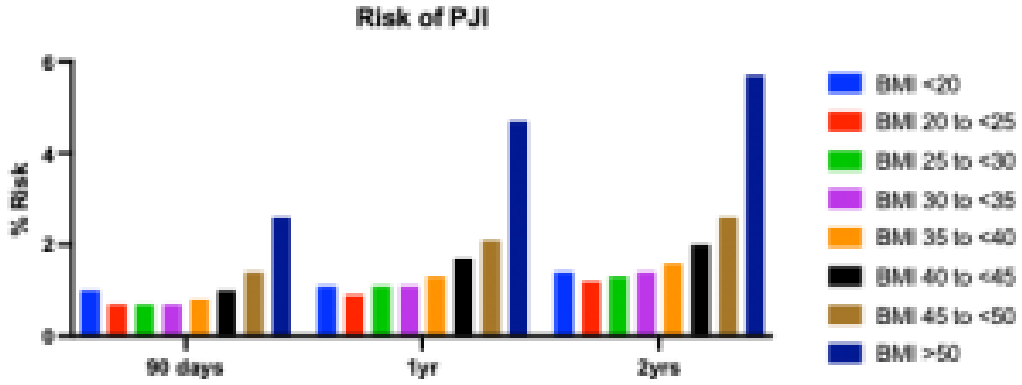

[1412] Antecedent DAIR Failure Does Not Significantly Impair Success of Two-Stage Revision for Hematogenous Periprosthetic Joint Infection of Total Knee Arthroplasty

Authors: Kenneth L Urish, Andrew Gordon, Pedro Baldoni, Akeem Williams, Jamie Heimroth, **Christian Cisneros**, Michael F Shannon, Andrew J Frear, Victoria R Wong

Background And Rationale: Management options for periprosthetic joint infection (PJI) after total knee arthroplasty (TKA) include debridement, antibiotics, and implant retention (DAIR) or two-stage exchange. Compared to two-stage exchange, DAIR is favored for acute PJI due to lower morbidity and faster recovery. Salvage two-stage after failed DAIR may be less successful than initial two-stage, but this remains debated in late-presenting hematogenous PJI.

Study Question: This study aimed to compare 1) failure between DAIR versus two-stage exchange for hematogenous PJI, and 2) failure of two-stage with and without antecedent DAIR for hematogenous PJI.

Methods: This retrospective study identified TKA PJI cases treated with DAIR or two-stage exchange between 2016–2022. Patients were identified via electronic medical records and confirmed by ICM 2018 criteria. The primary outcome was failure, defined by 2019 MSIS ort tiers 3–4. For retained spacers, failure was determined by clinical notes indicating no plan for exchange. Patients were stratified by initial treatment (99 two-stage, 94 DAIR). Comparisons were made for two-stage vs DAIR. Those who failed DAIR and later had two-stage (22 patients) were also compared to treatment with two-stage alone. Cox proportional hazards models estimated survival, and hazard ratios with 95% confidence intervals were calculated to compare 5-year failure risk.

Results: Survival analysis showed greater 2-year success in the primary two-stage group than two-stage with prior DAIR, although this difference was not significant (70% vs 48%, p=0.49). Similarly, primary two-stage demonstrated higher two-year success than primary DAIR (87% vs 73%) despite no statistical difference (p=0.27). Cox proportional hazards model demonstrated greater failure risk for elevated Charlson Comorbidity Index (HR: 1.23, 95% CI 1.05-1.43, p=0.01) in the primary DAIR vs. two-stage analysis, but no other significant factors for either analysis.

Discussion: Our results suggest that two-stage and without antecedent DAIR have comparable success rates in treating hematogenous PJI. In addition, primary DAIR and primary two-stage exchange perform comparably in eradicating infection for this PJI type. However, sample size may have limited power.

Conclusion: While antecedent DAIR does not appear to reduce two-stage success in hematogenous PJI, further studies are needed to confirm this finding.

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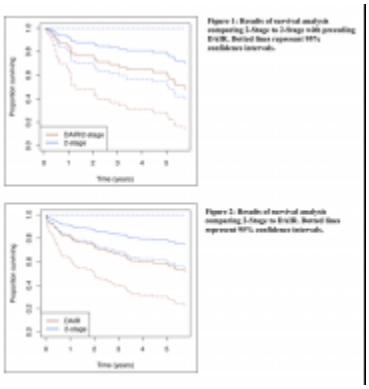


[1388] Use of Bacterial Autofluorescence Technology in Prosthetic Joint Infection: A Proof-Of-Concept Study

Authors: Christina Chao, Josef Jolissaint, Alberto Carli, **Christine Mironenko**

Background And Rationale: Bacterial autofluorescence is an emerging technology in the field of wound care that allows bacteria to become visible to the human eye. There are currently two devices on the market, the moleculight and the reveal fc glasses. Both devices emit a 405nm violet light which causes porphyrin and pyridine-producing bacteria in excess of 10^4 CFU to emit their own fluorescence, allowing the user to visualize the location of living bacteria. This point of care data about wound bioburden assists wound care clinicians to guide treatment particularly culture specimen location and wound debridement. We hypothesize there may be a role for this technology in the setting of intraoperative treatment of prosthetic joint infection. Bacterial autofluorescence has been demonstrated in the laboratory setting using remel porphyrin test agar or with supplementation of aminolevulinic acid hydrochloride (ALA), a precursor of porphyrin, to simulate the natural occurring ALA produced inside a living organism.

Study Question: Can we optimize the use of the reveal FC glasses to better visualize mature methicillin-sensitive staphylococcus aureus (MSSA) biofilm that is formed on orthopedic surfaces?

Methods: MSSA (xen36) was grown on 12 sterile porous ti-6al-4v screw caps (g7; Zimmer-Biomet), for 72 hours to establish mature biofilm. Tryptic soy broth (TSB) was used as culture media, with added kanamycin a. Media was changed every 24 hours. After 48 hours, 5mm of 5- ALA was added into the TSB and allowed to culture overnight. After 24 hours, screw caps were removed from growth media and placed in PBS. The reveal FC glasses were used to visualize the surface of the porous titanium.

Results: All 12 samples of biofilm produced red florescence when exposed to the 405nm light via the Reveal FC glasses.

Discussion: Orthopedic surgeons utilize antiseptic solutions and intrawound antibiotics to eradicate bacteria, however treatment failure rates remain high especially when infected implants are retained. Visualization of intraoperative bioburden within the tissues and implant surface has the potential to improve surgical outcomes in PJI. Our study demonstrated proof of concept of bacterial autofluorescence of staph in a biofilm model on an orthopedic surface.

Conclusion: The use of this technology should be investigated intraoperatively for its utility in PJI surgery.

Attachments:

[1469] Are Opioids Overprescribed in Septic Revision Total Hip Arthroplasty? A National Database Prescription Analysis

Authors: Juan D Lizcano, Kaitlin D Bernabe, Jesus M Villa, Nicolas S Piuzzi, Jorge Manrique, **Carlos A Higuera Rueda**

Background And Rationale: There is a lack of research examining opioid use patterns in septic revision total hip arthroplasty (R-THA). These procedures involve complex surgical interventions and extensive tissue resections, placing patients at increased risk for prolonged postoperative pain. Therefore, comprehensive documentation and evaluation of pain management and opioid utilization are critical to minimizing the potential for chronic opioid use.

Study Question: What is the prevalence of opioid prescriptions after septic R-THA? Are patients undergoing septic R-THA at a higher risk of chronic opioid consumption?

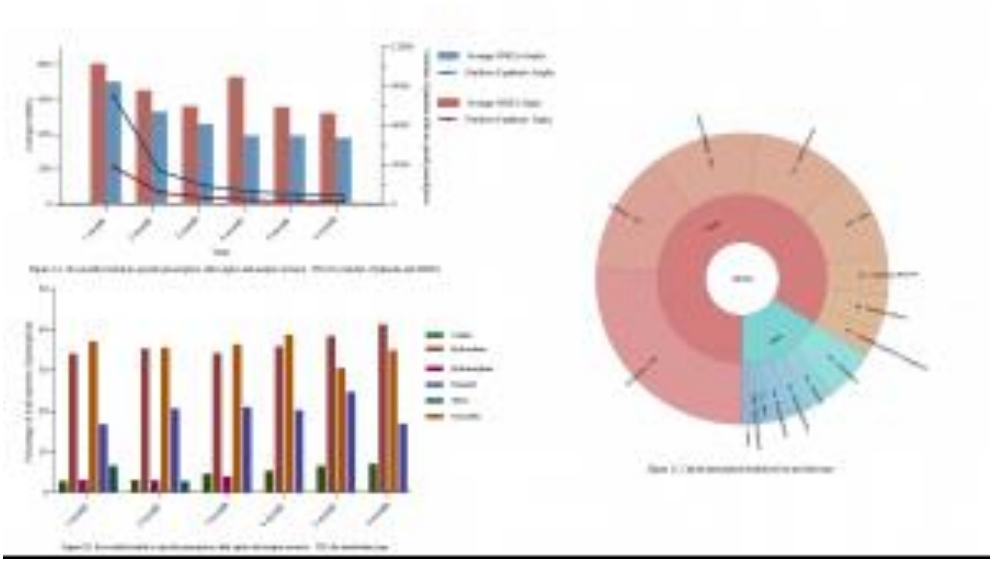
Methods: We performed a retrospective review of a national claims database using PearlDiver software. Patients undergoing septic and aseptic R-THA procedures from 2010 to 2022 were identified based on ICD-9-10 and CPT codes. The opioid prescription was measured for the first six months after the surgery. The morphine milliequivalents (MMEs), prescription provider, and medication type were documented.

Results: A total of 26,918 aseptic and 8,133 septic procedures were identified. Opioids were prescribed postoperatively in 8,290 (30.8%) aseptic and 2,853 (35.1%) septic procedures. 51.2% and 44.8% of the patients were opioid naïve in the aseptic and septic groups, respectively. The mean prescribed MMEs were higher throughout the 6 months in the septic cohort (P

Discussion: Septic R-THA required more and more potent opioid prescriptions following surgery. Although the percentage of chronic opioid prescriptions was higher in the aseptic cohort, the number of patients who registered chronic opioid consumption was substantial and should not be overlooked.

Conclusion: Patients undergoing septic procedures have increased requirements for pain management compared to aseptic procedures, and alternative pain management strategies to mitigate opioid use should be the target of new research efforts.

Attachments:



[1548] Operating Room Size Does Not Affect Periprosthetic Joint Infection Risk for Primary Hip and Knee Arthroplasty

Authors: Scott M Lavalva, **Andrew L Thomson**, Patricia Friedmann, Michael Parides, Alberto V Carli

Background And Rationale: Periprosthetic joint infection (PJI) is a devastating postoperative complication after total hip (THA) or knee (TKA) arthroplasty. Previous studies have suggested that operating room (or) size may be an important risk factor, which would have critical implications from an administrative and policy standpoint. Thus, we sought to determine whether or size was associated with the development of PJI at a single, high-volume institution.

Study Question: 1. Is there an association between operating room size and the incidence of PJI within 90 days postoperatively in primary hip and knee arthroplasty?

Methods: We retrospectively identified 35,646 primary THAs (n=16,504, 46%) and TKAs (n=19,142, 54%) from a single center from January 1st 2019 to December 31st 2024. ORs were stratified into three groups based on size: 400-449 square feet (ft2) was defined as small, 450-549 ft2 was medium, and 550-700 ft2 was large. The primary outcome was the development of PJI within 90 days postoperatively. The rate of PJI by or size was compared via univariate analysis using a chi-square test. Multivariable logistic regression was performed to investigate the association between or size and PJI while controlling for confounding variables.

Results: Of the 35,646 procedures included in the study, 13,558 (38%) were performed in small ORs, 15,584 (44%) in medium, and 6,504 (18%) in large. The incidence of PJI after procedures performed in small ORs was 108/13,558 (0.80%), compared to 178/15,584 (1.14%) in medium ORs and 59/6,504 (0.91%) in large ORs (p=0.009). On logistic regression analysis, there was no independent association between the development of PJI and small (odds ratio 0.9; p=0.45) or large (odds ratio 1.2; p=0.2) ORs.

Discussion: There was no discernible trend between operating room size and the development of PJI after TKA or THA at a single, high-volume institution.

Conclusion: Given the devastating consequences of this complication, future studies should seek to identify other modifiable risk factors to mitigate its incidence.

Attachments:
There is no figure for this abstract.

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Monitor 3

[1552] A Single Tertiary-Care Center Experience Using Vertical Rectus Abdominis Myocutaneous Flap in the Management of Complex Periprosthetic Joint Infections of the Hip

Authors: **Hesham Abdelbary**

Background And Rationale: Prosthetic joint infections (PJIs) pose significant challenges, often requiring multiple surgeries that lead to soft tissue loss, dead space, and fibrosis. Wound breakdown increases the risk of polymicrobial infection and treatment failure. The vertical rectus abdominis myocutaneous (VRAM) flap is a proven method for complex wound coverage, but its role in managing persistent hip PJI is underexplored.

Study Question: This study evaluates outcomes of VRAM flap reconstruction in polymicrobial hip PJI, focusing on flap survival, infection control, and wound healing.

Methods: We retrospectively reviewed five patients who underwent VRAM flap reconstruction for polymicrobial hip PJI between December 2020 and December 2023. Management was multidisciplinary, involving orthopedic, plastic, and infectious disease specialists. Primary outcomes included flap survival, infection control, and wound healing. Secondary outcomes were implant retention, postoperative complications (clavien-dindo classification), and functional status.

Results: At a mean follow-up of 28 months (range: 12–47), four patients (80%) achieved wound healing and remained infection-free, while one (20%) had persistent sinus drainage but retained the implant. Flap survival was 100%, with no necrosis or failure. No major complications requiring reoperation occurred. Two patients developed deep collections, managed with ultrasound-guided drainage (Clavien-Dindo IIIa). Minor complications included donor-site dehiscence (three), flap dehiscence (one), edge necrosis (two), and hernias (two), all managed non-surgically (Clavien-Dindo I/II). All patients retained implants and remained ambulatory.

Discussion: Managing polymicrobial hip PJIs requires early soft tissue closure, as prolonged wound exposure increases infection complexity. VRAM flaps offer vascularized, tension-free coverage without microvascular anastomosis, bridging the gap between local and free flap options. In our series, flap durability supported debridement and reimplantation, and infection control was only achieved after definitive reconstruction.

Conclusion: VRAM flap reconstruction is a reliable option for managing complex polymicrobial hip PJI. Flap survival was excellent, and most patients achieved infection control. However, persistent infection and the need for suppressive antibiotics highlight the ongoing challenges in these cases.

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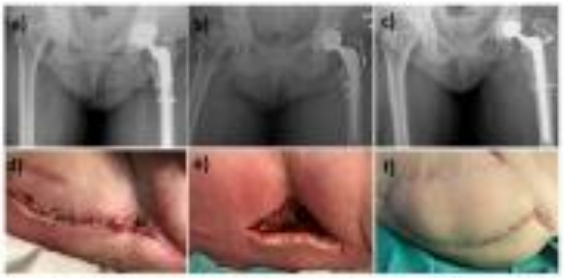

[1550] Lower Socioeconomic Status is Associated With Higher Rates of Loss To Follow-Up And Incomplete Antibiotic Adherence in Pediatric Acute Hematogenous Osteomyelitis

Authors: **Connor C Park**, Nicholas B Williams, Jessica D Burns

Background And Rationale: Acute hematogenous osteomyelitis (AHO) in pediatric patients can require extended antimicrobial treatment and frequently necessitates surgical intervention. Younger patients are especially susceptible to poor outcomes, emphasizing the need for urgent recognition and treatment of AHO. Additionally, patients from rural backgrounds have been found to also have higher rates of negative in-patient outcomes. Whether socioeconomic factors, insurance coverage, or travel burden affect long-term treatment and follow-up is unknown, though such insight is critical due to the prolonged therapy needed.

Study Question: Do social deprivation, insurance status, or travel burden influence patient outcomes during hospitalization and after discharge?

Methods: All patients diagnosed with AHO from January of 2018 to January of 2025 were evaluated. Included patients were under 18 years of age and had complete medical records.

Results: 109 patients were included. Average length of antimicrobial treatment was 39.5 days (SD 9.9). Area of deprivation index (ADI) was significantly higher in patients with unknown antibiotic adherence (median 46.5) than patients who completed treatment (median 36, p=0.013). Insurance type and travel burden had no effect on antibiotic adherence. These parameters had no effect on in-patient outcomes or readmission rates.

Discussion: Given the extended antimicrobial treatment required in AHO patients, healthcare providers should be acutely aware of the effect increased ADI has on antimicrobial treatment adherence. Outpatient clinical care should emphasize the importance of completing the prescribed antibiotic course with appropriate follow-up following discharge. Targeted interventions addressing social deprivation may improve adherence and reduce the risk of treatment failure in this vulnerable population.

Conclusion: Higher ADI is associated with incomplete antibiotic adherence in pediatric AHO patients. Focused outpatient support for patients from socially deprived backgrounds is essential to optimize long-term outcomes.

Attachments:
There is no figure for this abstract.

[1584] Tapping Our Resources: Do Preoperative Aspirations Add Diagnostic Value?

Authors: **Anne Spichler Moffarah**, Lauren Daddi, Ilda Molloy, Duc Nguyen, Marjorie Golden

Background And Rationale: Discrepancies between preoperative synovial aspiration and intraoperative cultures may occur, even in the absence of antibiotic therapy. This study evaluated the concordance between preoperative synovial aspiration and intraoperative culture results in patients undergoing surgery for hip and knee prosthetic joint infection (PJI).

Study Question: Is there a value for preoperative aspiration when compared to intraoperative cultures when suspicion for PJI of hip or knees?

Methods: Retrospective review of patients >18 years diagnosed with their first episode of hip or knee PJI between September 2017 and December 2020 who underwent surgical management. Demographics, microbiology (synovial aspiration and intraoperative cultures), and use of antibiotics relative to preoperative arthrocentesis and surgery were assessed. Concordance was defined as either matching organisms or negative results in both settings.

Results: Among 75 patients (mean age 70.0 +/- 13.3 years, 50.7% male, 71% white/Caucasian and 95% non-Hispanic), 54 (72%) had concordant results and 21 patients (28%) were discordant. Among the concordant group, 45/54 (83%) had identical organisms isolated, most commonly methicillin-sensitive Staphylococcus aureus (MSSA). Nine (17%) had negative cultures in both settings. Only 2/9 (22%) received antibiotics before preoperative synovial aspiration, and 4/9 (44%) received preoperative antibiotics. Among discordant patients, 14/21 (67%) had positive preoperative synovial aspiration culture. 11/14 (78%) with a positive preoperative synovial had negative intraoperative culture and 9/11 (82%) had received preoperative antibiotics. 3/14 (22%) had differing organisms across samples. 7/21 (33%) had negative preoperative synovial aspiration culture and positive intraoperative cultures; none received antibiotics prior to preoperative synovial aspiration. (Table 1)

Discussion: Our study showed some results similar to literature in terms of concordance percentage and organisms. We had almost 1/4 of the patients with culture negative on both groups and sometimes independent of antibiotics.

Conclusion: Almost 75% of patients had concordance between synovial preoperative aspiration and intraoperative culture. Negative preoperative cultures do not exclude infection and isolation of a pathogen does not preclude polymicrobial infection. Our results support the recommendation to obtain multiple intraoperative specimens at the time of surgery.

Attachments:

[1452] Local Injection of Vancomycin in Arthroplasty: A Systematic Review and Meta-Analysis of Primary and Revision Cases

Authors: **Suenghwan Jo**, Jae-young Hong, Sunwoo Lee, Jiyun Kang, Hyoungtae Kim

Background And Rationale: PJI is a serious complication after total hip or knee arthroplasty. Systemic IV antibiotics often fail to achieve sufficient local concentrations. Local vancomycin injection—via intraosseous (IO) or intra-articular (IA) routes—may overcome this limitation by delivering higher periarticular drug levels with fewer systemic effects. Its comparative effectiveness, especially in revision surgeries, remains uncertain.

Study Question: Does local vancomycin injection (IO or IA), added to IV prophylaxis, reduce PJI rates and increase tissue concentrations versus IV alone in primary or revision arthroplasty?

Methods: A prisma-compliant systematic review and meta-analysis was conducted. Databases included Medline, Embase, Scopus, Cochrane, and Web of Science. Studies comparing local vancomycin (IO/IA) plus IV versus IV alone in adult hip/knee arthroplasty were included. Outcomes: PJI rate, local tissue drug levels, adverse events. Bias was assessed with Cochrane rob-1 and Newcastle-Ottawa tools.

Results: Eleven studies (n >1,200) were included. Local injection achieved higher periarticular vancomycin levels than IV alone. PJI incidence was lower with local use (0.4–0.6%) than control (1.2–1.5%). Subgroup analysis showed greater benefit in revisions. Rates of nephrotoxicity and wound complications were low and similar between groups.

Discussion: Local vancomycin injection improves local antibiotic delivery and lowers PJI rates, especially in revisions. IO injection showed the best tissue penetration. Safety profiles were comparable. Protocol variation limits generalizability.

Conclusion: Local vancomycin injection, especially IO, is a safe and effective adjunct to IV prophylaxis in joint arthroplasty. Further RCTS are needed to standardize its use and evaluate long-term outcomes.

Attachments:
There is no figure for this abstract.

[1413] Local Fracture Conditions and Systemic Circulatory Factors Correlate with Host Cell Attachment to Implants

Authors: **Sarah Romereim**, Matthew R Smykowski, Nicholas M Bernthal, Joseph C Wenke, Rachel Seymour, Joseph R Hsu, Bailey Fearing

Background And Rationale: Orthopaedic implant-related infections occur at 20% infection rate in open fractures. A robust host cell response is and endogenous cell attachment to an implant is critical for protection from bacterial adhesion and biofilm formation. Here, we utilize external fixator (ex-fix) pins as a model to investigate the effect of local fracture conditions and systemic circulatory factors on cell phenotype and inflammatory response to orthopedic implants.

Study Question: Is there a significant difference between the type of fracture and the types of cells adhered to ex-fix pins placed in the fractured bone, and are circulating factors at the time of ex-fix pin removal correlated with cell types present on the ex-fix pins?

Methods: Cytokine concentrations in serum collected prior to pin removal were quantified with a 40-target human inflammation antibody array. Upon pin removal, adherent cells were isolated from ex-fix pins by enzymatic digestion and density gradient separation. Flow cytometric analysis quantified fibroblasts, fibrocytes, and leukocytes plus leukocyte subcategories of monocytes and macrophages. Statistical analysis was performed in graphpad prism.

Results: There was a significantly higher percentage of fibroblasts and lower percentage of leukocytes adhering to implants in open fractures (2-way ANOVA, $p<0.0001$, $n=17$). White blood count (WBC) at the time of ex-fix pin removal was positively correlated with macrophage adhesion to implants (Pearson's $r=0.525$, $p<0.05$, $n=36$). 18 circulating cytokines were also positively correlated with macrophage adhesion to implants (e.g. several interleukins, IFNg, G-CSF, MCSF; $r>0.4$, $p<0.05$).

Discussion: Our data suggests that ex-fix pins implanted in bones with open fractures have a lower percentage of adherent leukocytes but no difference in leukocyte subtypes. Circulating WBC and cytokines did not affect overall leukocyte adhesion but were correlated with a higher percentage of macrophages within the leukocyte population. This suggests there is a distinct difference in the way host cells respond to implants in the context of open trauma irrespective of systemic inflammation.

Conclusion: Yes, there was a correlation between fracture type and the percentage of fibroblasts vs. Leukocytes adhered to ex-fix pins. Yes, WBC and several serum cytokines were positively correlated with macrophage percentage within the leukocyte population on the ex-fix pins.

Attachments:
There is no figure for this abstract.

[1579] A Comparative Evaluation of Complication Rates after Total Hip Arthroplasty Across BMI Ranges

Authors: **Tarek Haj Shehadeh**, Elie Ghanem

Background And Rationale: Body mass index (BMI) is a significant risk factor for periprosthetic joint infection (PJI) following total hip arthroplasty (THA). However, the strength of this association is relatively weak, raising questions about the clinical utility of commonly used BMI cut-off values in preoperative screening. Moreover, much of the existing literature evaluating BMI typically used thresholds of 30 or 35, without thoroughly examining outcomes across higher BMI categories

Study Question: Compare complication rates across BMI ranges to identify which BMI thresholds may represent a clear contraindications for THA

Methods: We queried the Trinetx database for patients with primary hip osteoarthritis undergoing THA, grouping them into cohorts based on BMI ranges as follows: <20 kg/m2 [group 1], 20 to <25 kg/m2 [group 2], 25 to <30 kg/m2 [group 3], 30 to<35 kg/m2 [group 4], 35 to <40 kg/m2 [group 5], 40 to <45 kg/m2 [group 6], 45 to <50 kg/m2 [group 7] and >50 kg/m2 [group 8]. We collected demographic data and characteristics. Our outcomes of interest were PJI at 90-days, 1 year and 2 years post-TKA, and 90-day VTE, sepsis and cellulitis rates. We compared the rates with reference to the control group of normal BMI (20 to <25 kg/m2)

Results: At 90 days post-surgery, statistically significant increases in the rates of PJI in Group 4 (1.043%, OR=1.643), Group 5 (1.628%, OR=2.579), Group 6 (2.699%, OR=4.4323), Group 7 (4.139%, OR=6.726), and Group 8 (7.241%, OR=12.162) vs the control group (0.638%), of VTE in Group 3 (1.396%, OR= 1.263) Group 4 (1.672%, OR=1.517), Group 5 (1.752%, OR=1.591), Group 6 (2.074%, OR=1.889), Group 7 (2.937%, OR=2.699) vs the control group (1.109%) were seen. Similarly, the rates of cellulitis significantly increased in Group 4 (1.08%, OR=1.579), Group 5 (1.221%, OR=1.788), Group 6 (1.307%, OR=1.915), Group 7 (1.869%, OR=2.754), and Group 8 (5.172%, OR=7.887) vs the control group (0.687%), as well as in rates of sepsis in Group 1 (0.868%, OR=1.911), Group 5 (0.673%, OR=1.477), and Group 7 (1.469%, OR=3.252) vs the control group (0.456%). Finally, similar significance trends were noted for PJI rates at 1- and 2-years post THA

Discussion: The risk of PJI and major complications such as VTE showed a consistently sharp rise in groups with a BMI > 45 across time for 90 days to 2 years postoperatively, highlighting a compounding effect over time.

Conclusion: BMI of 45 might serve as a more suitable threshold for THA

Attachments:
There is no figure for this abstract.

[1537] Navigating Infection Risks: The Safety and Efficiency of Robotic Techniques in THA

Authors: **Josef E Jolissaint**, Andrew L Thomson, Alexandra Grizas, Andy O Miller, Geoffrey H Westrich

Background And Rationale: Advancements in robotic and navigated techniques for total hip arthroplasty (THA) have been proposed to improve surgical precision and outcomes. However, their impact on clinical outcomes, such as surgical site infections (SSI) and periprosthetic joint infections (PJI), remains unclear. This study evaluates SSI and PJI rates, as well as operative times, in primary robotic and navigated THA at a high-volume academic medical center, comparing them to traditional manual techniques.

Study Question: 1. How do surgical site infection (SSI) and periprosthetic joint infection (PJI) rates compare between robotic/navigated and manual techniques in primary total hip arthroplasty (THA)? 2. Is there a significant difference in operative times between robotic/navigated techniques and traditional manual methods in THA?

Methods: Prospectively collected SSI surveillance data was reviewed for all primary THA procedures performed from January 2018 to November 2024 at a high-volume academic orthopedic medical center. Patient demographics, case duration, and use of robotics or navigation was evaluated. SSI data was defined and collected using national healthcare safety network (NHSN) criteria.

Results: A total of 30,673 primary THAs were performed, 15,568 using manual techniques and 15,105 using robotic or navigated techniques. The robotic cases included 9,096 Mako, 3,309 Intellijoint, 898 Naviswiss, 853 Radlink, 744 OrthAlign, and 205 Velys. There were no significant differences in SSI or PJI rates between manual and individual robotic or navigated techniques ($p=0.50$, $p=0.19$, $p=0.11$, $p=0.12$, $p=0.15$, $p=0.57$). When combined as a cohort, robotic and navigated techniques showed no significant difference in PJI (0.28% vs. 0.18%, $p=0.07$) or SSI rates (0.36% vs. 0.36%, $p=0.06$) compared to manual techniques. Robotic and navigated techniques were associated with a modest 5.9-minute increase in operative time (91.6 vs. 85.7 minutes) compared to manual techniques.

Discussion: Robotic and navigated techniques in primary THA offer comparable safety profiles to manual techniques without increased risk of SSI or PJI.

Conclusion: Given the absence of increased complication rates and the minimal increase in operative time, technology can confidently be incorporated into clinical practice to enhance precision without compromising patient outcomes.

Attachments:
There is no figure for this abstract.

[1523] Smoking as a Modifiable Risk Factor of Prosthetic Joint Infection in Total Joint Arthroplasty: A Single Center Retrospective Review

Authors: **Adrian Lin**, Kole Joachim, Brandon Gettleman, Christopher Hamad, Amanda Perrotta, Ezekiel Dingle, Sumin Jeong, Othneil Sparks, Alexandra Stavrakis, Alexander Christ

Background And Rationale: Smoking has been identified as a risk factor for prosthetic joint infections (PJI), a devastating complication in total joint arthroplasty (TJA). Despite institutional efforts to counsel patients on the risks of smoking in the perioperative period, there is limited literature quantifying the risks of smoking in the development of PJI following total joint arthroplasty.

Study Question: What is the relationship between smoking status and risk of developing PJI in TJA?

Methods: A retrospective review was performed of adult patients who underwent total hip or knee arthroplasty between 2012 and 2024. Patients were stratified into current, former, and never smokers. A multivariate logistic regression model assessed the association between self-reported smoking status and PJI, adjusting for sex, BMI, historical exposure (pack-year history), age adjusted Charlson comorbidity index (cci), and alcohol use (low, moderate, and heavy). Results are reported as odds ratio [or], 95% confidence interval [95%ci], and p-value.

Results: Among 13,526 patients, current smoking was significantly associated with increased odds of developing a PJI compared to never smokers (OR: 2.26, 95%CI: 1.02–5.03, p=0.046). Former smokers had similar odds to never smokers (OR: 1.07, 95%CI: 0.72–1.60, p=0.740). Male sex (OR: 1.39, 95%CI: 1.07–1.79, p=0.012) and higher CCI (OR: 1.09, 95%CI: 1.05–1.12, p<0.001) were also associated with increased risk. Low alcohol use compared to no consumption was associated with a decreased odds of developing a PJI (OR: 0.66, 95%CI: 0.49–0.87,p=0.004), but no association was found for moderate (OR: 0.63, 95%CI: 0.32–1.26, p=0.197) and heavy alcohol use (OR: 0.68, 95%CI: 0.21–2.20, p=0.524).

Discussion: Current smoking was independently associated with higher odds of PJI while former smokers did not have increased risk. Age adjusted cci and male sex were also risk factors for developing PJI. Low alcohol use was associated with reduced odds of PJI, likely reflecting overall healthier patient profiles rather than a protective effect of alcohol itself, as no significant associations were observed for moderate or heavy use.

Conclusion: These findings support smoking cessation as a modifiable risk factor in TJA patients.

Attachments:
There is no figure for this abstract.

[1467] Evaluating Opioid Prescribing Practices in Septic Revision Total Knee Replacement

Authors: Juan D Lizcano, Kaitlin D Bernabe, Jesus M Villa, Nicolas S Piuzzi , Preetesh D Patel, **Carlos A Higuera Rueda**

Background And Rationale: Septic revision total knee arthroplasty (r-TKA) often requires major soft tissue resections, multiple surgeries, and functional limitations, leading to increased postoperative pain. Given the well documented opioid over prescription in primary knee procedures, patients undergoing r-TKA are at high risk of chronic opioid consumption (i.e, >6 months) and surgical complications.

Study Question: What is the prevalence of opioid prescriptions after septic r-TKA? Are patients undergoing septic r-TKA at a higher risk of chronic opioid consumption?

Methods: We performed a retrospective review of a national claims database using PearlDiver software. Patients undergoing septic and aseptic r-TKA procedures from 2010 to 2022 were identified based on ICD-9-10 and CPT codes. The opioid prescription was measured for the first six months after the surgery. The morphine milliequivalents (MMEs), prescription provider, and medication type were documented.

Results: A total of 28,422 aseptic and 15,901 septic procedures were identified. Opioids were prescribed postoperatively in 10,243 (36%) aseptic and 6,305 (39.7%) septic procedures. 43.4% and 57.2% of the patients were opioid naïve in the aseptic and septic groups, respectively. The mean prescribed MMEs were higher throughout the 6-month period in the septic cohort (P<0.001) (Figure 1A). While there was a constant decrease in prescription rates and MMEs postoperatively, 5.4% of the septic and 10.7% in the aseptic cohorts were still consuming opioids at six months. Hydrocodone, oxycodone, and tramadol were the most commonly prescribed opioids during this time period (Figure 1B). The main prescribers of opioids in the 30 days following surgery were orthopedic surgeons and family medicine physicians for both septic (17% vs. 22%) and aseptic (5% vs. 8 %) cohorts, respectively (Figure 1C).

Discussion: Septic r-TKA required more potent opioid prescriptions following surgery. Although the percentage of chronic opioid prescriptions was higher in the aseptic cohort, the number of patients who registered chronic opioid consumption after septic revision was substantial and should not be overlooked.

Conclusion: Patients undergoing septic procedures have increased requirements for pain management compared to aseptic procedures, and alternative pain management strategies to mitigate opioid use should be the target of research efforts.

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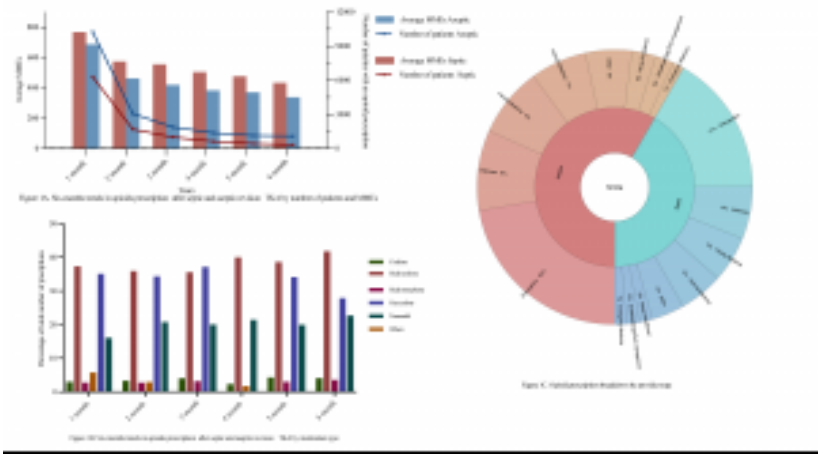

[1427] Meniscectomy Before Total Knee Arthroplasty Increases the Risk of All-Cause Revision and Revision for Infection: A National Database Analysis

Authors: Khaled A Elmenawi, Shujaa T Khan, Ignacio Pasqualini, **Anabelle Visperas**, Matthew E Deren, Viktor E Krebs, Robert M Molloy, Nicolas S Piuzzi

Background And Rationale: Many patients undergo total meniscectomy before undergoing total knee arthroplasty (TKA). The full impact of prior meniscectomy on TKA remains not well understood.

Study Question: We aimed to compare two large TKA cohorts with and without a history of meniscectomy.

Methods: A retrospective cohort study was conducted using the PearlDiver national database between 2016-2020 to identify adult patients who underwent primary unilateral TKA for osteoarthritis. Patients with < 1 year of follow-up were excluded. TKA patients with a documented history of ipsilateral total meniscectomy (n=41,701) were matched 1:1 to those without such history based on age, gender, body mass index (BMI), smoking, Elixhauser Comorbidity Index (ECI), hypertension, diabetes mellitus, and congestive heart failure (CHF). Outcomes included 90-day emergency department (ED) visits, reoperations, readmissions, and 1- and 2-year all-cause and infection-related revision rates. All reoperations and revisions occurred on the ipsilateral side. Regression analyses were performed accounting for age, gender, ECI, smoking, and diabetes.

Results: In multivariate analyses, patients with a history of meniscectomy had significantly higher odds of adverse postoperative events. Compared to controls, they experienced increased 90-day ED visits (OR 1.23, $p<0.001$), reoperations (OR 2.10, $p<0.001$), and readmissions (OR 1.43, $p<0.001$). History of meniscectomy was also associated with increased 1-year all-cause revision (OR 2.47, $p<0.001$), 1-year revision for periprosthetic joint infection (PJI) (OR 2.15, $p<0.001$), and 1-year aseptic revision (OR 2.62, $p<0.001$). The elevated risk persisted at 2 years for all-cause revision (OR 2.83, $p<0.001$), revision for PJI (OR 2.33, $p<0.001$), and aseptic revisions (OR 3.06, $p<0.001$).

Discussion: Prior meniscectomy is a significant risk factor for adverse outcomes after TKA, with higher rates of ED visits, reoperations, and both septic and aseptic revisions. These findings suggest that meniscectomy may predispose patients to a more compromised joint environment and worse recovery trajectories following TKA.

Conclusion: A history of total meniscectomy is associated with significantly increased risks of short- and long-term unfavorable outcomes. Targeted preoperative counseling and closer postoperative surveillance may be warranted in this population.

Attachments:
There is no figure for this abstract.

[1435] Fracture Related Infections of the Lower Extremity: Risk Factors for Treatment Failure

Authors: **Anne Spichler Moffarah**, Lauren Daddi, David Frumberg, Marjorie Golden

Background And Rationale: Surgical management of FRI includes debridement, antimicrobial therapy and either implant retention (DAIR), removal, or exchange. Antibiotics are typically culture-directed, while the antibiotic duration often depends on whether the implant can be removed. Risk factors for failure in patients with FRI are not well known.

Study Question: What are some of the risk factors for failure in patients with FRI of lower extremities especially related to surgical and medical management?

Methods: Retrospective, study of patients >18 years admitted between September 2017 and December 2023 with FRI of the lower extremities who had an internal implant at the time of initial surgery for fracture repair. Demographics, clinical characteristics, microbiology, medical and surgical management to treat FRI, as well as duration of antibiotics were analyzed with regards to failure.

Results: N=49 patients (mean age 51.4 ± 16.9 (SD) years, 59.2% male, 67% Caucasian). Fractures included 19 (38.8%) ankle, 18 (36.7%) tibia, 4 (8.2%) tibia and fibula, 4 (8.2%) femur, and others. 22 (45%) underwent removal, 10 (20%) revision, and 17 (35%) retention of the implant. Age, time from fracture to infection, BMI, diabetes and current smoker were not associated with failure. The most common intraoperative bacteria recovered included MSSA (N=14, 29%), Coagulase negative Staphylococcus (N=7, 14%) and Pseudomonas (N=7, 14%), with N=13 patients having polymicrobial cultures. Initial post-operative antibiotic courses were a median of 42 ± 13 days and targeted microorganisms which grew from intraoperative cultures. Treatment failure occurred in 19 (39%) patients. Around 70% of the patients received 42 days of antibiotics. Failure rates differed between post-infection surgery type (p=0.026). Figure 1

Discussion: Type of surgery to treat FRI as well as duration of antibiotics with regards to failure is still unknown. Our study verified some of those factors especially the suggested surgical management for FRI.

Conclusion: We suggest that in our population FRI of the lower extremities, age, BMI, and host factors were not associated with failure. The majority (71.4%) of patients received 42 days of initial antibiotics. Treatment was more successful when implants were removed. Increasing the sample size will allow for more conclusive findings about the interplay between retention, antibiotic treatment length, and failure.

Attachments:

Figure 1. Retention of implant is associated with treatment failure in FRI.

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[1529] Infection Outcomes Following Single- and Two-Window Posterolateral Approach for Ankle Fracture Fixation

Authors: **Insup Hong**, Margaret G Grossman, Joseph B Cohen, Hobie D Summers, Ashley E Levack

Background And Rationale: The posterolateral approach for ankle/pilon fracture fixation is a common approach for ankle fracture fixation that allows simultaneous access to the posterior malleolus and fibula. Two primary variations exist: the single-window approach, which accesses both structures through a single interval, and the two-window approach, which uses separate muscular intervals through the same skin incision for posterior and lateral fixation. A prior study has reported higher wound complication rates with the two-window approach; however, institutional experience suggests lower complication rates than previously described.

Study Question: Does the two-window posterolateral approach for ankle/pilon fracture fixation have a higher risk of postoperative infection and early wound complication than the single-window posterolateral approach for ankle fracture fixation?

Methods: A retrospective cohort study was conducted at a single level i trauma center (2007–2024), including adult patients undergoing ankle/pilon fracture fixation via a posterolateral approach with ≥3-month follow-up. Patients were grouped by single- vs. Two-window technique based on fracture pattern and surgeon discretion. Primary outcomes were surgical site infections and wound complications. Comparative analyses were conducted using a significance level of $p < 0.05$.

Results: Fifty-three patients were identified for inclusion (23 single-, 30 two-window). The single-window approach had a wound complication rate of 8.7% (n=2) compared to 0% in the two-window group (p=0.184). Deep infection rates were similarly low and comparable (8.7% vs. 3.3%, p=0.573) (Table 1).

Discussion: There were no statistically significant differences in the rates of early wound complications or deep infections between the two groups. Compared to previous studies reporting higher complication rates with the two-window technique, the lower rates observed in this cohort may reflect differences in surgical technique, earlier timing of surgery, and standardized perioperative protocols.

Conclusion: Both single- and two-window posterolateral approaches for ankle/pilon fracture fixation demonstrated acceptably low and comparable rates of postoperative wound complications and infection.

Attachments:

Table 1. Patient Demographics and Injury Characteristics by Surgical Approach

Variable	Single-Window (n = 23)	Two-Window (n = 30)	P-value[1]
Patient Demographics			
Age, y	46.7 (15.9)	48.5 (16.1)	0.698
Sex, n (%)			0.772
Male	11 (47.8%)	12 (40.0%)	
BMI	29.4 (26.0–34.3)	30.8 (28.4–33.8)	0.262
Tobacco use, n (%)	9 (39.1%)	2 (6.7%)	0.006[2]
Alcohol use, n (%)	1 (4.3%)	2 (6.7%)	1.000
CCI	0 (0–1)	0 (0–1)	0.349
Injury/Surgery Characteristics			
ISS	9 (9–12)	9 (9–9)	0.160
Pilon fracture	13 (56.5%)	5 (16.7%)	0.006[2]
Open fracture, n (%)	1 (4.3%)	9 (30.0%)	0.031[2]
External fixation, n (%)	11 (47.8%)	9 (30.0%)	0.298
Posterior dislocation, n (%)	5 (21.7%)	13 (43.3%)	0.176
Operative Information			
Operative time, min	252.0 (145.5–342.0)	134.5 (108.3–179.3)	0.003[2]
Follow-up duration, d	246.0 (139.0–479.5)	375.5 (203.3–777.0)	0.294

[1] P-values were calculated using the Student's t-test for normally distributed continuous variables, Mann-Whitney U test for non-normally distributed continuous variables, and Fisher's exact or chi-square test for categorical variables, as appropriate.

[2] Indicates statistically significant difference at $p < 0.05$.

Abbreviations: BMI, body mass index; CCI, Charlson Comorbidity Index; ISS, Injury Severity Score; min, minutes; d, days.

Data are presented as mean (standard deviation) for normally distributed continuous variables, median (interquartile range) for non-normally distributed continuous variables, and number (percentage) for categorical variables.

[1495] Economic Impact And Clinical Benefits Of Intraosseous Injections In Total Knee Arthroplasty

Authors: Jimmy Lieber, Austin E Wininger, Thomas C Sullivan, Timothy S Brown, Terry A Clyburn, Stephen J Incavo, **Kwan J Park**

Background And Rationale: Periprosthetic joint infection (PJI) following total knee arthroplasty (TKA) causes significant morbidity and incurs a substantial economic burden on the healthcare system. Recent studies have shown intraoperative intraosseous vancomycin (IOV) can reduce rates of PJI following primary and revision TKA.

Study Question: This study aims to quantify the economic cost savings achieved with regular IOV administration during primary and aseptic revision TKA compared to intravenous vancomycin (IVV).

Methods: Previously published data calculating institutional hospitalization economic burden of PJI following TKA using the nationwide inpatient sample was adjusted to 2024 inflation to calculate the total cost of a single PJI. Notably, the cost of PJI did not include the costs of physician services or the costs of follow-up care or indirect healthcare costs. Institutional costs for both IOV and IVV were calculated using Medicare rates for CPT code 36680 as well as the costs of instrumentation, medications, and additional operating room time. Previously published institutional data on PJI rates with IOV and IVV were used to calculate the number needed to treat (NNT) to prevent one PJI at 1-year.

Results: The total cost per case for IOV was $382.29 and $3.90 for IVV at our institution. The average 2024 inflation adjusted cost per PJI was $33,295.70. The NNT to prevent one PJI at 1-year for primary TKA was 90.91 and was 30.3 for aseptic revision TKA. The cost associated with using IOV to prevent one PJI at 1-year in primary TKA was $34,395.65 and $11,465.22 in aseptic revision TKA. The total cost savings in utilizing IOV to prevent one PJI at 1-year was $21,830.48 in aseptic revision TKA. For primary TKA, utilizing IOV costed $1,099.95 extra compared to the cost of PJI.

Discussion: The use of IOV during aseptic revision TKA resulted in significant reduction in the overall economic burden on the healthcare system and reduced morbidity of PJI when compared to IVV. However, for primary TKA, utilizing IOV resulted in an additional $1,099.95 compared to the cost of PJI.

Conclusion: The economic impact of i may be greater if other related costs of PJI are factored in such as physician visits, postoperative follow-up, and indirect healthcare costs (e.g. Lost wages).

Attachments:
There is no figure for this abstract.

[1426] Pharmacokinetics and Pharmacodynamics of Bacteriophage Therapy in the Management of Infections: A Scoping Review

Authors: Nicita Mehta, **Andrew T Nguyen**, KaiLan S Mackey, Thomas Cummiskey, Edward K Rodriguez, Jason Young

Background And Rationale: The interest in bacteriophage therapy has significantly increased due to the rising prevalence of antibiotic-resistant bacterial infections. However, the pharmacology of bacteriophage therapy has not been systematically reviewed. This scoping review aims to summarize the current state of bacteriophage pharmacokinetics and pharmacodynamics research to identify knowledge gaps and guide future research.

Study Question: What is the current state of literature on understanding the PK and PD parameters of phage therapies in vivo to better inform phage therapy for clinical use?

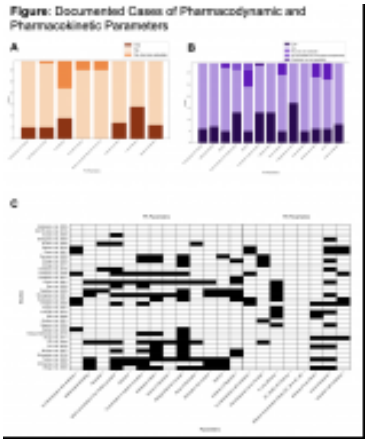
Methods: Following Prisma-Scr guidelines , we conducted a scoping review through December 18th, 2023 of Medline (Ovid), Pubmed, Embase (Elsevier), Web of Science core collection (Clarivate), and Cochrane Central. We included studies that presented original data on the pharmacokinetics and pharmacodynamics of bacteriophage therapy for in vivo infection treatment.

Results: In total, 34 in vivo studies were identified varying in multiple dimensions, including model organisms, target bacteria, delivery vehicles, modes of administration, and phage type. The SCOPING review maps the current research landscape of in vivo bacteriophage pharmacology.

Discussion: Phages possess many PK/PD properties that support them as a promising tool for infection control. Although oral administration is a convenient delivery mechanism, phages have demonstrated ability to be administered by various routes to better maximize bioavailability. Absorption varies based on route of administration. Phages demonstrate rapid distribution that varies depending on administration route and initial dose. Phages demonstrate significant efficacy that's influenced by factors such as specificity, moi and biofilms. Phages are primarily cleared through the reticuloendothelial system. Finally, phages have limited reports of toxicity.

Conclusion: Bacteriophage therapy shows notable promise as a potential alternative or therapeutic adjunct to antibiotics in clinical disease settings. Several studies of phage pharmacokinetics and pharmacodynamics have been conducted; however, these studies differ in multiple dimensions, complicating attempts to develop general principles for standardized phage administration. Further, significant gaps remain in understanding the numerous intrinsic phage and host factors that might affect the pharmacokinetics and pharmacodynamics of phage therapy in vivo.

Attachments:



[1541] Two-Stage Exchange for Hip PJI Remains Effective Amid Evolving Microbial and Stewardship Trends

Authors: **Josef E Jolissaint**, Andrew L Thomson, Elizabeth Robilotti, Michael W Henry, Alberto V Carli, Andy O Miller, Geoffrey H Westrich

Background And Rationale: Periprosthetic joint infection (PJI) remains a serious complication following total joint arthroplasty (TJA), with significant morbidity and a mortality rate akin to some cancers. Two-stage exchange arthroplasty has traditionally been the gold standard for chronic PJI, though success rates vary. As surgical techniques, resistance patterns, and PJI definitions evolve, updated outcome data are essential.

Study Question: This study evaluates contemporary outcomes of two-stage exchange at a high-volume tertiary center, focusing on infection recurrence, multidrug-resistant (MDR) organism prevalence, antibiotic use, and treatment duration.

Methods: This was a retrospective review of all patients undergoing first-time two-stage exchange arthroplasty for THA PJI between January 2016 and April 2022 at a single specialized orthopedic institution. Patients with prior revision surgeries, DAIR procedures, single-stage exchanges, or surgeries performed elsewhere were excluded. The primary outcome was infection recurrence at one and two years. Secondary outcomes included MDR organism incidence, post-reimplantation oral antibiotic use, and antibiotic duration.

Results: Eighty-one patients underwent two-stage exchange. Ten (12.4%) required reoperation—70% for reinfection, most within the first year, and 30% for mechanical issues. Among reinfections, 40% had the same organism, 30% had a new organism, and 30% were culture-negative. MDR organisms were present in 7.4% of initial cultures. Gram-negative organisms, anaerobes, facultative anaerobes, and fungi were found in 8.6%, 3.7%, 8.6%, and 1.2% of cases, respectively. The most common isolates were Staphylococcus epidermidis (17.3%), MSSA (16.1%), and Cutibacterium acnes (12.3%). Post-reimplantation antibiotics were used in 29.6% of cases—91% orally—with 9.9% requiring chronic suppressive therapy. The mean antibiotic duration after stage two was 9.0 weeks.

Discussion: In this contemporary cohort, the two-stage exchange approach achieved infection eradication rates consistent with historical standards. Most reinfections involved a different or undetectable organism. The low use of antibiotics after reimplantation and high rate of oral therapy suggest a shift toward more patient-centered care and improved antimicrobial stewardship.

Conclusion: These findings support continued use of the two-stage approach in THA PJI amid evolving microbial and treatment landscapes. Further research will help to understand factors contributing to reinfection and improve treatment strategies.

Attachments:
There is no figure for this abstract.

[1570] Orthopedic Hand Infections: A 10 Year Review of Cases from Southern Arizona

Authors: Tolga Turker, Esha Rajadhyaksha, Jacob K Denton, **Talha Riaz**

Background And Rationale: Orthopedic hand infections are a common complaint for patients seen by orthopedic surgeons and infectious diseases physicians. These can present as deep hand space infections, tenosynovitis, abscess or osteomyelitis, and as such treatment courses vary widely. The aim of our study was to characterize orthopedic hand infections in a large cohort of patients from southern Arizona, assessing the risk factors, treatment and outcomes.

Study Question: What comorbidities are associated with treatment failure, defined as re-admission, amputation or death? What comorbidities are associated with increased risk of surgical intervention for treatment of orthopedic hand infections?

Methods: A retrospective chart review was conducted using inpatient records with ICD10 codes for hand infections generated between 2013-2023 from a major healthcare system in the southwest United States. Demographic and clinical data was then manually extracted from these charts.

Results: 1768 records were found matching these criteria, of which 488 cases were selected at random. Of these, 418 patients required surgical intervention during their treatment course (85.65%). Fifty-five patients (11.27%) had recorded treatment failure.

Discussion: Diabetes and peripheral vascular disease were associated with a higher risk of treatment failure (or = 3.05; 95% ci: 1.70–5.34; $p < 0.001$, or = 4.30; 95% ci: 1.44–11.60; $p = 0.008$, respectively). Intraoperative findings of bone or tendon necrosis were also associated with a higher risk of treatment failure ((or = 4.16; 95% ci: 1.62–9.91; $p = 0.002$, and or = 4.04; 95% ci: 1.66–9.17; $p = 0.002$, respectively).

Conclusion: Patients with diabetes and peripheral vascular disease or have observed bone/tendon necrosis who develop orthopedic hand infections are at a higher risk for treatment failure. No comorbidity resulted in a statistically significant increased rate of surgical intervention.

Attachments:
There is no figure for this abstract.

[1562] Superficial Hypersensitivity Reactions to Dermabond and Subsequent Outcomes Following Primary Total Hip and Knee Arthroplasty: A Single Surgeon Case Series

Authors: Delano R Trenchfield, **Stefano Ghirardelli**, Gwo-Chin Lee, Alberto Carli, Peter Sculco

Background And Rationale: Skin adhesive glues such as Dermabond are widely used for wound closure in total joint arthroplasty due to their ease of use and cosmetic benefits. However, delayed allergic reactions (dars) can occur in a small subset of patients. Although typically limited to the superficial skin, these reactions may compromise the epithelial barrier and generate localized inflammation, potentially increasing the risk of superficial wound complications or progression to periprosthetic joint infection (PJI).

Study Question: What are the incidence and clinical outcomes of superficial hypersensitivity reactions to Dermabond following primary total hip (THA) and knee arthroplasty (TKA), particularly with respect to the development of PJI or need for return to the operating room?

Methods: A retrospective review was performed to identify all patients who developed superficial skin reactions to Dermabond after primary THA or TKA between January 1, 2017, and November 10, 2024. Time to reaction onset, treatment, resolution timeline, and adverse outcomes—including PJI and return to the or—were collected and analyzed.

Results: We identified 2,789 primary THA and TKA procedures utilizing Dermabond, 17 patients experienced superficial hypersensitivity reactions, corresponding to an incidence of 0.61%. Of these, 6 occurred after hip arthroplasty and 11 after knee arthroplasty. The average time to onset was 12.3 days postoperatively, and the mean time to documented resolution was 26.1 days. All patients were managed conservatively with a combination of topical and/or oral antihistamines, oral steroids, oral antibiotics, and hygiene measures. No cases of PJI or return to the OR were observed in this cohort.

Discussion: Superficial hypersensitivity reactions to Dermabond are rare, self-limited, and effectively treated with conservative measures. Nonetheless, consistent clinical follow-up is important to ensure resolution and to monitor for potential secondary complications such as superficial infection. While these reactions did not lead to PJI or reoperation in our series, clinicians should remain vigilant, particularly in the early postoperative period.

Conclusion: Superficial Dermabond reactions are uncommon, conservative management with close follow-up is a reliable treatment option that avoids the need of reoperation for wound dehiscence or PJI.

Attachments:
There is no figure for this abstract.

[1401] Purpureocillium Lilacinum Proximal Interphalangeal Joint Infection in an Immunocompetent Patient: A Case Report and Review of Literature

Authors: **Kathryn Radulovacki**, Om Naphade, Samantha Kaplan, Neill Li, Jessica Seidelman

Background And Rationale: Fungal bone and joint infections are rare and typically occur in immunocompromised patients. Purpureocillium lilacinum is an uncommon causative organism. Its indolent course and treatment resistance can delay diagnosis and complicate management. We present a case of P. lilacinum infection in the proximal interphalangeal (pip) joint of an immunocompetent patient as well as a literature review.

Study Question: What is the best treatment for immunocompetent patients with P. lilacinum bone or joint infections?

Methods: We describe an immunocompetent patient who developed a P. lilacinum joint infection after corticosteroid injection and perform a scoping review.

Results: A 67-year-old woman with hand osteoarthritis presented with two months of worsening pain, swelling, and erythema in her left index finger PIP joint after corticosteroid injection. She was scheduled for PIP arthrodesis two weeks prior, but surgery was aborted due to concerns for infection. Cultures were positive for P. lilacinum. She underwent irrigation and debridement at presentation and one week after. Susceptibility testing showed a minimum inhibitory concentration of 0.125 mcg/mL for posaconazole, so she was started on delayed-release tablets (300 mg daily). Serum levels were considered therapeutic at 2.9-3.5 mcg/mL. Her symptoms improved but she experienced gastrointestinal side effects which prompted posaconazole discontinuation at six months. One year after presentation, she has decreased swelling, no drainage, and improved functionality of the digit. A scoping review identified four studies describing P. lilacinum bone or joint fungal infections.

Discussion: P. lilacinum is a rare causative organism in fungal bone and joint infections. A literature review found four cases of such infections. Two patients failed initial treatment with antifungals (amphotericin b with miconazole, and voriconazole alone) but resolved with surgery. Another patient was treated with surgery, caspofungin, and voriconazole. The last patient recovered with two months of itraconazole alone. Current literature also supports performing surgery because the risk of continued infection outweighs the harms of intervention.

Conclusion: Our case report and literature review demonstrate the importance of timely surgery and antifungal therapy for purpureocillium lilacinum bone and joint infections in immunocompetent patients.

Attachments:

[1456] Results of an Early Showering Protocol Following Orthopaedic Trauma Surgery

Authors: **Robert E Bilodeau**, Alona Katzir, Heather S Haeberle , Kathryn A Barth, Craig E Klinger, John E Zierenberg, William M Ricci

Background And Rationale: The time from surgery to the allowance of bathing surgical wounds is typically at surgeon discretion and is without a standard. Delayed bathing (i.e. after suture/staple removal) and early bathing (i.e. prior to suture/staple removal) of surgical wounds each have theoretical advantages and disadvantages. Little clinical evidence exists regarding the safety of early bathing in orthopaedic trauma patients. Therefore, this study aimed to evaluate the outcomes of a protocol of early (3 days post-op) bathing of acute surgical wounds.

Study Question: To evaluate the clinical outcomes of a standardized postoperative protocol permitting removal of post-operative dressings, showering, and cleansing of incisional wounds three days following fracture surgery.

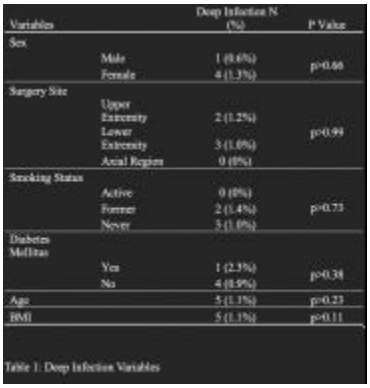
Methods: All patients operatively treated by the senior author at a single institution between September 2017 and September 2023 with a standard post-operative protocol that called for bandage removal and bathing over acute surgical wounds were retrospectively reviewed. Excluded were patients with complicated wounds defined as those associated with open fractures, revision surgery through recent (< 6 weeks) surgical wounds, and acute traumatic local skin abrasions or lacerations, as these patients were not treated with the early bathing protocol. Also excluded were patients with immobilization precluding wound access at 3 days post-op, with known prior infections and those without 3 months of follow-up.

Results: 465 surgeries in 444 patients with a mean age of 59 years (range 18–95; 65% female) met inclusion criteria. Mean follow-up was 11.7 months (SD 12.3; range 3.0–73.0). Re-operation for a wound or infectious complication occurred in 1.1% (5/465) of patients and superficial surgical site infection requiring antibiotic treatment occurred in an additional 1.1% of patients (5/465).

Discussion: The present study found no difference in superficial or deep SSI between factors of diagnosis of diabetes, smoking status, surgical site, BMI, or age. The absence of observed increases in infection rate in the current study cohort further supports the safety of an early showering protocol in patients with increased independent preoperative risk factors.

Conclusion: A protocol of dressing removal and showering at three days post-operatively over acute uncomplicated surgical wounds was associated with re-operation for deep infection in 1.1% of patients and superficial infection in 1.1% of patients.

Attachments:



Variables		Deep Infection N (%)	P Value
Sex			
	Male	1 (0.6%)	p=0.68
	Female	4 (1.3%)	
Surgery Site			
	Upper Extremity	2 (1.2%)	p=0.99
	Lower Extremity	3 (1.0%)	
	Axial Region	0 (0%)	
Smoking Status			
	Active	0 (0%)	p=0.75
	Former	2 (1.4%)	
	Never	3 (1.0%)	
Diabetes Mellitus			
	Yes	1 (2.3%)	p=0.38
	No	4 (0.9%)	
Age		5 (1.1%)	p=0.23
BMI		5 (1.1%)	p=0.11

Table 1: Deep Infection Variables

[1588] Arthrodesis to Avoid Amputation in Patients with Massive Bone Loss Due to Infection at the Knee: a Single Institution Review

Authors: Ashley Castan, Rosamaria Dias, Yazan Kadkoy, Joseph Ippolito, Kathleen Beebe, **Joseph Benevenia**

Background And Rationale: Prosthetic joint infection (PJI) at the knee is among the most commob indications for revision in patients undergoing limb salvage surgery. An arthrodesis allows for immediate weight bearing and lessens the likleihood of future revision surgeries. At our institution, we reserve this option for patients with massive bone loss greater than 4-6 cm of defciit.

Study Question: The purpose of this study was to analyze the patients who have undergone arthrodesis at the knee at our institution.

Methods: We conducted a thorough chart review of patients who received an arthrodesis with either the Intercalart Knee Arthrodesis (IKA) system or the femoral-tibia arthrodesis nail between 2018 and 2023 at our institution. 15 patients were included in this analysis and divided into which arthrodesis system they received. Defect size was measured using mechanical axis studies. We also analyzed the organism profiles, outcomes of each patient, and calculated MSTS scores.

Results: Twelve (80%) patients underwent IKA, with mean defect of 7.14cm. Three (20%) patients underwent femoral-tibia arthrodesis nail, with mean defect of 17.66cm. Ten (67%) patients retained their fusion without complication. Three (20%) patients experienced complication requiring return to the operating room. One patient was converted successfully to an articulating construct. The mean MSTS score improved from 14.4 to 20.2 post-arthrodesis ($p<0.05$).

Discussion: In this series, a majority (67%) of patients retained their fusion with improved functional outcomes and immediate weight bearing.

Conclusion: Knee arthrodesis is an option in patients with massive bone loss due to infection at the knee as a method to avoid amputation.

Attachments:
There is no figure for this abstract.

[1576] Acute Bacterial Septic Arthritis of an Osteoarthritic Hip, in Elderly Infirm Patients, Can be Treated with Custom Made Articulating Spacer (CUMARS) Instead of Washout. A 13 Month Follow Up Of 6 Patients.

Authors: **Pierre Pechon**

Background And Rationale: Septic arthritis of the hip is rare and requires washout and extended antibiotics; arthroplasty is contra-indicated during infection. This creates a paradox in elderly infirm patients: washout may treat the infection but the hip will remain arthritic and painful; arthroplasty with CUMARS will cure pain, prevent morbidity associated with extended bed-rest by permitting mobilization, but may necessitate a 2-stage revision with interim antibiotics.

Study Question: We present the treatment of six patients over 65yrs with severe hip osteoarthritis and septic arthritis, five of whom were treated with arthroplasty in a known-infected native hip.

Methods: Patients identified in our prospective database, over 1 year period, in a hospital serving 170,000 population.

Results: Six patients aged 65 to 86; two female four male. Patient 1 treated with washout only. Patient 2,3 & 4 cured with 1st of 2-stage CUMARS. Patient 5 cured with 2x washouts then 1st of 2-stage CUMARS. Patient 6 cured with 2x washouts then 2-stage arthroplasty. Arthroplasty group had median Oxford Hip Score 42/60. Mean length of stay 44 days (13-83). Mean 1.8 surgical operations per patient (range 1-4). One patient died at 5 months postop, 5 remain alive at median 13 months (range 11-23). Mean cost of treatment over 112,000 NZD (66\'000 USD). Oxford Hip Score at 13 months follow up (range 11-23) were median 42/60 in arthroplasty group and 12/60 in single patient treated with washout alone. At follow-up, the patient treated with washout alone showed significant joint destruction on radiographs; arthroplasty patients showed stable prostheses on radiographs.

Discussion: These cases are complex, heterogeneous, expensive and no prospective data or guidance exists on best management. Patients needed between 1 and 4 operations each. Performing 1st of 2-stage arthroplasty combined with radical synovectomy and 6-12 weeks of antibiotics was curative in 4 of 6 patients. 1 of 6 patients required a 2-stage revision. The single patient treated with washout alone had the worst functional outcome.

Conclusion: Performing single or 2-stage arthroplasty with extended antibiotics is appropriate management for acute septic arthritis of a hip in an elderly comorbid patient with a background of chronic OA, and permits early mobilization.

Attachments:
There is no figure for this abstract.

DISCLOSURES

A

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This individual reported nothing to disclose.

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Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
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Arthrology Designs Type: IP Royalties
Stryker Corporation: Type: Other Professional Activities
Discloser Type: IP Royalties
Previous Institution Type: IP Royalties
Johnson & Johnson/Depuy Orthopedic: Type: Other Professional Activities

Knimble Designs Type: IP Royalties
restor3d, inc.: Type: Other Professional Activities
Discloser Type: IP Royalties
Zooly Labs: Type: Stock
nSight Surgical: Type: Stock
Medacta USA: Type: Other Professional Activities
Onkos Surgical, Inc.: Type: Other Professional Activities
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Peerwell: Type: Stock
Zimmer: Type: IP Royalties
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Beyond Limits: Type: Stock
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Motion MSK : Type: Stock
PT Genie: Type: Stock
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Deciphera: Paid consultant
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National Institutes of Health (NIAMS & NICHD): Research support
Onkos: Paid consultant
Orthopaedic Research and Education Foundation: Board or committee member
Trellis: Research support
Zimmer: Paid consultant; Research support

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Ines Mandl Research Foundation: Research support
Journal of Orthopaedic Research: Editorial or governing board
Smith & Nephew: IP royalties; Paid consultant; Research support

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Submitted on: 10/9/2024
This individual reported nothing to disclose.

Collin Braithwaite (Queen Creek, AZ)
(This individual reported nothing to disclose); Submitted on: 10/11/2023

Timothy Scott Brown (Houston, TX)
Submitted on: 05/02/2024
American Association of Hip and Knee Surgeons: Board or committee member
Mid-America Orthopedic Association (MAOA): Board or committee member
Musculoskeletal Infection Society (MSIS): Board or committee member
Stryker: Paid consultant

Vincent Buckman (Lithia Springs, GA)
(This individual reported nothing to disclose); Submitted on: 04/20/2024

Jessica Davis Burns (Phoenix, AZ)
(This individual reported nothing to disclose); Submitted on: 10/20/2023

C

Laila Castellino (Dallas, TX)
Submitted on: 4/23/2025
This individual reported nothing to disclose.

Alberto V Carli (New York, NY)
Submitted on: 05/03/2024
Heraeus Medical: Paid consultant

Victor Carlson (logan, UT)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Ashley Castan (Port Monmouth, NJ)
Submitted on: 5/22/2025
This individual reported nothing to disclose.

Laura Certain (Salt Lake City, UT)
Submitted on: 4/8/2025
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
Executive Board of the Musculoskeletal Infection Society (2020-2025): Type: Board of Directors or committee member Self
Editor for Foot and Ankle Orthopaedics and Foot and Ankle International: Type: Editorial or governing board Self

Calvin Chandler (charlotte, nc)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Tony Chang (Upland, CA)
Submitted on: 4/21/2025
This individual reported nothing to disclose.

Christina A Chao (New York, NY)
(This individual reported nothing to disclose); Submitted on: 05/06/2024

Antonia F Chen (Newton, MA)
Submitted on: 4/9/2025
Avanos: Type: Other Professional Activities
Irrimax: Type: Other Professional Activities
BICMD: Type: Other Professional Activities
Ethicon: Type: Other Professional Activities
Convatec Inc.: Type: Other Professional Activities
Osteal Therapeutics: Type: Other Professional Activities
Type: Other Intellectual Property
Journal of bone and joint surgery: Type: Other Professional Activities
UpToDate: Type: Other Professional Activities
Adaptive Phage Therapeutics: Type: Other Professional Activities
Solenic: Type: Other Professional Activities
Type: Other Intellectual Property
Regeneron: Type: Other Professional Activities
Sonoran Biosciences: Type: Stock Option
Hyalex: Type: Stock Option
IlluminOss Medical, Inc.: Type: Stock Option
TrialSpark: Type: Other Professional Activities
Heraeus Noblelight America: Type: Other Professional Activities
Smith and Nephew Orthopaedics: Type: Other Professional Activities
Joint Purification System: Type: Stock Option
Stryker: Type: Other Professional Activities
American Association of Hip and Knee Surgeons: Type: Other Professional Activities
Journal of Arthroplasty: Type: Other Professional Activities
Peptilogics: Type: Other Professional Activities
AAHKS: Type: Board of Directors or committee member Self
JBJS: Type: Editorial or governing board Self

Weiqiang Chen (Cleveland, OH)
(This individual reported nothing to disclose); Submitted on: 04/17/2024

Alexis R Chow (Stratford, NJ)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Alexander Christ (Los Angeles, CA)
Submitted on: 4/24/2025
Daiichi Sankyo: Type: Other Professional Activities
Stryker: Type: Other Professional Activities

Globus Medical, Inc.: Type: Other Professional Activities
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
Onkos Surgical, Inc.: Type: Other Professional Activities
Smith & Nephew, Inc.: Type: Other Professional Activities
AAOS Hip & Knee Evaluation Committee; MSTS Fellowship Committee; ORS Implant Section
President: Type: Board of Directors or committee member Self
Arthroplasty: Type: Editorial or governing board Self

Zachary Christopher (Phoenix, AZ)
Submitted on: 4/10/2025
This individual reported nothing to disclose.

Christian Cisneros (Winter Park, FL)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Andrew James Clair (orlando, fl)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Henry D Clarke** (Phoenix, AZ)
Submitted on: 5/4/2025
Mayo Clinic: Type: Employment
The Knee Society: Type: Fiduciary Officer
Type: Other Intellectual Property
Aspire-ISE AG: Type: Stock
American Academy of Orthopaedic Surgeons: Type: Other Professional Activities
Elsevier Publishing: Type: Other Professional Activities
Type: Other Intellectual Property
OSSO VR: Type: Other Professional Activities
The Knee Society: Type: Board of Directors or committee member Self

Terry A Clyburn (Houston, TX)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Joseph Bowman Cohen (CHICAGO, IL)
Submitted on: 5/7/2025
Johnson & Johnson/Depuy Orthopedic: Type: Other Professional Activities
Nicolas W Cortes-Penfield (Omaha, NE)
Submitted on: 1/2/2025
This individual reported nothing to disclose.

Molly Elisabeth Courtright (Tucson, AZ)
(This individual reported nothing to disclose); Submitted on: 05/04/2024

Thomas Cummiskey (Cambridge, MA)
Submitted on: 4/23/2025
This individual reported nothing to disclose.

Brian Matthew Curtin (Charlotte, NC)
Submitted on: 4/10/2025
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
DePuy Orthopaedics Inc.: Type: Other Professional Activities
DJO, LLC: Type: Other Professional Activities
AAHKS--Evidence Based Medicine Committee: Type: Board of Directors or committee member Self
EJOST Deputy Editor JoA. Elite Reviewer JAAOS. Reviewer Orthopedics. Reviewer International Journal of Surgery. Reviewer Journal of Surgical Orthopedic Advances (SOA). Reviewer: Type: Editorial or governing board Self

D

Lauren Daddi (cheshire, ct)
Submitted on: 4/28/2025
This individual reported nothing to disclose

Laura Elizabeth Damioli (Aurora, CO)
Submitted on: 04/30/2024
Validus Cellular Therapeutics: Paid consultant

Brian C de Beaubien (Fenton, MI)
Submitted on: 10/20/2023
Link Orthopaedics: IP royalties; Paid presenter or speaker
MicroPort Orthopedics: IP royalties; Research support
Osteal Therapeutics: Stock or stock Options

Daniela Fatima De Lima Corvino (Birmingham, AL)
Submitted on: 4/15/2025
This individual reported nothing to disclose.

Eytan M Debbi (New York, NY)
Submitted on: 05/02/2024
DePuy, A Johnson & Johnson Company: Paid consultant
Ortho Development: IP royalties; Paid presenter or speaker
Think Surgical: Stock or stock Options

David Deckey (Phoenix, AZ)
Submitted on: 4/9/2025
Osgenic: Type: Stock
Journal of Arthroplasty: Type: Other Professional Activities
The Journal of Knee Surgery: Type: Other Professional Activities
AAHKS: Type: Other Professional Activities
AAHKS, AAOS: Type: Board of Directors or committee member Self
Journal of Arthroplasty, The Journal of Knee Surgery: Type: Editorial or governing board Self

Carl A Deirmengian (Philadelphia, PA)
Submitted on: 05/06/2024
Biostar Ventures: Stock or stock Options
Domain: Stock or stock Options
Forcast Ortho: Stock or stock Options
Trice: Stock or stock Options
Zimmer: Paid consultant; Research supportIvan

Delgado Alvarado (Dallas, TX)
Submitted on: 4/25/2025
This individual reported nothing to disclose.

Jacob Keith Robishaw-Denton (tucson, az)
(This individual reported nothing to disclose); submitted on: 04/25/2024

Matthew Edward Deren (Cleveland, OH)
Submitted on: 09/05/2024
Brasseler: Paid presenter or speaker
RomTech: Stock or stock Options

Rosamaria Esteves Dias (Elizabeth, NJ)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Ezekiel Dingle (Los Angeles, CA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Jennifer Dootz (Frederick, MD)
Submitted on: 4/24/2025
This individual reported nothing to disclose.

Michelle Maree Dowsey (Australia)
Submitted on: 4/23/2025
Royal Australian College of General Practitioners: Type: Other Professional Activities
University of Sydney: Type: Other Professional Activities
Australian Orthopaedic Research Foundation: Type: Fiduciary Officer
Australian Orthopaedic Association Research Foundation Committee: Type: Board of Directors or committee member Self

Matthew J Dietz (Morgantown, WV)
Submitted on: 05/06/2024
G21: Paid consultant
Guidepoint Consulting: Paid consultant
Heraeus Medical: Paid consultant; Research support
Peptilogics: Research support; Stock or stock Options; Unpaid consultant

Eduardo Drummond, MD (Pittsburgh, PA)
(This individual reported nothing to disclose); Submitted on: 05/01/2025

Evan Michael Dugdale (rochester, mn)
Submitted on: 5/1/2025
This individual reported nothing to disclose.

E

Said El Zein (Rochester, MN)
(This individual reported nothing to disclose); Submitted on: 05/04/2024

Khaled A Elmenawi (rochester, mn)
(This individual reported nothing to disclose); submitted on: 06/04/2024

Anthony Eshareturi (Manvel, TX)
(This individual reported nothing to disclose); Submitted on: 08/30/2024

F

Bailey Fearing (Charlotte, NC)
Submitted on: 10/10/2024
This individual reported nothing to disclose

Keith Fehring (Charlotte, NC)
Submitted on: 06/03/2024
American Association of Hip and Knee Surgeons: Board or committee member
DePuy, A Johnson & Johnson Company: IP royalties; Other financial or material support; Paid consultant; Paid presenter or speaker; Research support
Knee Society: Board or committee member
Zimmer: Paid consultant

Thomas K Fehring (Charlotte, NC)
Submitted on: 4/11/2025
Type: IP Royalties
Johnson & Johnson/Depuy Orthopedic: Type: Other Professional Activities

Christopher Femino (Melrose, MA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Mark P Figgie (New York, NY)
Submitted on: 4/12/2025
Current Institution Type: IP Royalties
bone solutions: Type: Other Professional Activities
endeavor orthopedics: Type: Stock
joint effort: Type: Stock
Limacorporate S.p.A.: Type: Other Professional Activities
hs2: Type: Stock
pathkeeper: Type: Stock
theradaptive: Type: Stock
native orthopedics: Type: Stock
icarus: Type: Stock
WishBone Medical Inc.: Type: Stock
WishBone Medical Inc.: Type: Other Professional Activities
wishbone-chairman of the board sylke-advisory board: Type: Board of Directors or committee member

Yale Fillingham (Wayne, PA)
Submitted on: 4/10/2025
Ethicon Inc.: Type: Other Professional Activities
Medacta USA, Inc.: Type: Other Professional Activities
Signature Orthopedics: Type: Other Professional Activities
Type: Other Intellectual Property

American Academy of Orthopaedic Surgeons: Type: Fiduciary Officer
Zimmer Biomet Holdings, Inc.: Type: IP Royalties
American Association of Hip and Knee Surgeons: Type: Fiduciary Officer
Stryker Corporation: Type: IP Royalties
Peptilogics: Type: IP Royalties
Parvizi Surgical Innovation: Type: Stock
Medacta USA, Inc.: Type: IP Royalties
Enovis: Type: Other Professional Activities
Tissuegene: Type: IP Royalties
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
AAOS (EBQV Chair); AAHKS (EMB Vice Chair): Type: Board of Directors or committee member Self

Suan-Sin Foo (Cleveland, OH)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Jonathan A Forsberg (New York, NY)
Submitted on: 4/9/2025
Onkos Surgical, Inc.: Type: Other Professional Activities
MT Innovations, LLC: Type: Other Professional Activities
Balmoral: Type: IP Royalties
Clinical Orthopedics and Related Research, Board of Trustees.: Type: Editorial or governing board Self

Mia J Fowler (New York, NY)
(This individual reported nothing to disclose); Submitted on: 10/01/2024

Andrew Frear (Pittsburgh, PA)
(This individual reported nothing to disclose); Submitted on: 06/14/2024

Patricia Friedmann (New York, NY)
Submitted on: 5/8/2025
This individual reported nothing to disclose

Karl-Heinz Frosch (Germany)
Submitted on: 07/13/2024
Arthrex, Inc: IP royalties; Paid presenter or speaker; Research support

David B. Frumberg (New Haven, CT)
Submitted on: 04/08/2024
American Academy for Cerebral Palsy and Developmental Medicine: Board or committee member
Limb Lengthening and Reconstruction Society: Board or committee member
Orthofix, Inc.: Paid consultant
Ultragenyx: Paid consultant

Benjamin M Frye (Morgantown, WV)
Submitted on: 5/4/2025
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
Stryker: Type: Other Professional Activities

Daisuke Furukawa (stanford, ca)
Submitted on: 4/15/2025; this individual reported nothing to disclose

G

Elizabeth Gancher (Philadelphia, PA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.-

Derese Getnet** (Baltimore, MD)
Submitted on: 5/1/2025
Nanobiofab Type: IP Royalties
Current Institution Type: IP Royalties
Current Institution Type: IP Royalties
Nanobiofab: Type: Employment

Brandon Stephen Gettleman (Los Angeles, SC)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Elie S Ghanem (Columbia, MO)
Submitted on: 4/8/2025
This individual reported nothing to disclose.

Jeremy Gililland (Salt Lake City, UT)
Submitted on: 05/03/2024
Biomet: Research support
CoNextions: Stock or stock Options
Convatec: Paid consultant
Enovis: Paid consultant
Hip Society: Board or committee member
Journal of Arthroplasty: Editorial or governing board
Medacta: Research support
MiCare Path: IP royalties; Stock or stock Options
OrthoGrid: IP royalties; Paid consultant; Stock or stock Options
Stryker: IP royalties; Paid consultant; Research support
Zimmer: Research support

Ida Leah Gitajn (Lebanon, NH)
Submitted on: 3/21/2025
Paragon 28, Inc.: Type: Other Professional Activities
Stryker: Type: Other Professional Activities
Synthes GmbH: Type: Other Professional Activities

Andrew H Glassman (Columbus, OH)
Submitted on: 04/22/2024
Innomed: IP royalties

Marjorie Golden (New Haven, CT)
Submitted on: 4/8/2025
Iterum: Type: Other Professional Activities

Stuart Barry Goodman (Redwood City, CA)
Submitted on: 4/8/2025
WishBone Medical Inc.: Type: Other Professional Activities

President of ARCO: Type: Board of Directors or committee member Self
Bioengineering: Editorial or governing board Biomaterials: Editorial or governing board Bone and Joint Research: Editorial or governing board Clinical Orthopaedics and Related Research: Editorial or governing board J Arthroplasty: Editorial or governing board Journal of Orthopaedic Translation: Editorial or governing board Orthopedics: Editorial or governing board PLOS ONE: Editorial or governing board Regenerative Engineering and Translational Medicine: Editorial or governing board Merck Manual: Type: Editorial or governing board Self

Andrew Gordon (pittsburgh, pa)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Megan E Gorleski** (Philadelphia, PA)
Submitted on: 5/8/2025
Rothman Orthopaedics: Type: Employment

Stephen Duane Graham (Charlotte, NC)
Submitted on: 4/25/2025
This individual reported nothing to disclose.

Ed M Greenfield (Indianapolis, IN)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Alexandra Prorock Grizas (NEW YORK, NY)
Submitted on: 5/8/2025
Association for Profe: Type: Fiduciary Officer
Association for Professionals in Infection Control and Epidemiology: Type: Board of Directors or committee member Self

Margaret G Grossman (Chicago, IL)
Submitted on: 4/28/2025
This individual reported nothing to disclose.

Kelly Guerin (New York, NY)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

H

Naomi L Haddock (San Bruno, CA)
Submitted on: 4/28/2025
This individual reported nothing to disclose.

Heather Haeberle (New York, NY)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Heather Haeberle (New York, NY)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Tarek Haj Shehadeh (Hershey, Pa)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Christopher D Hamad (Santa Monica, CA)
Submitted on: 4/11/2025
This individual reported nothing to disclose.

Mohammed Hammad (New York, NY)
Submitted on: 05/07/2025
This individual reported nothing to disclose.

Jaap Hanssen (Netherlands)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Jamie Heimroth (New Hyde Park, NY)
(This individual reported nothing to disclose); Submitted on: 10/30/2023

Michael Henry (New York, NY)
(This individual reported nothing to disclose); Submitted on: 05/03/2024

Lyong Heo (Livermore, CA)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Matthew Stewart Hepinstall (New York, NY)
Submitted on: 05/08/2024
American Association of Hip and Knee Surgeons: Board or committee member
CAOS: Board or committee member
Exactech, Inc: Paid consultant; Research support
ISTA: Board or committee member
JointMedica: Paid consultant
Stryker: Paid consultant; Paid presenter or speaker; Research support

Carl L Herndon (New York, NY)
Submitted on: 08/12/2024
DePuy, A Johnson & Johnson Company: Paid consultant
Journal of Arthroplasty: Editorial or governing board
KCI: Paid consultant

Angela Hewlett (Omaha, NE)
Submitted on: 10/10/2024
Forcast Orthopedics: Type: Other Professional Activities
Journal of Bone and Joint Infection editorial board : Type: Editorial or governing board Self

Kayla Hietpas (Charlotte, NC)
Submitted on: 4/30/2025
This individual reported nothing to disclose

Carlos A Higuera Rueda (Weston, FL)
Submitted on: 4/28/2025
Parvizi Surgical Innovations LLC: Type: Stock
KCI USA, Inc: Type: Other Professional Activities
CLEU Diagnostics LLC: Type: Stock
Stryker Corporation: Type: Other Professional Activities
Solenic Medical: Type: Stock
BD Biosciences: Type: Other Professional Activities
AAOS, AAHKS, SICOT: Type: Board of Directors or committee member Self
Journal of Arthroplasty, JBJI: Type: Editorial or governing board Self

Jason Shih Hoellwarth (New York, NY)
Submitted on: 04/05/2024
Stryker: Paid consultant

Jae-Young Hong (Korea, Republic of)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Insup Hong (Forest Park, IL)
Submitted on: 4/18/2025
This individual reported nothing to disclose.

Robert J Hopkins** (Frederick, MD)
Submitted on: 4/28/2025
Nanobiofab: Type: Employment

Carly Julia Horne (Knoxville, TN)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Tyler Hoskins (Morristown, NJ)
(This individual reported nothing to disclose); Submitted on: 06/01/2022

Joseph R Hsu (Charlotte, NC)
Submitted on: 05/06/2024
Austin Medical: Paid consultant
Smith & Nephew: IP royalties; Paid consultant; Paid presenter or speaker
Stryker: IP royalties; Paid consultant; Paid presenter or speaker

Nick L Hudock
Submitted on: 4/25/2025
This individual reported nothing to disclose.

I

Rita Igwilo-Alaneme (Rochester, Mn)
(This individual reported nothing to disclose); submitted on: 05/06/2024

Stephen J Incavo (Houston, TX)
Submitted on: 10/10/2024
Cranial Devices: Type: Stock

Type: IP Royalties
Type: IP Royalties
OrthoInnovate: Type: Stock
Type: IP RoyaltiesJoseph

Anthony Ippolito (Verona, NJ)
(This individual reported nothing to disclose); Submitted on: 06/03/2024

Jose M. Iturregui (Phoenix, AZ)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

J

Michal Jandzinski (Ann Arbor, MI)
(This individual reported nothing to disclose); Submitted on: 02/06/2024

Sumin Jeong (Los Angeles, CA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Suenghwan Jo (New York, NY)
Submitted on: 4/30/2025
This individual reported nothing to disclose.

Kole Preston Joachim (Los Angeles, CA)
(This individual reported nothing to disclose); Submitted on: 06/09/2024

Christopher Johnson (Chicago, IL)
(This individual reported nothing to disclose); Submitted on: 10/20/2023Josef jolissaint (charlotte, nc)
Submitted on: 4/17/2025
This individual reported nothing to disclose

David Hyun-Wook Jung (Chicago, IL)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Yazan Kadkoy (Newark, NJ)
(This individual reported nothing to disclose); Submitted on: 06/03/2024

K

Ji Yun Kang (Korea, Republic of)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Adam Hadley Kantor (Salt Lake City, UT)
(This individual reported nothing to disclose); Submitted on: 08/01/2024

Samantha Kaplan (Durham, NC)
(This individual reported nothing to disclose); Submitted on: 06/17/2024

Alona Katzir (New York, NY)
Submitted on: 4/30/2025
This individual reported nothing to disclose

Eyal Kazin (United Kingdom)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Lauren Kemp (Dallas, TX)
Submitted on: 4/15/2025
This individual reported nothing to disclose.

Mitchell F Kennedy (Wakefield, MA)
Submitted on: 4/23/2025
This individual reported nothing to disclose.

Shujaa T Khan (Cleveland, OH)
(This individual reported nothing to disclose); Submitted on: 04/29/2024

Michael Maher Kheir (Novi, MI)
Submitted on: 10/14/2024
Parvizi Surgical Innovation: Type: Other Professional Activities
Solenic Medical: Type: IP Royalties
pitch sink: Type: Other Professional Activities
Journal of Orthopaedic Experience & Innovation: Type: Other Professional Activities
Journal of Orthopaedic Experience & Innovation: Type: Editorial or governing board Self

Farouk Jarir Khury (New York, NY)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Hyoungtae Kim (Korea, Republic of)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Craig Klinger (New York, NY)
Submitted on: 10/9/2024
RevOrtho LLC: Type: IP Royalties

Taejun Ko (Frederick, MD)
Submitted on: 4/29/2025
This individual reported nothing to disclose.

Sarah Koljaka (Branford, CT)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Viktor Erik Krebs (Rocky River, OH)
Submitted on: 08/30/2023
Journal of Arthroplasty: Editorial or governing board

Stryker: IP royalties; Paid presenter or speaker
Stryker Orthopaedics: Paid consultant

Gene Kulesha (Parsippany, NJ)
Submitted on: 5/5/2025
Onkos Surgical, Inc.: Type: Stock Option

L

Travis Larsen (New York, NY)
Submitted on: 5/5/2025
This individual reported nothing to disclose.

Allison Lastinger (Morgantown, WV)
Submitted on: 4/23/2025
Avania: Type: Other Professional Activities
International Asthma Conference at Nemacolin: Type: IP Royalties
Musculoskeletal Infection Society Meeting, Program Committee: Type: Board of Directors or committee member Self

Scott Michael Lavalva (New York, NY)
Submitted on: 5/8/2025
This individual reported nothing to disclose.

Justin Le (Blackwood, NJ)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Sunwoo Lee (Korea, Republic of)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Gwo-Chin Lee (New York, NY)
Submitted on: 4/10/2025
The Knee Society: Type: Other Professional Activities
Type: Other Intellectual Property
Corin USA: Type: Stock
Type: Other Intellectual Property
American Academy of Orthopaedic Surgeons: Type: Other Professional Activities
The Knee Society: Type: Board of Directors or committee member Self
JAAOS Global Research and Reviews- Editor in Chief: Type: Editorial or governing board Self

Bethany Lehman (Cleveland, OH)
Submitted on: 5/5/2025
Merck & Co., Inc. : Type: IP Royalties

Ashley Levack (Hinsdale, IL)
Submitted on: 04/29/2024
AO Trauma North America: Board or committee member
Orthopaedic Research Society: Board or committee member
Orthopaedic Trauma Association: Board or committee member

Neill Li (Cary, NC)
Submitted on: 06/02/2024
Checkpoint Surgical: Paid consultant

Angelina Liddy (Southampton, PA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

James Samuel Lieber (Springfield, IL)
(This individual reported nothing to disclose); Submitted on: 05/05/2025

Adrian Lin (SANTA MONICA, CA)
(This individual reported nothing to disclose); Submitted on: 10/23/2023

Xiaonao Liu** (Frederick, MD)
submitted on: 4/28/2025
nanobiofab: type: fiduciary officer
nanobiofab: type: employment
nanobiofab: type: fiduciary officer

Deyu Liu (Frederick, MD)
Submitted on: 4/23/2025
This individual reported nothing to disclose.

Jennifer Liu (Houston, TX)
(This individual reported nothing to disclose); Submitted on: 06/05/2024

Juan David Lizcano (Philadelphia, PA)
(This individual reported nothing to disclose); submitted on: 06/17/2024

Qiuhe Lu (Cleveland, OH)
(This individual reported nothing to disclose); Submitted on: 04/17/2024

Markus Luger (Austria)
Submitted on: 5/1/2025
This individual reported nothing to disclose.

Beverly I Lundell (Woodbury, MN)
Submitted on: 4/22/2025
This individual reported nothing to disclose.

M

Nicholas Henry Maassen (Chicago, IL)
Submitted on: 4/9/2025
restor3d, inc.: Type: Other Professional Activities
MidAmerica Orthopedic Association, Bylaws Committee, Education Comittee AAOS Shoulder and Elbow Content Comittee: Type: Board of Directors or committee member Self

KaiLan Mackey (Calabasas, CA)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Katherine E Mallett (Rochester, MN)
Submitted on: 09/07/2023
AAOS: Board or committee member

William J Maloney, III (Redwood City, CA)
Submitted on: 10/10/2024
Type: Other Intellectual Property
Type: Other Intellectual Property
International Knee Society: Type: Board of Directors or committee member Self

Robert Manasherob (Palo Alto, CA)
(This individual reported nothing to disclose); Submitted on: 03/22/2024

Jorge Manrique (Miami Shores, FL)
Submitted on: 5/4/2025
Stryker: Type: IP Royalties
Parvizi Surgical Innovations : Type: Stock
Colombian Journal of Orthopedics and Traumatology, Academic committee: Type: Editorial or governing board Self

Veronica Marval (New York, NY)
Submitted on: 5/6/2025
This individual reported nothing to disclose.

Takahiro Matsuo (Rochester, MN)
Submitted on: 5/7/2025
This individual reported nothing to disclose

David Jacob Mayman (New York, NY)
Submitted on: 11/11/2024
Stryker Corporation: Type: Other Professional Activities
Imagen Technology Inc: Type: Stock
Type: Other Intellectual Property
WishBone Medical Inc.: Type: Stock
Ortho AI: Type: IP Royalties
Type: Other Intellectual Property
ORTHALIGN INC: Type: Stock
Type: Other Intellectual Property
CyMedica Orthopedics, Inc.: Type: Stock
MiCare Path: Type: Stock
WishBone Medical Inc.: Type: Stock Option
Hip Society, member Knee Society, member: Type: Board of Directors or committee member Self

Stephen Jack McBride (New Zealand)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Michael Andrew McHugh (Frisco, TX)
(This individual reported nothing to disclose); Submitted on: 04/26/2024

Jack William McHugh (Rochester, MN)
Submitted on: 4/30/2025
This individual reported nothing to disclose.

Alexander C McLaren (Phoenix, AZ)
Submitted on: 4/11/2025
Hayes Diagnostics: Type: Stock
Forcast Orthopaedics: Type: Stock Option
Musculoskeletal Infection Society/ Executive board member: Type: Board of Directors or committee member Self

Martin McNally (United Kingdom)
Submitted on: 4/24/2025
Bonesupport AB: Type: IP Royalties
Peptilogics inc.: Type: Other Professional Activities

Colin A McNamara (Miami, FL)
Submitted on: 4/11/2025
This individual reported nothing to disclose.

Mark Frederick Megerian (Shaker Heights, OH)
(This individual reported nothing to disclose); Submitted on: 06/02/2024

Nicita Mehta (Boston, MA)
Submitted on: 5/2/2025
This individual reported nothing to disclose

Vincent Kanaka-Ikaika Melemai
Submitted on: 4/17/2025
This individual reported nothing to disclose.

Rory Metcalf (Charlotte, NC)
Submitted on: 4/30/2025
This individual reported nothing to disclose.

Andy Miller (New York, NY)
Submitted on: 10/9/2024
Musculoskeletal Infection Society: Type: Fiduciary Officer
MSIS exec board: Type: Board of Directors or committee member Self

Cezarina Mindru (Houston, TX)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Jason A Minnich (Portland, IN)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Jon E Minter (Alpharetta, GA)
Submitted on: 10/17/2024
This individual reported nothing to disclose.

Christine Mironenko (Brooklyn, NY)
(This individual reported nothing to disclose); submitted on: 06/04/2024

Robert M Molloy (Avon Lake, OH)
Submitted on: 06/20/2024
American Association of Hip and Knee Surgeons: Board or committee member
Stryker: IP royalties; Paid consultant; Paid presenter or speaker; Research support
Zimmer: Research support

Ilda B Molloy (New Haven, CT)
Submitted on: 07/07/2024
Smith & Nephew: Paid consultant

Maximilian M Mueller (null, null)
(This individual reported nothing to disclose); submitted on: 09/04/2024

Sonal **S Munsiff** (Rochester, NY)
Submitted on: 5/7/2025
This individual reported nothing to disclose

Andrew Murtha (Houston, TX)
Submitted on: 10/06/2024
American Association of Hip and Knee Surgeons: Board or committee member

N

Farideh Najafi (Cumming, GA)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Bianca Nakar (New York, NY)
Submitted on: 10/16/2024
This individual reported nothing to disclose

Erik Nakken (Ann Arbor, MI)
Submitted on: 10/14/2024
This individual reported nothing to disclose

Om Naphade (Cary, NC)
(This individual reported nothing to disclose); Submitted on: 05/27/2024

Roman Natoli (Indianapolis, IN)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Sandra Bliss Nelson (Boston, MA)
Submitted on: 3/19/2025
UpToDate: Type: Other Professional Activities

Section Editor (Musculoskeletal Infections, Skin and Soft tissue infections), UpToDate Advisory Board, Journal of Bone and Joint Infection: Type: Editorial or governing board Self

Andrew Nguyen (Jamaica Plain, MA)
Submitted on: 5/4/2025
This individual reported nothing to disclose

Joseph Nguyen (New York, NY)
Submitted on: 05/07/2024
HSS Journal: Editorial or governing board
Journal of Women's Sports Medicine: Editorial or governing board
The American Journal of Sports Medicine: Editorial or governing board

Celia Maxima Niclassen (Germany)
Submitted on: 4/29/2025
This individual reported nothing to disclose

Allina A Nocon (New York, NY)
(This individual reported nothing to disclose); Submitted on: 06/03/2024

O

Susan Marie Odum (Charlotte, NC)
Submitted on: 04/08/2024
AAOS: Board or committee member; Paid consultant
Lumbar Spine Research Society: Board or committee member
PrideOrtho: Board or committee member
Stryker: Paid consultant

Nathan O'Hara
Submitted on: 05/05/2025
Arbutus Medical Inc.: Stock options
Pilot & Feasibility Studies: Editorial or governing board

Brooke Rachel Olin (Philadelphia, PA)
Submitted on: 10/10/2024
This individual reported nothing to disclose

Jessica O'Neil (Philadelphia, PA)
Submitted on: 10/17/2024
This individual reported nothing to disclose

Samuelson Osifo (new haven, ct)
Submitted on: 4/23/2025
This individual reported nothing to disclose

Jesse E Otero (Charlotte, NC)
Submitted on: 4/30/2025
Onkos Surgical, Inc.: Type: Other Professional Activities
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
DePuy Synthes Products, Inc.: Type: Other Professional Activities

P

Benjamin W Padon (New York, NY)
(This individual reported nothing to disclose); Submitted on: 06/04/2024

Brian Joseph Page (New York, NY)
Submitted on: 5/8/2025
Smith and Nephew: Type: Other Professional Activities
Paragon 28, Inc.: Type: Other Professional Activities
Orthopaedic Trauma Association - Online Discussion Forum; member: Type: Board of Directors or committee member Self
Journal of Orthopaedic Trauma - Associate Editor: Type: Editorial or governing board Self

Pearl Ravindra Paranjape**(Claymont, DE)
Submitted on: 05/06/2024
Zimmer: Employee

Michael Parides (New York, NY)
Submitted on: 5/7/2025
This individual reported nothing to disclose

Connor Charles Park (Phoenix, AZ)
(This individual reported nothing to disclose); submitted on: 05/30/2024

Kwan Park (HOUSTON, TX)
Submitted on: 05/06/2024
American Association of Hip and Knee Surgeons: Board or committee member
Journal of Bone and Joint Surgery - British: Editorial or governing board
Zimmer: Paid consultant

Jim Parr** (United Kingdom)
Submitted on: 4/11/2025
zimmer biomet holdings, inc.: type: employment
zimmer biomet holdings, inc.: type: stock option

Hari Kiran Parvataneni (Gainesville, FL)
Submitted on: 4/9/2025
JOA, Arthroplasty Today, OTO: Type: Other Professional Activities
AAHKS: Type: Other Professional Activities
Solenic Medical: Type: IP Royalties
OrthoSummit: Type: Other Professional Activities
AAHKS: Type: Board of Directors or committee member Self
Arthroplasty Today, Journal of Arthroplasty, Operative Techniques in Orthopaedics: Type: Editorial or governing board Self

Javad Parvizi (Philadelphia, PA)
Submitted on: 03/04/2024
Acumed, LLC: Stock or stock Options
Alphaeon: Stock or stock Options
Becton Dickenson: IP royalties; Paid consultant
Cardinal Health: Paid consultant; Research support

Ceribell: Stock or stock Options
Convatec: Paid consultant
Coracoid: Stock or stock Options
Corentec: IP royalties; Paid consultant
Corin U.S.A.: Stock or stock Options
Datatrace: Publishing royalties, financial or material support
Department of Defense: Research support
DePuy: Research support
Efferent: Stock or stock Options
Elsevier: Publishing royalties, financial or material support
Elute: Stock or stock Options
Ethicon: Paid consultant
G-21: Paid consultant
Hip Innovation Technology: Stock or stock Options
Illuminus: Stock or stock Options
Intellijoint: Stock or stock Options
Jaypee Publishers: Publishing royalties, financial or material support
KCI / 3M (Acelity): Paid consultant
MicroGenDx: Research support
Molecular Surface Technologies: Stock or stock Options
Nanooxygenic: Stock or stock Options
National Institutes of Health (NIAMS & NICHD): Research support
NDRI: Research support
OREF: Research support
Osteal: Stock or stock Options
Parvizi Surgical Innovations and Subsidiaries: Stock or stock Options
Peptilogic: Stock or stock Options
Plasmology4: Stock or stock Options
SLACK Incorporated: Publishing royalties, financial or material support
Smith & Nephew: Research support
Sonata: Stock or stock Options
Sonogen: Stock or stock Options
Stryker: Research support
Tangen: Stock or stock Options
TissueGene: Research support
Wolters Kluwer Health - Lippincott Williams & Wilkins: Publishing royalties, financial or material support
Zimmer Biomet: Paid consultant; Research support

Niosha Parvizi (Gladwyne, PA)
Submitted on: 5/2/2025
This individual reported nothing to disclose.

Ignacio Pasqualini (Cleveland, OH)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Patrick J Passarelli (Rochester, NY)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Preetesh Dhiraj Patel (White Hse Sta, NJ)
(This individual reported nothing to disclose); Submitted on: 05/02/2022

Pierre Pechon (NULL)
Submitted on: 6/16/2025
This individual reported nothing to disclose.

Christopher Earl Pelt (Salt Lake City, UT)
Submitted on: 06/03/2024
3M: Paid consultant; Paid presenter or speaker
AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Joint Development, LLC: Stock or stock Options
Peptilogics: Research support
Smith & Nephew: IP royalties; Research support
TJO (Total Joint Orthopedics): IP royalties; Paid consultant; Paid presenter or speaker
Zimmer Biomet: Research support

Amanda Perrotta (Los Angeles, CA)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Francesco Petri (Rochester, MN)
(This individual reported nothing to disclose); Submitted on: 05/04/2024

Conner W Pike** (New York, NY)
Submitted on: 4/30/2025
Atropos Health: Type: Employment

Nicolas Santiago Piuzzi (Cleveland, OH)
Submitted on: 1/28/2025
Osteal Therapeutics: Type: Stock Option
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities
Ethicon Endo-Surgery: Type: Other Professional Activities
Stryker Corporation: Type: Other Professional Activities
Pacira Pharmaceuticals Incorporated: Type: Other Professional Activities
Journal of Knee Suergery, Associate Editor: Type: Editorial or governing board Self

Johannes F Plate (Mars, PA)
Submitted on: 08/26/2024
American Association of Hip and Knee Surgeons: Board or committee member
Eventum Orthopaedics: Stock or stock Options
Journal of Arthroplasty: Editorial or governing board
Osteal Therapeutics, Inc: Research support
Smith & Nephew: Paid consultant

Benjamin Kyle Potter (Penn Valley, PA)
Submitted on: 06/17/2024
Biomet: Unpaid consultant
Clinical Orthopaedics and Related Research: Editorial or governing board

Journal of Orthopaedic Trauma: Editorial or governing board
Signature Orthopaedics: Paid consultant

Yves S Poy Lorenzo (Australia)
Submitted on: 4/30/2025
This individual reported nothing to disclose

Alfredo Puing (New Haven, CT)
Submitted on: 5/2/2025
This individual reported nothing to disclose

R

Sarah Rabin (Rockville, MD)
Submitted on: 5/7/2025
This individual reported nothing to disclose

Kathryn Hope Radulovacki (Durham, NC)
(This individual reported nothing to disclose); submitted on: 04/26/2024

Joshua Rainey (Salt Lake City, UT)
Submitted on: 4/9/2025
This individual reported nothing to disclose.

Esha V Rajadhyaksha (Tucson, AZ)
Submitted on: 5/7/2025
This individual reported nothing to disclose.

Kyle Rako (Houston, TX)
(This individual reported nothing to disclose); Submitted on: 05/04/2024

Julie Elizabeth Reznicek (Midlothian, VA)
Submitted on: 4/29/2025
This individual reported nothing to disclose.

Talha Riaz (Tucson, AZ)
(This individual reported nothing to disclose); Submitted on: 04/26/2024

William M Ricci (New York, NY)
Submitted on: 04/04/2024
Ambulatory Surgery Center Development Network: Other financial or material support
Cable Fix LLC: Other financial or material support
CrookedFoot Medical LLC: Other financial or material support
HS2: Other financial or material support
Joint Effort Administrative Services Organization: Other financial or material support
Journal of Orthopaedic Trauma: Editorial or governing board
McGinley Orthopaedics: Other financial or material support
Orthopaedic Trauma Association: Board or committee member
OsteoCentric: Other financial or material support
OsteoCentric Technologies: Unpaid consultant
Primo MC LLC: Other financial or material support

Rockwood & Green Fracture in Adults/Wolters Kluwer Health - Lippinott Williams & Wilkins: Editorial or governing board
Smith & Nephew: IP royalties; Paid consultant
Wolters Kluwer Health - Lippincott Williams & Wilkins: Publishing royalties, financial or material support

Alaina Schwensen Ritter (Gainesville, FL)
Submitted on: 4/30/2025
This individual reported nothing to disclose

Christina Rivera (Rochester, MN)
Submitted on: 05/06/2024
Gilead Sciences: Paid consultant; Paid presenter or speaker

Julio Rivera (Bethesda, MD)
Submitted on: 4/8/2025
This individual reported nothing to disclose

Elizabeth Robilotti (New York, NY)
(This individual reported nothing to disclose); Submitted on: 05/06/2024

Edward Rodriguez (Dover, MA)
Submitted on: 5/1/2025
Globus Medical, Inc.: Type: Other Professional Activities
BMC MSK disorders: Type: Editorial or governing board Self

Sarah Romereim (Charlotte, NC)
(This individual reported nothing to disclose); Submitted on: 05/30/2024

Scott David Rothenberger (Pittsburgh, PA)
(This individual reported nothing to disclose); Submitted on: 03/25/2024

Taylor M Rowe (Charlotte, NC)
(This individual reported nothing to disclose); Submitted on: 10/23/2023

S Robert Rozbruch (New York, NY)
Submitted on: 04/05/2024
Informa: Publishing royalties, financial or material support
Johnson & Johnson: Paid consultant; Paid presenter or speaker
Nuvasive: IP royalties; Paid consultant; Paid presenter or speaker
Osteosys: Stock or stock Options
Springer: Publishing royalties, financial or material support

Joshua Craig Rozell (Roslyn, NY)
Submitted on: 4/8/2025
Aerobiotix: Type: Other Professional Activities
Foundation for Physician Advancement: Type: IP Royalties
Stryker Corporation: Type: Other Professional Activities
American Association of Hip and Knee Surgeons: Type: Other Professional Activities
Journal of Arthroplasty: Type: Other Professional Activities

American Academy of Orthopaedic Surgeons: Type: Other Professional Activities
Editorial board; Journal of Arthroplasty: Type: Editorial or governing board Self

S

Ana V Salas Vargas (Houston, TX)
Submitted on: 4/22/2025
This individual reported nothing to disclose.

Neeku Salehi (Mountain View, CA)
Submitted on: 2/4/2025
This individual reported nothing to disclose

Adrian Santana (Piscataway, NJ)
Submitted on: 5/3/2025
This individual reported nothing to disclose

Anzar Sarfraz (New York, NY)
(This individual reported nothing to disclose); submitted on: 09/30/2024

Meredith Schade (Hershey, PA)
Submitted on: 05/07/2024
MSIS: Board or committee member

Gregory Schimizzi (Houston, TX)
Submitted on: 3/26/2025
This individual reported nothing to disclose

Adam Schlauch (San Francisco, CA)
(This individual reported nothing to disclose); Submitted on: 01/23/2024

Rita Schoop-Schmetgens (Germany)
Submitted on: 5/5/2025
This individual reported nothing to disclose

Ran Schwarzkopf (New York, NY)
Submitted on: 05/08/2024
AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
Arthroplasty Today: Editorial or governing board
Gauss surgical: Stock or stock Options
Intelijoint: Paid consultant; Stock or stock Options
Journal of Arthroplasty: Editorial or governing board
PSI: Stock or stock Options
Smith & Nephew: IP royalties; Paid consultant; Research support
Zimmer: Paid consultant

Peter Keyes Sculco (New York, NY)
Submitted on: 04/28/2024
Enovis: IP royalties; Paid consultant
Intellijoint Surgical: Stock or stock Options
Intelljoint Surgical: Research support

Parvizi Surgical Innovation: Stock or stock Options
Zimmer: Paid consultant; Paid presenter or speaker

Jessica Seidelman (Durham, NC)
Submitted on: 10/10/2024
3M Company: Type: Other Professional Activities
Type: Other Intellectual Property

Poorani Sekar (Iowa City, IA)
Submitted on: 4/16/2025
This individual reported nothing to disclose.

Rachel Seymour (Charlotte, NC)
Submitted on: 06/03/2024
Orthopaedic Trauma Association: Board or committee member

Thorsten M Seyler (Durham, NC)
Submitted on: 05/06/2024
American Association of Hip and Knee Surgeons: Board or committee member
Lippincott Williams & Wilkins: Publishing royalties, financial or material support
MiCare Path: Stock or stock Options
Musculoskeletal Infection Society: Board or committee member
Pattern Health: IP royalties
Peptilogics: Paid consultant
Restor3d: IP royalties; Paid consultant; Stock or stock Options
Smith & Nephew: IP royalties; Paid consultant
Zimmer: Research support

Cade Shadbolt (Australia)
Submitted on: 5/1/2025
St Vincent's Research Foundation: Type: IP Royalties
Eli Lilly and Company: Type: IP Royalties

Michael Francis Shannon (Pittsburgh, PA)
Submitted on: 10/11/2024
This individual reported nothing to disclose.Matthew shirley (rochester, mn)
(This individual reported nothing to disclose); submitted on: 05/21/2024

Neel B Shah (Pittsburgh, PA)
Submitted on: 03/25/2024
Peptilogics: Paid consultant

Jeremy Dewitt Shaw (Pittsburgh, PA)
Submitted on: 3/13/2025
Type: IP Royalties
Purgo Scientific: Type: Stock Option
LSRS, CSRS, AOSpine, MSIS: Type: Board of Directors or committee member Self

Irene Katharina Sigmund (Austria)
(This individual reported nothing to disclose); Submitted on: 05/06/2025

Gerard Slobogean (Dundalk, MD)
Submitted on: 04/02/2024
Journal of Orthopaedic Trauma: Editorial or governing board
Smith & Nephew: Paid consultant
Zimmer: Paid consultant

Eric B Smith (Merion Station, PA)
Submitted on: 10/13/2024
This individual reported nothing to disclose

Matthew Richard Smykowski (Charlotte, NC)
(This individual reported nothing to disclose); Submitted on: 05/30/2024

Subramaniam Somasundaram** (Claymont, DE)
Submitted on: 4/29/2025
Abbott Laboratories: Type: Stock
Zimmer Biomet Holdings, Inc.: Type: Employment
Merck: Type: Stock
Zimmer Biomet Holdings, Inc.: Type: Stock

Jason Souza (Columbus, OH)
Submitted on: 02/14/2024
Balmoral Medical, LLC: Paid consultant
Checkpoint, Inc: Paid consultant
Integrum, Inc: Paid consultant

Mark J Spangehl (Phoenix, AZ)
Submitted on: 10/9/2024
Sonoran Biosciences: Type: Stock Option
Journal of Arthroplasty: Type: Editorial or governing board Self

Othneil N Sparks (Los Angeles, CA)
Submitted on: 5/7/2025
This individual reported nothing to disclose

Anne Spichler Moffarah (Orange, CT)
(This individual reported nothing to disclose); submitted on: 04/06/2024

Bryan Donald Springer (Charlotte, FL)
Submitted on: 2/17/2025
Type: Other Intellectual Property
Type: Other Intellectual Property
The Hip Society, IOEN, AJRR : Type: Board of Directors or committee member Self

Thaddeus Stappenbeck (Cleveland, OH)
(This individual reported nothing to disclose); Submitted on: 04/17/2024

Alexandra Stavrakis (Santa Monica, CA)
Submitted on: 10/14/2024
Smith and Nephew: Type: Other Professional Activities
Zimmer: Type: Other Professional Activities

Edward J Stolarski (Sarasota, FL)
Submitted on: 4/2/2025
Zimmer Biomet Holdings, Inc.: Type: Other Professional Activities

Anne C Sullivan (Heath, OH)
Submitted on: 10/23/2023
AAOS: Board or committee member
Aaos practice prep package: Editorial or governing board
Biocomposites, Ltd.: Research support

Thomas Castlen Sullivan (Missouri City, TX)
Submitted on: 10/9/2024
This individual reported nothing to disclose

Hobie D Summers (Chicago, IL)
Submitted on: 06/02/2024
AONA Trauma Education Committee: Board or committee member

Mihir Surapaneni (Ann Arbor, MI)
(This individual reported nothing to disclose); Submitted on: 06/02/2024

T

Don Bambino Geno Tai (Minneapolis, MN)
Submitted on: 4/15/2025
This individual reported nothing to disclose

Kathleen W Tam (New York, NY)
Submitted on: 10/10/2024
This individual reported nothing to disclose

Aaron J. Tande (Rochester, MN)
Submitted on: 4/30/2025
Musculoskeletal Infection Society: Type: Other Professional Activities
Type: IP Royalties
Musculoskeletal Infection Society: Type: Board of Directors or committee member Self
Journal of Bone and Joint Infection: Type: Editorial or governing board Self

Saad Tarabichi (Phoenix, AZ)
(This individual reported nothing to disclose); submitted on: 05/10/2024

Alexander Tatara (Dallas, TX)
Submitted on: 4/26/2025
Current Institution Type: IP Royalties

Daniel H Taupin, MD (Penn Valley, PA)
No disclosure available.

Van Thai-Paquette** (Claymont, DE)
Submitted on: 4/8/2025
Zimmer Biomet Holdings, Inc.: Type: Stock

Zimmer Biomet Holdings, Inc.: Type: Employment
Current Institution Type: IP Royalties
Current Institution Type: IP Royalties

Elizabeth Thottacherry (Palo Alto, CA)
(This individual reported nothing to disclose); Submitted on: 05/03/2024

Andrew Thomson (New York, NY)
Submitted on: 5/5/2025
This individual reported nothing to disclose

Krista O'Shaughnessey Toler** (Pierceton, IN)
Submitted on: 4/11/2025
Zimmer Biomet Holdings, Inc.: Type: Employment
Current Institution Type: IP Royalties
Zimmer Biomet Holdings, Inc.: Type: Stock

Robert Tower (Dallas, TX)
Submitted on: 4/24/2025
This individual reported nothing to disclose

Delano R Trenchfield (Parkland, FL)
Submitted on: 5/7/2025
This individual reported nothing to disclose

Tolga Turker (Tucson, AZ)
(This individual reported nothing to disclose); Submitted on: 10/31/2023

U

Ashley Jordyn Ungor (Tucson, AZ)
(This individual reported nothing to disclose); submitted on: 05/05/2024

Kenneth Urish (Sewickley, PA)
Submitted on: 10/9/2024
MSIS: Type: Other Professional Activities
Onkos Surgical, Inc.: Type: Other Professional Activities
Peptilogics: Type: Other Professional Activities
Smith and Nephew: Type: Other Professional Activities
Discloser Type: IP Royalties
MSIS, ASTM, PA Orthopaedic Society: Type: Board of Directors or committee member Self

V

Paul Ryan Van Schuyver (Phoenix, AZ)
(This individual reported nothing to disclose); Submitted on: 06/05/2024

Jens Taylor Verhey (Phoenix, AZ)
(This individual reported nothing to disclose); Submitted on: 05/23/2024

Jesus M Villa (Weston, FL)
Submitted on: 4/16/2025
This individual reported nothing to disclose

Anabelle Visperas (Cleveland, OH)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

Lisa Vuong (Gainesville, FL)
Submitted on: 4/16/2025
This individual reported nothing to disclose.

W

Zhaorui Wang (Pleasanton, CA)
Submitted on: 10/10/2024
This individual reported nothing to disclose

Kevin D. Warner ** (Saginaw, MI)
Submitted on: 05/13/2024
Bristol-Myers Squibb: Stock or stock Options
Heron Therapeutics: Employee; Paid presenter or speaker
Johnson & Johnson: Stock or stock Options
Osteal Therapeutics: Paid consultant; Stock or stock Options
Pfizer: Stock or stock Options
Stryker: Stock or stock Options
Zimmer: Stock or stock Options

Shay Ivan Warren (New York, NY)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Joseph C Wenke (Galveston, TX)
Submitted on: 05/09/2024
Journal of Orthopaedic Research: Editorial or governing board
JSOR: Editorial or governing board

Geoffrey H Westrich (New York, NY)
Submitted on: 06/10/2024
Eastern Orthopedic Association: Board or committee member
Ethicon: Paid consultant; Paid presenter or speaker
Exactech, Inc: IP royalties
Knee Society: Board or committee member
Stryker: IP royalties; Paid consultant; Paid presenter or speaker; Research support

Lauren Whearty (New Zealand)
Submitted on: 5/8/2025
This individual reported nothing to disclose

Mya Briona Wilkes (Towson, MD)
Submitted on: 4/29/2025
This individual reported nothing to disclose

Akeem A Williams (Pittsburgh, PA)
Submitted on: 10/9/2024
This individual reported nothing to disclose

Nicholas B Williams (Litchfield Park, AZ)
(This individual reported nothing to disclose); Submitted on: 09/20/2024

Akeem A Williams (Pittsburgh, PA)
Submitted on: 10/9/2024
This individual reported nothing to disclose.

Audrey Christine Wimberly (New York, NY)
(This individual reported nothing to disclose); submitted on: 06/10/2024

Austin Wininger (Houston, TX)
Submitted on: 4/9/2025
This individual reported nothing to disclose

Adam Winter (New Haven, CT)
Submitted on: 4/19/2025
This individual reported nothing to disclose

Allison Jeannine Wintring (Indianapolis, IN)
Submitted on: 5/8/2025
This individual reported nothing to disclose

Victoria Rose Wong (Pittsburgh, PA)
(This individual reported nothing to disclose); Submitted on: 05/31/2024

Cody Wyles (Rochester, MN)
Submitted on: 10/02/2024
AAOS: Board or committee member
American Association of Hip and Knee Surgeons: Board or committee member
DePuy, A Johnson & Johnson Company: Paid consultant
Restor3D: Paid consultant

Y

BuYu Yeh (Frederick, MD)
Submitted on: 4/25/2025
This individual reported nothing to disclose

Jason Young (Boston, MA)
Submitted on: 4/23/2025
This individual reported nothing to disclose

Mark Youssef (New York, NY)
(This individual reported nothing to disclose); Submitted on: 06/05/2024

Z

John Zierenberg (New York, NY)
Submitted on: 10/10/2024
This individual reported nothing to disclose.

* content of the activity is not related to the business lines or products of their employer/company.
** content of the accredited activity is limited to basic science research, such as preclinical research and drug discovery, or the methodologies of research, and they do not make care recommendations.

All relevant financial disclosures have been mitigated