AAHKS 2024 ANNUAL MEETING

FINAL PROGRAM

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Gaylord Texan Resort & Convention Center
November 7–10 // Dallas, Texas

aahks ANNUAL MEETING 25

Join us Early in 2025
October 23–26

Due to logistical conflicts with the hotel, the 2025 AAHKS Annual Meeting will be held earlier than usual. We'll be back to the normal early November dates in 2026. (November 5–8, 2026)

Gaylord Texan Resort & Convention Center

Grapevine, Texas

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Did you know that AAHKS has expanded its **Associate Member** membership category to ensure **all physicians involved in hip and knee surgical care** have access to the best hip and knee arthroplasty education available?

Enjoy AAHKS membership **benefits** like:

- Member rates to attend the AAHKS Spring and Annual Meetings.
- Access to AAHKS' official monthly peer-reviewed journal, the *Journal of Arthroplasty (JOA).*
- Member publishing rates in AAHKS' *Arthroplasty Today* (a Web of Science, open access journal).
- Networking opportunities with the entire team involved in TJA care; and much more!

Who qualifies.....anesthesiologist, internal medicine doctors - any physician who has a clinical role in treating patients undergoing hip and/or knee arthroplasty!

Being a member of AAHKS has many benefits. Join and enjoy them all!

Please visit **www.AAHKS.org/join** or scan the QR code to apply today!

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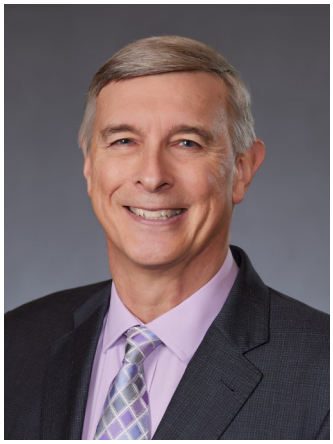

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Education

EDUCATIONAL ACTIVITY SCOPE

The 2024 AAHKS Annual Meeting is designed to provide practicing orthopaedic surgeons with research-based, state-of-the-art information on diagnosis, surgical and non-surgical treatment options and overall management of hip and knee conditions. This educational activity includes the review of the most current scientific research study findings, faculty and participant discussions and interactive symposia. It covers multiple clinical topics such as primary and revision total hip arthroplasty, primary and revision total knee arthroplasty, non-arthroplasty, infection, complications other than infection as well as health policy. It is aimed at improving overall surgeon competence related to the care of patients with arthritis and degenerative diseases.

OBJECTIVES

Upon completion of this educational activity, participants will be able to:

- Synthesize the most current research study findings in hip and knee condition management
- Evaluate various surgical and non-surgical treatment options (e.g., primary total joint arthroplasty, revision total joint arthroplasty, non-arthroplasty) in hip and knee condition management
- Assess the efficacy of new treatment options through evidence-based data
- Interpret relevant health care policy

ACCREDITATION AND CME CREDIT

The American Association of Hip and Knee Surgeons (AAHKS) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

AAHKS designates this live activity for a maximum of 18 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

CLAIM CME CREDITS

Once the meeting concludes, AAHKS will send an email and an app notification with a link to the Annual Meeting evaluation. At the end of the evaluation, you will be redirected to claim CME credit. It is the meeting attendee's responsibility to claim credits based on the hour-for-hour participation in the educational activity.

DISCLAIMER

The material presented at this 2024 Annual Meeting has been made available by AAHKS for educational purposes only. This content is not intended to represent the only method or practice appropriate for the medical situations discussed; it is intended to present a balanced and scientifically sound view, approach, statement or opinion of the faculty, which may be helpful to others who face similar situations, or afford a forum to discuss, debate and explore new and evolving topics. The presentation of topics and any data about clinical practices should not be interpreted as advocating for, or promoting, practices that are not, or not yet adequately based on current science, evidence and clinical reasoning.

CONSENT AGREEMENT

By attending the Annual Meeting, participants acknowledge and agree that AAHKS and/or its agents may record the Program and related events, use audio and video recordings, photographs, and presentation materials such as slides and abstracts for AAHKS's purposes, including but not limited to other educational products, news, advertising and promotional purposes, without compensation.

FDA STATEMENT

Some pharmaceuticals and/or medical devices demonstrated or discussed at the Annual Meeting have not been cleared by the US Food and Drug Administration (FDA) or have been cleared by the FDA for specific purposes only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each pharmaceuticals and/or medical device he or she wishes to use in clinical practice. The AAHKS policy provides that "off label" status of the device or pharmaceutical is also specifically disclosed (i.e. that the FDA has not approved labeling the device for the described purpose). Any device or pharmaceutical is being used "off label" if the described use is not set forth on the product's approved label.

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DISCLOSURE

Each planner, presenter or contributor to the Annual Meeting has been asked to disclose if they have received something of value from a commercial company or institution, which relates directly or indirectly to the subject of their presentation.

AAHKS does not view the existence of these disclosed interests or commitments as necessarily implying bias or decreasing the value of the author's participation in the course. **Note that AAHKS takes measures to mitigate all relevant financial relationships.**

For the most up to date disclosure list, please visit www.AAHKS.org/Meeting.

AAHKS 2024 ANNUAL MEETING

Presenting the 2024 Lawrence D. Dorr, MD Humanitarian Award to Douglas A. Dennis, MD

It is with great pleasure that we present the 2024 Lawrence D. Dorr, MD Humanitarian Award to Douglas A. Dennis, MD. Years ago, Dr. Dorr invited Dr. Dennis to accompany him on a medical mission to Nicaragua and the experience was life changing. With a growing interest in orthopaedic mission work, Dr. Dennis created Operation Walk Denver in 2002. The following year, Operation Walk Denver was on their first mission trip to Nicaragua.

Since that initial trip, Operation Walk Denver has traveled to numerous countries in Central and South America providing more than 1900 free joint replacement surgeries for poverty-stricken patients with little to no access to needed medical care. With each trip, Operation Walk Denver seeks to perform 60-70 joint replacements, requiring substantial funding to cover medical supplies and shipping costs for approximately eight tons of cargo, as well as travel, housing and feeding for a team of 50+ healthcare workers. Initially, much of the economic support needed for mission trips was funded by Dr. Dennis but thanks to expanding fundraising events, Operation Walk Denver is now able to support two trips annually.

Dr. Dennis has also helped fund repairs of vital equipment at mission hospitals, making them more efficient and safer for local surgeons. Early on, Dr. Dennis established a non-profit foundation to serve as the vehicle for Op Walk Denver donations and include generous donations from Dr. Dennis' patients. Due to general funding plus endowment donations, Operation Walk Denver has raised $4M.

This has afforded Dr. Dennis the resources to plan on expanding the scope of his good works. He envisions a future that would include purchasing implants for local surgeons to use throughout the year, bringing patients with extremely complex cases to Denver to be treated in a tertiary medical center and creating an "Operation Walk University." This program would bring healthcare personnel from countries visited by the Denver chapter to train in local hospitals and benefit the level of care provided in their home countries.

The Lawrence D. Dorr, MD Humanitarian Award recognizes AAHKS members who have distinguished themselves by providing humanitarian medical services and programs with a significant focus on musculoskeletal diseases and trauma including the hip and knee in the United States or abroad.

For more information on the Lawrence D. Dorr, MD Humanitarian Award, please go to **www.AAHKS.org/Humanitarian.**

AAHKS 2024 ANNUAL MEETING

Presenting the 2024 Presidential Award to Gregory J. Golladay, MD

AAHKS is proud to present the 2024 Presidential Award to Gregory J. Golladay, MD, in recognition of his exceptional commitment and contributions to AAHKS.

Each year, the AAHKS President bestows the Presidential Award on an AAHKS member for their exceptional service to AAHKS and the profession. The award recognizes long-term contributions in advocacy, research, education and outreach.

This year's Presidential Award recipient, Dr. Golladay, has distinguished himself primarily through his involvement with AAHKS publications. This includes long service on the AAHKS Publications Committee rising to the position of Chair of the Committee. Dr. Golladay's tenure on the Publications Committee coincided with great changes in peer-reviewed medical journal publishing but under his leadership AAHKS publications have adjusted to the evolving dynamics of the publishing industry and he has kept our journals thriving and fulfilling the mission of disseminating important research on hip and knee arthroplasty.

In 2018, Dr. Golladay was appointed Deputy Editor for *Arthroplasty Today* (AT) in preparation for a five-year term as Editor-in-Chief of the journal that is now coming to an end.

During his run as Editor-in-Chief, *Arthroplasty Today* has made tremendous strides – growing exponentially in volume and citations while earning recognition by Pub Med for indexing and Clarivate for an Impact Factor, among other milestones. *Arthroplasty Today* has an expanding and influential social media presence with over 7000 following AT on various social media platforms. Dr. Golladay has recruited an international, diverse, and expert Editorial Board, added additional regular issues as well as the popular printed highlights issue distributed at the AAHKS Annual Meeting and special topical issues.

As Dr. Golladay prepares to transition to Emeritus Editor-in-Chief, he hands off a journal that has matured into a respected and recognized source in the medical literature as well as an organizational asset that enhances the AAHKS mission, reputation and finances.

Dr. Golladay practices at VCU Health in Virginia. He graduated from Louisiana State University School of Medicine, did his residency training at University of Michigan Hospitals and Health Centers and completed Fellowship training in Adult Reconstruction at Massachusetts General Hospital.

In honoring Dr. Golladay with the 2024 Presidential Award, AAHKS acknowledges his longstanding contributions and leadership to the organization. Please join us in congratulating Greg Golladay at the 2024 AAHKS Annual Meeting.

Symposium I

How to Manage Intraoperative Complications during Primary TKA

Moderator: Jeremy M. Gililland, MD

When performing TKA, surgeons must be extremely meticulous and cautious in order to avoid rare potentially catastrophic complications. Nevertheless, despite our best efforts, intraoperative complications can occur and surgeons ought to be comfortable dealing with them in a safe standardized approach in order to prevent additional morbidity. The goal of this symposium is to provide a comprehensive overview of the management of numerous significant TKA complications, ranging from prevention to intraoperative interventions and postoperative considerations. Videos will be used when appropriate to highlight the surgical techniques.

Learning Objectives:

1. Develop an approach to deal with an intraoperative MCL injury.
2. Learn how to manage neurovascular injuries during and following TKA.
3. Learn how to manage intraoperative extensor.
4. Learn how to fix intraoperative fractures.

Outline:

Introduction
Jeremy M. Gililland, MD

Dealing with an Intraoperative Medial Collateral Ligament Injury
Jeremy M. Gililland, MD

Dealing with a Neurovascular Injury
Christopher M. Melnic, MD

Dealing with an Intraoperative Extensor Mechanism Injury
Jenna A. Bernstein, MD

Dealing with an Intraoperative Fracture
Michael Blankstein, MD, MSc, FRCSC

Discussion
All Faculty

Notes

Paper #1

300 Periprosthetic Tibia Fractures Around a TKA: Characteristics and Outcomes From a Single Center

Evan M. Dugdale, MD, Thomas D. Alter, MD, Michael J. Stuart, MD, Stephen A. Sems, MD, Brandon Yuan, MD, Mark J. Spangehl, MD, Bryan D. Springer, MD, Daniel J. Berry, MD, Matthew P. Abdel, MD

Introduction: Periprosthetic tibia fractures around a total knee arthroplasty (TKA) remain challenging to manage with little published information for guidance. The purpose of this study was to review the characteristics, management techniques, and outcomes of periprosthetic tibia fractures in the largest series to date.

Methods: We identified 300 periprosthetic tibia fractures (285 patients) around a TKA (43% primaries, 57% revisions) sustained between 1996 and 2020. Fractures were classified according to Felix et al. as Type I (tibial plateau), II (adjacent to stem), III (distal to stem) or IV (tibial tubercle) with subtypes A (well-fixed component), B (loose component), and C (intraoperative fracture). Mean age at fracture was 67 years and 64% were female. Mean follow-up was 6 years.

Results: There were 53% Type I, 24% Type II, 16% Type III and 8% Type IV fractures. A total of 46% occurred intraoperatively and 54% postoperatively (61% subtype A, 39% subtype B). Intraoperative fracture incidence was 0.10% in primary TKAs and 1.4% in revision TKAs. Among intraoperative fractures, the two-year survivorship free of a subsequent operation involving tibial component revision was highest in Type I (100%), followed by Type II (90%), Type III (86%), and Type IV (67%; $p < 0.001$). The estimated five-year cumulative incidence of postoperative fractures was 0.1% and 0.7% in primary and revision TKA, respectively. The highest two-year survivorship free of tibial component revision from time of postoperative fracture was in Type III fractures (88%), followed by Type IV (79%), Type II (51%) and Type I (10%; $p < 0.001$).

Conclusion: Intraoperative periprosthetic tibia fracture incidence was 14-fold higher in revision TKA compared to primary TKA. Among all intraoperative fractures, tibial plateau fractures were well-tolerated with 100% survivorship free of tibial component revision. Conversely, postoperative tibial plateau fractures had only a 10% survivorship free of tibial component revision at two years.

Notes

Paper #2

Component Deviation From Neutral Alignment in TKA Is Not Associated With an Increase in Revisions

Gavin W. Clark, FRACS, Dermot M. Collopy, FRACS, Dylan Harries, PhD, Darren Chen, FRACS, Samuel J. MacDessi, FRACS, Michael J. McAuliffe, FRACS

Introduction: Total knee arthroplasty (TKA) alignment, with deviation of component position and limb alignment away from mechanical axis alignment, has been tempered by the possibility of early failure. This study sought to determine if component position and limb alignment were associated with increased risk of revision in a large TKA series followed in the Australian Joint Replacement Registry (AOA NJRR).

Methods: Six surgeons prospectively collected final TKA implant position for 5,259 TKAs using computer navigation or robotic assisted systems. Revision data for these TKAs were determined from the AOA NJRR after a mean follow up of 3.2 years (range 0-10.2). The rate of revision between the alignment variables was compared with hazard ratios, calculated using Cox proportional hazard models adjusted for age and gender.

Results: The study cohort, with 56 revisions, had a lower cumulative percentage revision than the same implants within the overall registry cohort (HR 0.58, 95% confidence interval (0.44, 0.75), p=0.001). Varus tibial component alignment was associated with lower overall revision rate (p=0.032). There was 1 revision among 754 tibial components with greater than 5 degrees varus (mean follow up 1.8 years). Varus coronal limb alignment also had a significant association with lower revision rates (p=0.036), but this was no longer the case after adjusting for tibial alignment. Femoral component alignment and tibial slope were not associated with revision rates. An association was found between tibial and limb alignment and revision for infection (p=0.014, p=0.021), with valgus alignment associated with an increased revision rate.

Conclusion: This large cohort study supports continued use of alternative alignment philosophies in TKA with varus tibial components and valgus femoral components not associated with increased rates of early revision. Varus and valgus alignment phenotypes may have related patient factors impacting the associations seen between alignment and revision for infection in this study.

Notes

Paper #3

Effects of Surgeon Volume on Outcomes Following TKA in the Morbidly Obese: An Analysis From the AJRR

Christopher N. Carender, MD, Emily Jimenez, MPH, Ayushmita De, PhD, Daniel J. Berry, MD, Matthew P. Abdel, MD, Nicholas A. Bedard, MD

Introduction: The purpose of this study was to utilize the American Joint Replacement Registry (AJRR) to examine the effects of surgeon total knee arthroplasty (TKA) volume and surgeon obesity-specific TKA volume on rates of revision following primary TKA in patients with morbid obesity.

Methods: We identified 833,099 primary TKAs performed from 2017-2021 by 4,829 surgeons in the AJRR. Annual surgeon TKA volumes and obesity-specific TKA volumes were calculated based on the median annual number of primary TKAs performed per surgeon for all patients and for patients with morbid obesity, respectively. Multivariate logistic regression was used to evaluate the effects of surgeon volume and obesity-specific volume on risk of all-cause revision and revision for periprosthetic joint infection (PJI).

Results: Median surgeon TKA volume was 85 cases/year (range: 1 to 466 cases/year) and median surgeon obesity-specific TKA volume was 11 cases/year (range: 1 to 242 cases/year). Increasing surgeon TKA volume was not associated with a decreased risk of any revision or a decreased risk of revision for PJI ($p>0.05$ for all) for patients with morbid obesity. Similarly, there were no associations between surgeon obesity-specific primary TKA volume and risk of any revision or revision for PJI following TKA in patients with morbid obesity ($p>0.05$ for all).

Conclusion: Morbidly obese patients had a similar risk of any revision and PJI after undergoing primary TKA performed by low-volume or high-volume surgeons. Similarly, surgeon annual obesity-specific primary TKA volume was not associated with these endpoints in this patient population. Based on these data, surgeon volume does not appear to be a modifiable risk factor for optimization of outcomes in morbidly obese patients undergoing primary TKA.

Notes

Paper #4

Glycated Albumin as a Predictor of Outcomes in Primary TJA Patients: A Multicenter Prospective Study

Saad Tarabichi, MD, Elizabeth A. Abe, BS, Juan D. Lizcano, MD, Graham S. Goh, MD, Brooke Olin, BS, Wenbo Mu, PhD, William Hozack, MD, Li Cao, MD, FRCS (ORTHO), Javad Parvizi, MD, FRCS, P. Maxwell Courtney, MD

Introduction: HbA1c has long been the standard test for measuring glycemic control; however, it may not be the ideal metric to predict complications following primary total joint arthroplasty (TJA). While HbA1c measures glycemic control over 2-3 months, other markers such as fructosamine (7-21 days) and glycated albumin (GA) (14-21 days) may be more accurate. The purpose of this multicenter study was to assess the utility of these novel glycemic indices at predicting short-term complications.

Methods: This prospective study enrolled 1,020 patients (633 knees, 387 hips) undergoing primary TJA at two institutions. HbA1c, fructosamine and GA were measured preoperatively using standardized assays. Using the American Diabetes Association guidelines of poor glycemic control (HbA1c >=7%, fructosamine >=262 mol/L, GA of >=15.8%), 90-day complications in patients above the threshold for each marker were identified and compared with those below it. Multivariate regression was utilized to assess the predictive value of each test.

Results: HbA1c and GA were found to have the strongest correlation with one another (r=0.626), followed by fructosamine and GA (r=0.406) and fructosamine and HbA1c (r=0.301). Patients with GA >=15.8% had higher rates of medical complications (10.3% vs. 1.6%, p< 0.001), while there was no difference in patients with elevated fructosamine or HbA1c. Upon regression analysis, GA >=15.8% (OR, 5.8 [95% CI, 2.3 to 15.1]; p< 0.001) was identified as an independent risk factor for 90-day complications, while fructosamine and HbA1c were not. We found no association between any of the indices and the development of periprosthetic joint infection (PJI) (p>0.05).

Conclusion: The results of our prospective study suggest that GA more accurately predicts short-term complications in TJA patients, when compared to fructosamine and HbA1c. Longer follow-up is necessary to identify the optimal GA cutoff for use in this setting and determine whether any correlation exists elevated GA levels and PJI.

Notes

Paper #5

No Increased Risk Following Total Knee Arthroplasty for Patients With Obstructive Sleep Apnea (OSA)?

Friedrich Boettner, MD, Christian Manuel Sterneder, MD, Laura E. Streck, MD, Lyubomir Haralambiev, MD, Carola A. Hanreich, MD

Introduction: In patients undergoing total knee arthroplasty (TKA), obstructive sleep apnea (OSA) is common. Our retrospective study aimed to investigate whether perioperative outcome differ between patients with low-moderate OSA risk and patients with high OSA risk and whether the perioperative outcomes of patients with and without CPAP (continuous positive airway pressure) device differ.

Methods: After excluding patients (missing STOP-Bang-Score, concomitant lung disease), 1,444 TKA operated between 2016 and 2020 were included. The STOP-Bang Score was used to determine the risk for OSA (low-moderate risk: Score 0-4, high risk: Score 5-8). SpO2 drops < 90% and readmission rates were compared for low-moderate risk patients and high risk patients as well as for patients with and without CPAP.

Results: There was no difference in SpO2-drops < 90% (1% vs. 1% P=0.612) and readmission rate (4% vs. 3%, P=0.537) between low-moderate risk (409 TKA) and high risk patients (1035 TKA). A significant reduction in O2 Flow-Rate (P< 0.001) and no difference in SpO2 (P>0.999) was observed from post anesthesia care unit to morning of postoperative day one for both groups. 47% (677/1444) utilized a CPAP machine. There was no difference in the incidence of SpO2 drops < 90% (1% vs. 1%, P=0.605) and readmission rate (3% vs. 5%, P=0.055) between both groups.

Conclusion: In the absence of underlying pulmonary disease perioperative outcomes did not differ between TKA patients with a low-moderate OSA risk and patients with a high OSA risk according to the STOP-Bang Score regardless of the use of a CPAP machine. Outpatient TKA might be an option for optimized OSA patients (without underlying pulmonary disease) regardless of STOP-Bang Score and use of a CPAP machine.

Notes

Paper #6

More Money, More Problems: Prior Authorization is a Barrier to Cost-Effective Care in Primary TKA

Elizabeth A. Abe, BS, Juan D. Lizcano, MD, Saad Tarabichi, MD, Nihir Parikh, BS, Chad A. Krueger, MD, P. Maxwell Courtney, MD

Introduction: While prior authorization (PA) was originally intended to reduce unnecessary health care utilization, there is now evidence to suggest that its use results in increased administrative burden and delayed access to care. To our knowledge, the financial burden and cost-effectiveness of PA in total knee arthroplasty (TKA) is yet to be examined. The purpose of this prospective study was to quantify the costs associated with obtaining PA in primary TKA patients.

Methods: All commercially insured patients undergoing primary TKA from 2020 to 2022 at our institution were included. Data on PA status, time to approval or denial, number of denials and denial reasons was prospectively collected. Additionally, the number of office visits and overall costs of nonoperative treatment received in the year prior to TKA, and from initial PA request to date of surgery, was also recorded.

Results: 4,289 patients were included in the analysis. Of these, 2,906 (67.8%) patients required PA and 1,383 (32.2%) did not. Mean cost in the year prior to TKA was higher in patients that required PA prior to surgery ($716 ± 814 vs. $645 ± 688, p=0.005). We also found that mean cost from request date to date of surgery was significantly greater in the PA cohort ($166 ± 238 vs. $85.7 ± 87.9, p=0.002). Main cost drivers in the PA cohort during the year prior to TKA were office visits followed by x-rays. Upon multivariate regression, any addendum requirement was found to increase costs from request date to date of surgery by $102 (p=0.047).

Conclusion: In the present study, obtaining PA in patients undergoing primary TKA paradoxically increased costs in both (1) the year prior to TKA and (2) from initial request date to date of surgery. Future studies are needed in order to gain a better understanding of the PA approval process.

Notes

Paper #7

Repeat Use of Mesh-Glue Dressing is Associated With Allergic Contact Dermatitis: A Prospective Study

Conor M. Jones, MD, Robert A. Burnett, MD, Myles Atkins, MD, Amr Turkmani, BS, Craig J. Della Valle, MD, Brett R. Levine, MD, MS, Richard A. Berger, MD, Vasili Karas, MD

Introduction: Certain dressing types have been associated with allergic contact dermatitis (ACD), presenting as a peri-incisional eczematous skin reaction. The purpose of this study was to compare rates of ACD following arthroplasty between patients with prior exposure and those naïve to a specific dressing type (2-octyl cyanoacrylate liquid adhesive and a self-adhesive polyester mesh).

Methods: 222 patients undergoing 245 procedures (162 TKA, 69 THA, 13 UKA) between August 2023 and May 2024 at a single institution were prospectively evaluated. Patients were categorized as "Exposed" or "Naive" based on prior exposure to the studied dressing. Patients were excluded if they had a previous skin reaction to the surgical mesh dressing. Skin checks were performed at postoperative day 7 and 14. The primary outcome of the study was ACD requiring treatment. Baseline demographics, comorbidities and 90-day complications were compared. Multivariate logistic regression analysis was utilized to determine the independent risk of dressing exposure on ACD.

Results: 86 Patients were "Exposed" and 159 were "Naïve". There were no differences in age, gender, smoking status, body mass index (BMI), or Charlson Comobidity Index (CCI) between the two cohorts ($p>0.05$). ACD was more common in "Exposed" patients (7/86; 8.1%) compared to "Naïve" patients (3/159; 1.9%; $p=0.030$). After controlling for sex, age at surgery, BMI, smoking status, procedure type, history of skin conditions and CCI, patients with prior dressing exposure were more likely to experience ACD (Odds Ratio: 5.37, 95% Confidence Interval: 1.30-22.23, $p=0.020$). At 90-day follow-up, there was no difference in emergency department visits, readmissions, or reoperation rates between the two groups.

Conclusion: Previous exposure to the mesh dressing increases risk of ACD by fivefold as compared to naïve patients. Although symptoms uniformly resolved with treatment, clinicians should weigh the benefits of repeat use of this dressing given the risk of ACD.

Notes

Paper #8

Patellar Resurfacing and Survivorship After Primary Total Knee Arthroplasty

Kent R. Kern, MD, Tyler Madden, MD, Brian R. Hallstrom, MD, Richard E. Hughes, PhD, David C. Markel, MD, Karl C. Roberts, MD

Introduction: Patellar resurfacing remains a controversial topic globally. Practices vary widely with resurfacing rates of 3.4% (Sweden), 11.8% (Germany), 38.4% (UK), 75.4% (Australia) and 89.7% (U.S.). This study analyzes survivorship of total knee arthroplasty (TKA) based on patellar resurfacing from the Michigan Arthroplasty Registry Collaborative Quality Initiative (MARCQI).

Methods: This was a retrospective cohort study that included 162,292 primary TKAs enrolled in MARCQI from 2012 to 2019. In MARCQI, 92.6% (150,347) of primary TKAs resurfaced the patella and 7.4% (11,945) were left unresurfaced. Data was analyzed to determine the incidence and survivorship of TKA performed with and without patellar resurfacing. Hazard ratios and cumulative percent revision (CPR) out to five years were calculated to compare revision rates. CPR was calculated using propensity score matching accounting for sex and age.

Results: The overall CPR at five years for resurfaced TKAs was 3.05% (95% CI: 2.67, 3.48) and those without resurfacing was 4.41% (95% CI: 3.93, 4.94) with a hazard ratio of 1.63 (1.11, 2.39) ($p<0.01$). Knees with an unresurfaced patella were associated with a statistically higher CPR at 2, 3, 4 and 5 years postoperatively with no overlap in confidence intervals. Among all revised cases, 14.2% were due to pain in the unresurfaced group and 8.41% in the resurfaced with an odds ratio for revision due to pain of 1.80 (1.28, 2.52) ($p<0.001$).

Conclusion: In MARCQI, resurfacing the patella reduces revision rates. Unresurfaced patellas had nearly twice the risk of revision for pain compared to the resurfaced group. Our statewide registry data supports that surgeons should strongly consider resurfacing the patella to avoid increased rates of revision and potentially increased morbidity and cost to the patient and health care system.

Notes

Paper #9

Does Patella Osteoarthritis Affect Outcomes of Selectively Unresurfaced Patellae in Primary TKA?

Zachary J. Gunderson, MD, Ruba Sokrab, MD, Taylor G. Landis, MD, Leonard T. Buller, MD, Evan R. Deckard, BS, R. Michael Meneghini, MD

Introduction: Not resurfacing the patella during primary total knee arthroplasty (TKA) has steadily increased over the last decade as implants and techniques have improved. However, limited data exist on the degree of patella arthritis acceptable to leave the patella unresurfaced and the subsequent effect on patient-reported outcome measures (PROMs). This study evaluated PROMs in case-control matched cohorts of primary TKAs with unresurfaced and resurfaced-patellae.

Methods: 1,935 consecutive primary TKAs were retrospectively reviewed. 871 of patellae were selectively unresurfaced, of which 667 (76%) had an aggressive lateral facetectomy. The remaining 1,064 TKA patellae were resurfaced. TKAs without patella resurfacing were case-control matched to resurfaced-patella based on age, BMI, sex, ASA, Kellgren-Lawrence osteoarthritis grade, OARSI osteophyte grade and patellofemoral joint space narrowing grade measured radiographically (all ≤1 and ≥2 matched exactly). Whether a lateral facetectomy was performed on an unresurfaced patella was documented. PROMs were evaluated at a mean of 2.7 years (range, 1-10) with a significance level of 0.05.

Results: 140 TKAs with unresurfaced patellae were matched to 140 TKAs with resurfaced patellae. Unresurfaced and resurfaced-patella groups did not differ by demographics ($P \geq 0.334$) or osteoarthritis severity grades ($P \geq 0.999$). At latest follow-up, the matched groups did not differ in any PROM ($P \geq 0.225$) nor improvement from preoperative baseline ($P \geq 0.193$). A higher proportion of unresurfaced-patellae with lateral facetectomy achieved MCIDs for KOOS JR (94, 89, 86%) and decreased stair climbing pain (88, 85, 81%) compared to resurfaced patellae and unresurfaced without lateral facetectomy, with numbers available.

Conclusion: Study results show that patients with unresurfaced and resurfaced patellae have similar PROMs after primary TKA regardless of patellofemoral osteoarthritis severity. An aggressive lateral patellar facetectomy should be performed when selectively leaving a patella unresurfaced to achieve PROM MCIDs more frequently. Long term studies on resurfaced and unresurfaced patellae in contemporary TKA remain warranted.

Notes

Paper #10

Successful vs. Unsuccessful Manipulation Under Anesthesia After Primary Total Knee Arthroplasty

Justin M. Walsh, MD, Thomas C. Sullivan, BS, Blesson Varghese, BS, Stephen J. Incavo, MD, Timothy S. Brown, MD, Kwan J. Park, MD

Introduction: Stiffness after total knee arthroplasty (TKA) affects approximately 1.3-5.8% of patients undergoing TKA. We evaluated the outcomes of manipulation under anesthesia (MUA) with or without arthroscopic lysis of adhesions (LOA) following primary TKA and investigated the effect of patient demographic and perioperative variables on its outcomes.

Methods: A single-institution retrospective cohort study on patients undergoing MUA or LOA after primary TKA between August 2016 and March 2024. Over 17,000 primary TKAs by 34 surgeons across eight clinical sites at our institution were available for review yielding 654 patients (678 knees, 726 MUA/LOAs), including 54 repeat interventions. Inclusion criteria was any patients undergoing MUA or LOA after primary TKA. Exclusion criteria included revision TKA, previous incision and drainage, and neuromuscular disorders. Patient history and demographics, perioperative variables and postoperative outcomes were collected. Chi-squared and unpaired t-tests were used for categorical and continuous variables, respectively.

Results: 293 patients underwent repeat MUA/LOA or revision TKA for arthrofibrosis or failed to gain ≥50% of flexion achieved intraoperatively and were thus deemed unsuccessful. Compared with successful MUA/LOAs, unsuccessful cases were more likely to have a cruciate retaining implant (49% vs. 35%, $P<0.001$), be slightly less healthy (Elixhauser Comorbidity Index 3.0 vs. 2.5, $P=0.009$), and be a current smoker (5.1% vs. 8.5%, $P=0.067$). Unsuccessful interventions were more likely to have demonstrated loss of or no change in knee flexion at the first postoperative visit and failed to recover thereafter. Successful cases achieved 29.3° of knee flexion at final follow-up, compared with 7.1° in unsuccessful cases ($P<0.001$).

Conclusion: We present the results of the largest single-institution study to date on the outcomes of MUA and LOA after primary TKA. While successful interventions achieve roughly 30° of knee flexion, unsuccessful MUA/LOAs typically manifest by the first postoperative visit and fail to recover.

Notes

Symposium II

A Comprehensive Approach to Stiffness in Total Knee Arthroplasty

Moderator: Matthew P. Abdel, MD

Knee stiffness, which is often described as the inadequate range of motion of the joint, limits the patient's ability to perform everyday activities. The reported incidence of knee stiffness varies from 1.3%-6.9% (Hug et al. JOA 2018). However, the development of a stiff TKA is multifactorial, and there are several areas of inconclusiveness around the disease state. To date, there has been a lack of consensus on identification (who is the "stiff patient"), best preoperative risk mediators (can we optimize prior to surgery), and best treatment options if the event occurs. The symposium is to provide a high-level comprehensive approach for the management of stiffness in total knee arthroplasty. The objective is to provide an overview of the presentation of stiffness throughout the patient episode of care with corresponding option for treatment or mitigation of post operative stiffness. The course will combine both biological and clinical evidence to aid in clinical practice and stimulate future research.

Learning Objectives:

1. Understand how to identify the at-risk patient and optimize them in the preoperative period.
2. Understand how to decrease risk and mitigate stiffness in the early post-operative period.
3. Understand options for treatment if optimization in the perioperative period is not successful. What treatment options are at your disposal?

Outline:

Introduction of Symposium and Faculty
Matthew P. Abdel, MD

Genetics of Arthrofibrosis
Linda Suleiman, MD

Early Identification of Risk Factors Associated with Stiffness and Potential Perioperative Optimization
Peter K. Sculco, MD

Early post-operative management. What can we do in the first 90-days?
Brian P. Chalmers, MD

Options for Post-Op Management of Stiffness Options for When Stiffness Occurs
Matthew P. Abdel, MD

Questions & Answers vs. Case-Based Panel Discussion
All Faculty

Notes

Paper #11

GLP-1 Receptor Agonist Utilization at the Time of THA for Patients With Morbid Obesity

Billy I. Kim, MD, Tyler K. Khilnani, MD, Scott M. LaValva, MD, Linda A. Russell, MD, Susan M. Goodman, MD, Gwo-Chin Lee, MD

Introduction: Morbid obesity negatively affects outcomes after total hip arthroplasty (THA). The optimal strategy for weight loss prior to THA has not been identified. Recently, glucagon-like peptide-1 receptor agonists (GLP-1 RA) have been used to promote pharmacologic weight loss in the medical management of obesity. The goal of this study was to evaluate the effect of perioperative use in GLP-1 RA in patients with morbid obesity undergoing primary THA on postoperative outcomes.

Methods: Using an administrative claims database, patients with morbid obesity (BMI>40.0kg/m2) undergoing primary THA were identified. Patients with morbid obesity and GLP-1 RA use for three months before and after surgery (treatment) were matched to patients with morbid obesity without GLP-1 RA use (controls) and to a comparison group of patients with severe obesity (BMI=35.0-39.9kg/m2) in a 1:4:4 ratio based on patient age, gender, diagnosis of type II diabetes mellitus (TIIDM), and Charlson Comorbidity Index (CCI). Univariable tests were performed to compare overall group differences in 90-day and two-year postoperative outcomes, followed by post hoc pairwise testing and p-value adjustment for multiple comparisons.

Results: Patients with morbid obesity on GLP-1 RA had a significantly lower rate of 90-day periprosthetic joint infection (PJI) (1.6% vs. 3.2%; P=0.034), readmission (6.9% vs. 9.7%; P=0.043), any medical complication (10.5% vs. 14.1%; P=0.028) and postoperative hematoma formation (0.0% vs. 1.3%; P=0.001) compared to controls. Patients with morbid obesity on GLP-1 RA demonstrated lower rates of hematoma formation (0.0% vs. 1.0%; P=0.003) compared to patients with severe obesity (BMI=35.0-39.9kg/m2). There were no differences in other medical or two-year surgical complications.

Conclusion: Perioperative GLP-1 RA use in patients with morbid obesity reduced the risk of acute PJI and 90-day hospital readmission. The risk is reduced to a level comparable to obese patients with BMI< 40.0kg/m2. These medications may be a viable weight optimization strategy.

Notes

Paper #12

Optimal Timing for Cessation of GLP-1 Agonist Before Elective Total Hip and Knee Arthroplasty

Shivan Chokshi, BA, Marcus C. Ford, MD, John R. Crockarell, MD, James L. Guyton, MD, William M. Mihalko, MD, PhD, Christopher T. Holland, MD, MS

Introduction: Glucagon-like peptide-1 receptor agonists (GLP-1A) have advanced the treatment of type 2 diabetes and obesity. Given the prevalence of these conditions among candidates for total joint arthroplasty (TJA), managing GLP-1A in the perioperative period is crucial to minimize complications.

Methods: The TriNetX Research Network was queried for patients who underwent total hip or knee arthroplasty from January 2018 to January 2023. A control group of 206,005 patients with no prior Ozempic use was identified. Ozempic users were categorized based on when they stopped the medication before surgery: 30 days(482 patients), 14 days (591), 7 days (680), 5 days (758), 3 days (777), 1 day (706), and continued use through surgery (170). Propensity-matched cohorts were analyzed to determine the relationship between the time of last Ozempic dose and anesthesia complications using multivariate logistic regression.

Results: Stopping Ozempic 5 days before surgery was an independent risk factor for delayed emergence from anesthesia (OR 1.59, P=0.005); stopping 3 days (OR 1.84, P< 0.001) and 1 day prior (OR 2.23, P< 0.001) also increased this risk. For aspiration, stopping 7 days prior was a risk factor (OR 1.24, P=0.002), with higher risks for stopping 5 days (OR 2.53, P< 0.001), 3 days (OR 3.09, P< 0.001), and 1 day (OR 4.96, P< 0.001) prior. Stopping 7 days before surgery also increased the risk for aspiration pneumonitis (OR 1.29, P< 0.001), with higher risks for stopping 5 days (OR 2.74, P< 0.001) and 1 day prior (OR 2.74, P< 0.001). The highest risk for all complications was observed in patients who continued Ozempic use through surgery. Diabetes itself was not an independent risk factor for any of the complications.

Conclusion: To minimize risks of delayed emergence from anesthesia, aspiration, aspiration pneumonitis, and conversion to intubation, ceasing GLP-1A 14 days before surgery is optimal. Careful planning and coordination in managing GLP-1A in the preoperative period are essential to optimize surgical outcomes.

Notes

Paper #13

GLP-1 Receptor Agonist Mediated Weight Loss Improves Outcomes After Total Knee Arthroplasty

Whitney Kagabo, MD, Anirudh Buddhiraju, MD, Harpal S. Khanuja, MD, Julius K. Oni, MD, Lucas E. Nikkel, MD, Vishal Hegde, MD

Introduction: Glucagon-like peptide-1 receptor agonists (GLP-1RA) are becoming increasingly popular as a form of weight loss management in morbidly obese patients. There remains a paucity of literature on the effect of GLP-1RA mediated weight loss on outcomes after total knee arthroplasty (TKA). This study aimed to evaluate the risk profile of TKA patients who underwent significant preoperative weight reduction using GLP-1RAs.

Methods: The TrinetX research network was queried to identify patients who underwent primary TKA between March 2021 - May 2024 across 88 health care organizations. Patients who achieved a preoperative BMI reduction from ≥43 to ≤40 within 1 year while being prescribed a GLP-1RA were identified. Patients were then 1:1 propensity matched with two control groups to account for baseline differences in demographics, laboratory investigations, and comorbidities. Control group A were with patients with a preoperative BMI≥43 who did not lose weight and control group B were with patients with a preoperative BMI≤40 who were not being prescribed a GLP-1RA. Risk ratios were evaluated for postoperative outcomes.

Results: A total of 268 patients were identified. After 1:1 propensity matching, 266 patients were matched to control group A and 268 patients were matched to control group B. Compared to control group A, GLP-1RA patients had a decreased risk of deep infection (0% vs. 3.9%, p=0.001) and pulmonary embolism (0% vs. 4% p=0.001). Compared to control group B, GLP-1RA patients had a decreased risk of aspiration (0% vs. 3.7% p=0.001). There was no difference between groups for any other complications, readmissions or emergency department visits.

Conclusion: Patients prescribed a GLP-1RA who underwent significant weight loss prior to TKA had a decreased risk of complications compared to patients who did not lose weight. GLP-1RAs can be an important tool to help patients achieve weight optimization prior to TKA.

Notes

Paper #14

GLP-1 Receptor Agonists Decrease Postoperative Complications Following Total Knee Arthroplasty

Roman Austin, BS, Jens T. Verhey, MD, Saad Tarabichi, MD, Mark J. Spangehl, MD, Henry D. Clarke, MD, Joshua S. Bingham, MD

Introduction: Obesity is associated with increased risk following total knee arthroplasty (TKA). Glucagon-like peptide-1 receptor agonists (GLP1-RA) have emerged as a promising therapy for obesity. The purpose of this study was to determine whether obese patients taking a GLP1-RA had different outcomes to patients not on the medication following TKA.

Methods: All obese patients with OA undergoing primary TKA from 2010 to 2022 were identified using an insurance claims database (n=749,864). Patients taking a GLP1-RA (n=34,048) were matched on a 1:1 basis to patients not taking the medication (n=34,048) using age, gender, body mass index (BMI), Elixhauser Comorbidity Index (ECI) and tobacco use. All patients had a minimum of two-year follow-up. The outcomes were 90-day medical complications, 90-day readmission rates, and two-year surgical complications.

Results: There were no differences in age, sex, BMI, tobacco use and ECI between the two groups ($p>0.05$). Patients on GLP1-RA had lower odds of developing ischemic stroke (0.27% vs. 0.62%; OR 0.58; $P<0.05$), deep vein thrombosis (0.65% vs. 1.58%; OR 0.47; $P<0.05$), pulmonary embolism (0.29% vs. 0.75%; OR 0.44; $P<0.05$), myocardial infarction (0.14% vs. 0.38%; OR 0.49; $P<0.05$), pneumonia (0.74 vs. 1.66%; OR 0.48; $P<0.05$), acute kidney injury (1.08% vs. 1.84%; OR 0.74; $P<0.05$), and sepsis (0.29% vs. 0.56; OR 0.67; $P<0.05$). The odds of revision surgery was lower for patients on a GLP1-RA (3.11% vs. 3.72%; OR 0.88; $P<0.05$). Patients taking a GLP1-RA also had lower odds of prosthetic joint infection (0.33% vs. 0.98%, OR=0.39, $p<0.05$), periprosthetic fracture (0.05% vs. 0.09%, OR=0.44, $p<0.05$), and aseptic loosening (0.20% vs. 0.48%, OR=0.40, $p<0.05$).

Conclusion: Obese patients on GLP1-RA had lower odds of 90-day medical complications, 90-day readmissions, and two-year reoperations following TKA compared to matched patients not taking the medication.

Notes

Symposium III

Patient Preoperative Optimization: How to Do It and How to be Paid for the Work

Moderator: Kevin B. Fricka, MD

Total joint arthroplasty is a safe and reproducible procedure that significantly improves the lives of many patients affected by the debilitating effects of arthritis. Optimizing the patient population to navigate this surgical procedure with minimal complications and maximum outcomes is a key goal for the arthroplasty surgeon. With expectations for increasing patient volume and declining reimbursements, the need for efficient and evidence-based pre-operative patient care is crucial. AAHKS has been successful in working with CMS and the AMA RUC/CPT to ensure that these Principal Care Management (PCM) codes are approved for use with TJA surgery. This symposium will provide arthroplasty surgeons with a roadmap for delivering this care to patients and coding for this work.

Learning Objectives:

1. Learn pre-operative medical optimization for hip/knee arthroplasty patients to improve outcomes and minimize complications.
2. Learn which patients are candidates for outpatient joint replacement once optimized.
3. Learn proper coding and billing for the work of pre-operative optimization.

Outline:

Introduction
Kevin B. Fricka, MD

Medical Optimization for Surgery: Who, How and Building the Team
Antonia F. Chen, MD, MBA

Nutrition and Obesity: Update on Current Guidelines
Bryan D. Springer, MD

Who Goes Where? Inpatient vs. Outpatient Surgery
Scott M. Sporer, MD, MS

Can I Bill for All this Pre-Op Work?
Michael P. Ast, MD

Discussion
All Faculty

Notes

Paper #15

Comparison of Survivorship of Distal Femoral Replacements by Fixation Method

Alexandra L. Hohmann, BA, Nihir Parikh, BS, Alexandra S. Gabrielli, MD, Jessica Leipman, BS, Chad A. Krueger, MD, Yale A. Fillingham, MD

Introduction: Distal femoral replacements (DFRs) are utilized in primary or revision total knee arthroplasty (TKA) to correct for the lack of supportive bone, but they are known to have high failure rates. This study aimed to examine DFR survival and causes of failure by fixation method.

Methods: This study was a retrospective, single-institution cohort study of patients who underwent DFR for revision TKA or primary fracture. Patient demographic and surgical data were collected via chart review, and fixation method was determined using operative notes and radiographs. Patients were divided into cohorts by DFR fixation method: cemented, cementless and cemented with a femoral cone. Outcomes of interest included revision rates, revision causes and DFR survival by fixation method.

Results: We identified 243 DFRs for study inclusion: 187 cemented, 30 cementless and 26 cemented with femoral cone. No significant differences were seen amongst groups for indication of primary DFR (P = 0.54). At the time of the last follow-up, 55 (29.4%) cemented, 4 (13.3%) cementless, and six (23.1%) cemented with femoral cone DFRs had required revision (P = 0.164). Causes of revision, including aseptic loosening, periprosthetic joint infection, periprosthetic fracture and soft tissue failure, were not significantly different amongst groups (P = 0.968). Femoral loosening was the primary cause of revision in eight (14.5%) of cemented, one (25.0%) uncemented and one (16.7%) cemented with femoral cone revised DFRs (P = 0.623). Five-year survival rates for cemented, uncemented and cemented with femoral cone were 72%, 87%, and 77%, respectively.

Conclusion: In our retrospective cohort, method of DFR fixation did not significantly affect rates or causes of revision. This study represents a larger sample of DFRs than comparable analyses, which does not support the additional cost of fixation with a cone.

Notes

Paper #16

Prior Canal Instrumentation is a Major Risk Factor for Fixation Failure After DFR

Andrew J. Hughes, FRCS, Colin C. Neitzke, BS, Jeffrey A. O'Donnell, MD, Yu-Fen Chiu, MS, Sonia K. Chandi, MD, Elizabeth B. Gausden, MD, MPH, Gwo-Chin Lee, MD, Peter K. Sculco, MD, Brian P. Chalmers, MD

Introduction: Distal femoral replacement (DFR) is a salvage option for massive femoral bone loss secondary to osteolysis, infection and periprosthetic fracture, and is often performed in a multiply revised total knee arthroplasty (rTKA). This study aimed to report on a large cohort of DFRs performed at a single institution and report survivorship and risk factors for aseptic loosening, specifically the impact of a previously instrumented femoral canal on DFR fixation.

Methods: 105 patients undergoing rTKA to DFR between 2016 and 2021 with a minimum of two-year follow-up were identified. There were 68 (65%) women and the mean age was 73 years. Sixteen (15%) patients received a femoral sleeve or cone. Kaplan-Meier estimates were used to assess survivorship free from all-cause reoperation, all-cause revision and revision secondary to PJI or aseptic loosening. Simple logistic regression was conducted to assess for potential risk factors for progressive radiographic loosening.

Results: Overall, two-year survivorship free from revision for aseptic loosening was 93%. Two-year survivorship free from all-cause revision and reoperation were significantly lower in the presence of a previously instrumented femoral canal: 81% vs. 100% for revision (P=0.014) and 59% vs. 87% for reoperation (P=0.008). Femoral sleeve/cone use did not improve two-year all-cause revision (88% vs. 87%, P=0.871) or reoperation (68% vs. 81%, P=0.397) survivorship. Regression analysis found re-rTKA (OR=18.3, P=0.006), prior femoral canal instrumentation (OR=14.6, P=0.01) and prior femoral canal cementation (OR=8.2, P=0.007) to be risk factors for aseptic loosening.

Conclusion: DFR for rTKA had a high two-year survivorship free from revision for aseptic loosening (93%). Regression analysis revealed multiple risk factors for aseptic femoral component loosening with a previously instrumented femoral canal being a major risk factor for fixation failure. Future research on fixation strategies in violated, sclerotic canals is needed to reduce the risk of aseptic loosening in this high-risk cohort.

Notes

Paper #17

Outcomes Following Distal Femur Replacement: A Multi-Institutional Retrospective Review

David C. Landy, MD, PhD, Wyatt G. Southall, BS, Stephen T. Duncan, MD, Christopher Lee, MD, Michael S. Sridhar, MD, Michael T. Archdeacon, MD, Joshua M. Lawrenz, MD, Jeffrey A. Foster, MD, Arun Aneja, MD, PhD

Introduction: Distal femoral replacement (DFR) is increasingly used to treat distal femur fractures (DFF), especially for patients with limited bone stock, poor bone quality and advanced age. While DFR does not rely on bony healing and allows early weight bearing, complications can be devastating, especially periprosthetic joint infection (PJI). Meta-analytic studies have found lower than expected complication rates but appear limited by publication bias. This multi-institutional retrospective cohort study sought to estimate representative outcomes of DFR for DFF.

Methods: A retrospective review was performed at 13 academic trauma centers to capture all patients undergoing DFR for DFF from 2010 through 2022. DFR for infectious, oncologic and other indications were excluded. The primary outcome was PJI. Secondary outcomes included reoperation, mortality and function. Outcomes are estimated using proportions with 95% confidence intervals (C.I.) and stratified by patient characteristics with Fisher's exact testing.

Results: In total, 174 patients were included with 131 (75%) having a periprosthetic DFF. Patients were older (median age 77 years, interquartile range 70-84), women (84%) and sicker (64% ASA class III and 24% ASA class IV). Median follow-up was six months (interquartile range, 2-14). The rate of PJI was 5.7% (95% C.I., 3.1-10.4) and this was non-statistically significantly lower for native compared to periprosthetic DFF (2.3 vs. 6.9%, P=.45). The reoperation rate was 16.5% (95% C.I., 11.6-22.9%) and the mortality rate was 28.1% with median time to death being three months (interquartile range, 1 to 11). Most patients returned to their baseline ambulation level, 54.9% (95% C.I., 47.1-62.4%).

Conclusion: DFR for DFF is associated with a relatively low PJI rate though, as expected, mortality in this population is high as were reoperations. The benefits and risks of DFR should continue to be considered when evaluating treatment options, though we hope these estimates will help counseling patients and families.

Notes

Paper #18

575 Rotating-Hinge TKAs: Surprisingly Low Rates of Aseptic Loosening

E. Bailey Terhune, MD, Mason F. Carstens, MS, Kristin M. Fruth, BS, Charles P. Hannon, MD, MBA, Kevin I. Perry, MD, Daniel J. Berry, MD, Matthew P. Abdel, MD

Introduction: Rotating-hinge total knee arthroplasties (RH-TKAs) have reasonable short-term survivorship in smaller series, but concerns remain regarding risks of septic and aseptic failures. The purpose of this study was to assess outcomes of contemporary RH-TKAs in one of the largest series to date.

Methods: We identified 575 RH-TKAs performed from 2002-2021 at a single institution. Mean age was 67 years, 58% were female and mean body mass index (BMI) was 30 kg/m2. 65% had type 2B or 3 bone loss. Kaplan-Meier survivorship analyses were performed. Mean follow-up was six years (range 2-19).

Results: Survivorship free from any revision was 76% at five years and 64% at 10 years. The most common revision indications were PJI (54%) and aseptic loosening (20%). Survivorship free from revision for aseptic loosening was 96% at five years and 90% at 10 years. Survivorship free from revision for PJI was 84% at five years and 81% at 10 years. In RH-TKAs performed for reimplantation, survivorship free of revision for PJI was 74% at five years and 72% at 10 years. In RH-TKAs performed for aspetic loosening, survivorship free from revision for aseptic loosening was 87% at five and 10 years. RH-TKAs performed for reimplantation were associated with increased risk for revision for recurrent PJI (HR 3, $p<0.001$) and any revision (HR 2, $p<0.001$). Of 438 unrevised knees, 6% of femoral components and 8% of tibial components showed radiographic evidence of loosening at final follow-up. Mean KSS improved from 33 to 69 at two years ($p<0.001$).

Conclusion: This large series of RH-TKAs demonstrated 90% survivorship free from revision for aseptic loosening at 10 years. This represents the best survivorship published to date. Knees with prior PJI have markedly decreased survivorship, with double the risk of revision.

Notes

Paper #19

Mid-Term Clinical Outcomes in Revision Total Knee Arthroplasty for Flexion Instability

Luke R. Lovro, MD, Cooper R. Parish, BS, Leonard T. Buller, MD, Evan R. Deckard, BS, R. Michael Meneghini, MD

Introduction: Flexion instability is challenging to diagnose and treat yet remains a leading cause of revision total knee arthroplasty (TKA). Previous studies report modest improvements in early patient-reported outcome measures (PROMs) following revision for flexion instability compared to other etiologies; however longer-term follow-up is lacking. This study evaluated outcomes after revision TKA for flexion instability at mid-term follow-up in a large patient cohort.

Methods: 987 consecutive revision TKAs performed by five surgeons from 2011 to 2021 were retrospectively reviewed. 224 (22.7%) were revised for flexion instability, of which 73% (N=163) were without concomitant diagnoses. Consistent clinical and radiographic diagnostic criteria for flexion instability were used as described by Abdel et. al. at Mayo Clinic. PROMs at latest follow-up and improvement from pre-revision baseline were evaluated. Covariates, minimal clinically important difference (MCIDs), substantial clinical benefit (SCB), and patient acceptable symptom state (PASS) thresholds were documented. Statistical significance for analyses was $P<0.05$.

Results: The sample was 66% female, with mean age and body mass index (BMI) of 65 years and 33 kg/m2, respectively. 80% of patients achieved minimum one-year follow-up with a mean of 3.2 years (range, 1-12). Aseptic revision-free survivorship was 90.6% (95%CI, 83-98) out to 11.7 years, respectively. Only 1.2% of cases required a re-revision for flexion instability. Postoperative improvement in all PROMs exceeded established MCIDs ($P\leq0.001$). MCID, SCB and PASS thresholds for KOOS JR were achieved in 69%, 54% and 50% of cases, respectively. Furthermore, 51% of patients reported being 'satisfied or very satisfied' and 58% of patients reported their knee 'sometimes' or 'always' felt normal at latest follow-up.

Conclusion: Although frequently a challenging diagnosis, patients and surgeons can expect clinically meaningful improvement in PROMs and low re-revision rates when undergoing revision for flexion instability when employing consistent and established diagnostic criteria and surgical correction techniques.

Notes

Paper #20

Does UKA Failure Mode Impact Conversion TKA Outcomes?

Alexander V. Strait, MS, Tobenna Nwankwo, MS, Henry Ho, MS, Kevin B. Fricka, MD, William G. Hamilton, MD, Robert A. Sershon, MD

Introduction: Unicondylar knee arthroplasty (UKA) conversion to total knee arthroplasty (TKA) is associated with greater resource utilization and morbidity than primary TKA; however, it is unclear how the indication for conversion TKA impacts outcomes. The purpose of this study was to evaluate if UKA failure mode affects subsequent TKA survivorship at a high-volume institution.

Methods: Prospectively collected data were queried for all conversion, primary and first-time revision TKAs performed by 9 surgeons between 2000 and 2023. This resulted in 439 UKA conversions to TKA and comparator groups of 15,021 primary and 1,432 revision TKAs. Conversions were grouped by UKA failure mode. The primary outcome measure was conversion TKA survivorship using revision for any reason as an endpoint. Secondary outcomes included survivorship between all TKA procedures. Mean follow-up length for conversion TKAs was 5.6+/-5.1 (range, 0-22.4) years.

Results: There were no statistically significant differences in survivorship between conversion TKAs based on their UKA failure mode (P=0.12). The most common reasons for conversion of UKA to TKA were progression of osteoarthritis (n=121), polyethylene wear with osteolysis (n=91), and tibial (n=85) and femoral (n=37) component loosening. There were 14 conversion TKAs that required subsequent revision due to infection (n=4), tibial (n=3) and femoral (n=3) component loosening, polyethylene wear with osteolysis (n=2), instability (n=1), and patellar clunk (n=1). Overall survivorship of conversion TKA was similar to primary TKA (P=0.76), with 10-year rates of 95.0% (95% CI, 92.1-97.9%) and 95.8% (95% CI, 95.3-96.3%), respectively. Both procedures demonstrated greater survivorship than revision TKAs (P<0.01), which had a 10-year rate of 81.0% (95% CI, 78.0-84.0%).

Conclusion: Our institutional experience demonstrated that UKA conversion to TKA can be successfully performed regardless of UKA failure mode, including for aseptic and septic reasons. Long-term survivorship of conversion TKA closely mirrored primary TKAs and was significantly better than first-time revision TKA.

Notes

Paper #21

Intraosseous Vancomycin Reduces the Rate of PJI Following Aseptic Revision Total Knee Arthroplasty

Colin A. McNamara, MD, Austin E. Wininger, MD, Thomas C. Sullivan, BS, Timothy S. Brown, MD, Terry A. Clyburn, MD, Stephen J. Incavo, MD, Kwan “Kevin” J. Park, MD

Introduction: Periprosthetic joint infection (PJI) is a devastating complication following total knee arthroplasty (TKA). Prior literature supports the intraosseous (IO) delivery of vancomycin as a safe and effective technique for primary TKA. The purpose of this study was to evaluate its efficacy for aseptic revision TKA.

Methods: A single-institution retrospective review was performed on patients who underwent aseptic revision TKA from May 2016 to October 2023. Vancomycin was administered through an intravenous (IV) route in 386 cases and via an IO infusion in 333 cases. The IV cohort received a 15mg/kg dose of vancomycin prior to skin incision. The IO cohort received a 500mg dose of vancomycin infused into the tibia after tourniquet inflation. All patients also received a weight-based dose of IV cefazolin perioperatively. Patient characteristics, surgical details and infection-related data were extracted during chart review. PJI diagnosis was based on the 2018 Musculoskeletal Infection Society criteria. Fisher's exact tests and chi-square analyses were used to compare categorical outcomes.

Results: The incidence of PJI was significantly lower in the IO cohort compared to the IV cohort at 30-day (0.3% vs. 2.1%, P=0.03), 90-day (0.9% vs. 3.1%, P=0.04), and 1oneyear follow-up (1.6% vs. 4.9%, P=0.04). There were no reported adverse reactions to vancomycin. There were no differences in the incidence of acute kidney injury (2.7% vs. 2.9%, P=0.90), deep venous thrombosis (1.2% vs. 1.8%, P]=0.56) or pulmonary embolism (0% vs. 0.3%, P=1.0) between groups.

Conclusion: IO vancomycin infusion is a safe and effective alternative to IV administration for patients undergoing aseptic revision TKA. Furthermore, IO vancomycin optimized the efficiency of vancomycin administration in this high-risk surgical cohort and resulted in a significant reduction in the rate of PJI through 1-year follow-up.

Notes

Symposium IV

Practice Norms in Primary Hip and Knee Arthroplasty: What is Everyone Else Doing?

Moderator: Daniel J. Berry, MD

The moderator will conduct a poll of the membership using an audience response system with real-time display of results and commentary and will ask the audience a series of questions about their current practices in perioperative and intraoperative management of primary THA and TKA. The audience will respond using the audience response system and results will be displayed immediately. The moderator will weave in comparison of the current year's responses to data gathered in previous years to demonstrate areas of practice evolution. The symposium will place emphasis on areas of rapid practice change.

Learning Objectives:

1. Identify what AAHKS peers are currently doing for perioperative management of primary THA and TKA and how this has changed in the key areas in the past two years.
2. Identify what AAHKS peers are currently doing with respect to intraoperative decisions, choices and practices in primary THA and TKA and how this has changed in the past two years.

Outline:

Introduction
Daniel J. Berry, MD

Practice Poll
Daniel J. Berry, MD

Conclusion & Discussion
Daniel J. Berry, MD

Notes

Paper #22

Autoclave Efficacy on Contaminated Orthopaedic Cement

Andrew Thomson, BS, Mohammed Hammad, MD, Christina A. Chao, MS, Alberto V. Carli, MD, FRCSC, Mathias P.G. Bostrom, MD

Introduction: Retained polymethylmethacrylate (PMMA) debris in surgical instrument trays is a rare but disquieting situation for the arthroplasty surgeon. Although retained debris could be considered to be sterile after autoclaving, there is no peer-reviewed literature to support this assumption. This uncertainty from this potential bioburden often leads to operating room personnel turning over entire surgical tables and opening new surgical instruments, which consumes time and burdens a hospital's sterilization infrastructure. The purpose of this study was to determine if retained, heavily contaminated PMMA in surgical trays could be effectively sterilized through different clinically utilized autoclave protocols.

Methods: MSSA biofilm was grown on identically sized PMMA coupons for 72 hours. Following incubation, coupons were rinsed with PBS to remove planktonic bacteria, then exposed to three commonly used autoclave protocols. Cobalt-Chrome (CC) coupons were included in the same tray, replicating instruments in proximity to retained PMMA. Autoclave protocols included: 1.) Single Instrument Flash protocol: Pre-vac, 270° F, 10 min exposure, 1 min drying, 2.) One Tray protocol: Pre-vac, 270° F, 4 min exposure, 1 min drying, and 3.) Standard protocol: Pre-vac, 270° F, 10 min exposure, 60 min drying. A separate control group did not undergo any autoclaving. Coupons were then sonicated for 30 minutes in tryptic soy broth and plated to later count CFUs.

Results: CFU counts revealed that each sterilization protocol was effective in completely eradicating culturable S. aureus (72 hr biofilm) from PMMA coupons. Control coupons showed significant contamination with CFU counts in the range of 106 CFU/mL. Cross-contamination between the PMMA and CC coupons did not occur.

Conclusion: Our findings demonstrate that heavily contaminated PMMA and exposed metal in surgical trays can be effectively sterilized through several autoclaving protocols. Clinicians should feel confident in the efficacy of autoclave protocols in removing bacteria and its associated biofilm from orthopaedic materials.

Notes

Paper #23

Extended Oral Antibiotics Is Protective Against Repeated Periprosthetic Joint Infections

Richard Chao, BS, Scott D. Rothenberger, PhD, Andrew Frear, BS, Brian R. Hamlin, MD, Brian A. Klatt, MD, Kenneth L. Urish, MD, PhD, Neel B. Shah, MD

Introduction: Periprosthetic joint infections (PJI) are common and serious complications following knee and hip arthroplasty. Our previous retrospective study suggested extended antibiotics following DAIR decreased failure rates and were not associated with increased adverse events. Further, extended antibiotics beyond one year did not provide additional benefits. These observations were tested in a prospective cohort study.

Methods: A multicenter prospective cohort of patients who underwent DAIR for total knee arthroplasty PJI and received primary antibiotics were compared to patients that received primary antibiotics combined with extended antibiotics for one year. Participants had a minimum of two-year follow-up. The primary outcome of interest was the failure rate derived from the survival time between the DAIR procedure and future treatment failure. Secondary endpoints included adverse events associated with antibiotics.

Results: A prospective cohort of 79 patients were followed where 39 participants (52.7%) received primary antibiotics and 35 participants (47.3%) received both primary and extended antibiotics following DAIR. Multivariable time-to-event analyses revealed that extended antibiotic use as an independent predictor of treatment success. Infection-free survival differed significantly between the two treatment regimens, as the hazard of PJI failure was significantly lower for extended antibiotics as compared to primary antibiotics alone (adjusted HR=0.46 [0.24, 0.87], p= 0.017). Adverse event rates did not significantly differ between patients treated with primary antibiotics only vs. primary combined with extended antibiotics.

Conclusion: This prospective cohort study supports previous observations that extended antibiotics for one year was associated with lower failure rates as compared to primary antibiotics alone. Extended antibiotics after primary antibiotics was not found to be associated with increased adverse events as compared to only primary antibiotics.

Notes

Paper #24

DAIR for Acute PJI: Results of 133 Primary Hip Arthroplasties at Extended Follow-up of Seven Years

E. Bailey Terhune, MD, Khaled A. Elmenawi, BS, Jessica Grimm, MS, Charles P. Hannon, MD, MBA, Nicholas A. Bedard, MD, Daniel J. Berry, MD, Matthew P. Abdel, MD

Introduction: There is renewed interest in single or double debridement, antibiotics and implant retention (DAIR) for acute periprosthetic joint infections (PJIs). The purpose of this study was to assess the results of single DAIRs for acute PJI after primary hip arthroplasty.

Methods: We identified 133 hips (114 total hip arthroplasties, 19 hemiarthroplasties) with acute PJI treated with DAIR followed by chronic antibiotic suppression between 2000-2021 at a single institution. Acute postoperative PJI was defined as infection within four weeks of primary hip arthroplasty, and acute hematogenous PJI was defined as infection occurring more than four weeks after primary hip arthroplasty with symptoms for less than 21 days. The mean age was 67 years, 42% were female and mean BMI was 34 kg/m2. PJI diagnosis was based on the 2011 MSIS criteria. Kaplan-Meier survivorship analyses were performed. Mean follow-up was seven years.

Results: Survivorship free of reinfection was 80% at one year, 79% at two years and 77% at five years. There was no difference in survivorship free of reinfection between early postoperative and acute hematogenous PJIs (p=0.1). McPherson Host Grade C was predictive reinfection (HR 5, p=0.03). Reinfection was caused by the original organism in 38% of hips. Median time to reinfection was 13 days. Survivorship free of any revision was 85% at onw year, 83% at two years and 82% at 5 years. Indications for revision included recurrent PJI (92%), dislocation (4%) and aseptic mechanical failures (4%). Mean HHS improved from 63 to 83 at five years (p=0.8).

Conclusion: In this large series of acute PJIs after primary hip arthroplasties treated with a single DAIR, infection-free survival was 77% at five years. Poor host status predicted reinfection. With a rigorous definition of acute PJI, success was markedly improved at extended follow-up compared to most historical series.

Notes

Paper #25

One-Stage vs. Two-Stage Treatment for Prosthetic Joint Infection: A Prospective, Randomized Trial

Thomas K. Fehring, MD, Jesse E. Otero, MD, PhD, Keith A. Fehring, MD, Brian M. Curtin, MD, MS, Taylor M. Rowe, BA, Susan M. Odum, PhD, Bryan D. Springer, MD, Kayla Hietpas, MPH

Introduction: A two-stage approach is commonly used to treat prosthetic joint infection. Successful one-stage studies are underpowered, lack a two-stage comparative group and exclude patients with comorbidities or resistant organisms. Given the morbidity and expense of two-stage treatment, we conducted a multicenter, randomized trial comparing the results of one and two-stage treatment for chronic PJI, specifically including patients with comorbidities and resistant organisms.

Methods: Chronically infected primary hip and knee arthroplasties defined by MSIS criteria with a known organism were included. Exclusions were revision patients, fungal infections, immunosuppressed patients or soft tissue involvement precluding wound closure. Patients were classified according to MSIS host staging system. Success was defined as no reoperation for PJI. All patients underwent a double surgical setup, similar irrigation protocols, six weeks of IV antibiotics initially and six months of oral antibiotics post reimplantation. A total of 323 patients (n=166 one-stage; n=157 two-stage) were randomized. Groups were similar with respect to demographics and host classification. To date, 234 of 323 have two-year data. Of the 89 remaining, 21 (6.5%) are deceased, 8 (2.5%) retained spacers, 43 (13.3%) are lost to follow-up and 17 (5.3%) will have two-year follow-up within the next 3 months.

Results: Overall, the two-year success rate of one-stage treatment was 97% (115/118) while the success of two-stage treatment was 91% (106/116) (p=0.058). Compared to the two-stage group, the one-stage group had a 71% reduced relative risk of failure (RR 0.29; 95% CI 0.08, 1.04). After adjusting for MSIS host classification, resistant organism and draining sinuses, the relative risk of failure remained the same between one and two stage treatments.

Conclusion: Results of this RCT indicate that the success of one and two-stage treatment for PJI at two years is similar.

Notes

Paper #26

Only 20% of TKA PJIs Meet Published Eligibility Criteria for One-Stage Exchange

Khaled A. Elmenawi, MD, Benjamin D. Mallinger, BS, Hervé Poilvache, MD, PhD, Matthew P. Abdel, MD, Charles P. Hannon, MD, MBA, Nicholas A. Bedard, MD

Introduction: Although two-stage exchange arthroplasty remains the gold standard for chronic TKA PJI in the US, one-stage exchange is gaining popularity. It is unknown how many patients with TKA PJI are eligible for a one-stage exchange. The purpose of this study was to determine how many patients who previously underwent two-stage exchange would have met eligibility criteria for one-stage exchange and to determine whether eligibility would have impacted outcomes.

Methods: From 2000–2020, there were 509 two-stage revisions performed for TKA PJI at our institution. Mean age was 67 years, mean BMI was 34 kg/m2 and 56% were males. Patients were considered eligible for one-stage exchange if they had unilateral PJI with susceptible bacteria identified preoperatively, were a McPherson A host, had the index two-stage exchange, had absence of severe bone or soft tissue loss and were not septic. Cumulative incidences of any reoperation, any revision and revision for PJI were compared between groups utilizing a competing risk model. Mean follow-up was four years.

Results: Out of 509 two-stage exchanges, only 20% would have met eligibility criteria for a one-stage exchange. The most common reasons for ineligibility were host grade (54%), unknown organism (22%) and prior two-stage exchange (19%). The two-year cumulative incidence of any reoperation was 20% for patients ineligible for one-stage and 15% for eligible patients (p=0.09). The two-year cumulative incidence of any revision was 13% for patients ineligible for one-stage and 7% for eligible patients (HR 2, p=0.03). The two-year cumulative incidence of any revision for PJI was 9% for patients ineligible for one-stage and 6% for eligible patients (p=0.3).

Conclusion: Only 20% of patients who underwent two-stage exchange would have met published criteria for a one-stage exchange. The twofold increased revision rate in patients ineligible for one-stage exchange should be considered when analyzing evolving data.

Notes

Paper #27

Sobering Outcomes of Two-Stage Revision for PJI Among Patients With Revision TKA Components

Jacob R. Ball, MD, Ryan Palmer, BS, Sagar Telang, BS, Arjun Aron, BS, Dara Bruce, BS, Donald B. Longjohn, MD, Daniel A. Oakes, MD, Jay R. Lieberman, MD, Nathanael D. Heckmann, MD

Introduction: Periprosthetic joint infection (PJI) following revision total knee arthroplasty (TKA) is a major complication leading to substantial morbidity. Despite ongoing efforts, PJI continues to be the most common reason for failure following revision TKA. This study aims to assess outcomes following the explantation of revision TKA components for the diagnosis of PJI.

Methods: This study retrospectively assessed a cohort of individuals who were managed by complete implant removal of a revision TKA construct for the diagnosis of PJI at a large tertiary academic center. Patient demographics, implants, intraoperative data and postoperative outcomes were collected from chart review and radiographic analysis. Revision components were defined as long stems, cones or sleeves, hinged components or megaprosthetic components.

Results: In total, 62 knees were evaluated with a mean follow-up time of 3.4±2.8 years. Among these, 45 (73%) had a previous PJI and 28 (45%) had failed prior irrigation and debridement. In total, 44 (71%) knees had long cemented stems, 17 (27%) were hinged implants, 15 (24%) had cones or sleeves and 10 (16%) were megaprosthetic components. The mean operative time was 273.8±91.5 minutes. Following explantation, 15 (24%) patients required ICU admission, 16 (26%) experienced a 90-day readmission, 19 (31%) underwent an unplanned reoperation and two (3%) died within one year. In total, 49 patients underwent replantation (79%). Of these replanted patients, the post-replantation reoperation rate was 33%, with 9 (56%) individuals requiring reoperation for recurrent infection. Ultimately, 39 (62.9%) of patients retained re-revision implants, seven (11%) patients retained a static spacer and five (8%) underwent above-knee amputation.

Conclusion: The surgical management of PJI following revision TKA is a challenging surgical problem for the arthroplasty surgeon and is associated with marked patient morbidity. Surgeons and patients should be mindful of the high likelihood of treatment failure if explantation of implants is considered.

Notes

Paper #28

Repeat Two-Stage Exchange Arthroplasty for Recurrent PJI of the Hip: Sobering Results

Aaron R. Owen, MD, Oliver B. Dilger, BA, Nicholas A. Bedard, MD, Charles P. Hannon, MD, MBA, Tad M. Mabry, MD, Daniel J. Berry, MD, Matthew P. Abdel, MD

Introduction: Two-stage exchange arthroplasty is the North American gold standard for chronic periprosthetic joint infection (PJI) of the hip. However, a subset of patients become reinfected and may require a repeat two-stage exchange arthroplasty. The purpose of the present study was to assess revisions, reoperations and risk factors for failure associated with repeat two-stage exchange arthroplasties for recurrent PJIs after total hip arthroplasty (THA).

Methods: We identified 52 repeat two-stage exchange THAs completed from 2000-2021 at a single, high-volume academic medical center. The mean age was 61 years, 39% were female and the mean BMI was 33 kg/m2. At the time of re-resection, high-dose antibiotic spacers were used in 90% of patients (28 articulating, 19 nonarticulating) and 10% had a resection arthroplasty in the interim. The mean time from resection to reimplantation was 33 weeks. Kaplan-Meier survivorship estimates were calculated, and risk factors (including the McPherson staging system) were assessed. Mean follow-up was six years.

Results: The seven-year survivorships free of re-revision for reinfection, any re-revision and any reoperation were 85%, 57%, and 50%, respectively. The leading indications for re-revision were PJI (35%) and dislocation (35%). McPherson host grade C was a significant risk factor for re-revision for infection (HR 5, p=0.04). Additionally, increased operative time at reimplantation was a risk for any reoperation (HR 1.06, p=0.01) and reoperation for infection (HR 1.07, p< 0.01). At final follow-up, 98% of patients had a revision THA in situ (1 hip disarticulation).

Conclusion: Repeat two-stage exchange arthroplasty of the hip had a seven-year survivorship free of reinfection that was 85%, but only 57% were free of any re-revision (most due to revision for dislocation). McPherson C hosts had a fivefold increased risk of re-infection.

Notes

Symposium V

Managing Chronic PJI: No Longer 'One Size Fits All' Two-Stage Exchange

Moderator: Yale A. Fillingham, MD

The methods for treating a chronic periprosthetic joint infection (PJI) historically have only encompassed a single option of two-stage exchange. However, our methods for treating a chronic PJI have now expanded to include two-stage exchange, single-stage exchange, and the new kid on the block, the 1.5-stage exchange. The nuances of each procedure are different, from the patient selection to patient expectations. We will discuss how arthroplasty surgeons can successfully implement the expanding options for the treatment of chronic PJI.

Learning Objectives:

1. Understand the differences between the three methods of managing PJI.
2. Learn the differences between the indications for the treatment methods.
3. Understand the patient's perspective in setting appropriate expectations for each treatment.

Outline:

Introduction
Yale A. Fillingham, MD

Two-Stage Exchange: It's Called the "Gold Standard" for a Reason
R. Michael Meneghini, MD

Single-Stage Exchange: No, You're Wrong…My Way is Better!
Craig J. Della Valle, MD

1.5-Stage Exchange: You're All Wrong…My Way Can Give You the Best of Both Worlds!
Nathaneal D. Heckmann, MD

Antibiotic Cement: Choosing the Best Combination of Antibiotics and Mixing Technique to Improve Antibiotic Delivery
Charles P. Hannon, MD, MBA

Q&A with Case-Based Discussions of Challenging PJI Patients to Highlight the Need for Different Spacer Constructs and Treatment Methods
All Faculty

Notes

The James A. Rand Young Investigator's Award

What is the Safest and Most Effective Dose of IV Dexamethasone in TKA? A Multicenter Prospective RCT

Charles P. Hannon, MD, MBA, Anne DeBenedetti, MSc, Robert L. Barrack, MD, Young-Min Kwon, MD, PhD, Jess H. Lonner, MD, Rafael J. Sierra, MD, James I. Huddleston III, MD, Charles Nelson, MD, Ran Schwarzkopf MD, MSc, Gwo-Chin Lee, MD, Thomas P. Vail, MD, Erik Hansen, MD, Jeffrey A. Geller, MD, Craig J. Della Valle, MD

Introduction: The purpose of this multicenter, double-blinded prospective randomized controlled trial was to determine the safest and most effective dose of intravenous (IV) dexamethasone administered during primary total knee arthroplasty (TKA).

Methods: Four hundred and four patients undergoing inpatient primary TKA were randomized across 11 centers to receive 4mg (n=138), 8mg (n=137), or 16mg (n=129) of IV dexamethasone intraoperatively. All sites utilized the same perioperative multimodal protocol. Opioid consumption measured in morphine milligram equivalents (MME), pain scores, nausea scores, vomiting episodes and sleep duration were collected for seven days postoperatively. Glucose levels were measured on postoperative day (POD) one. The mean age was 68 years, mean body mass index was 33 kg/m2, and 62% were female. Independent sample t-tests were used for continuous data and Chi-squared and Fisher's exact tests were used for discrete data. An a priori power analysis determined that 114 patients were needed per group to detect a 25% difference in cumulative 48-hour opioid consumption. Demographic characteristics were comparable between groups, suggesting successful randomization.

Results: Patients who received 16mg IV dexamethasone consumed less MME on POD1 (38 vs. 37 vs. 27 MME; p=0.047) and had fewer vomiting episodes (p=0.02). There were no differences in cumulative opioid consumption within the first 48 hours (p=0.24) or pain with activity on POD1 (p=0.49). The 8mg group demonstrated the lowest glucose levels at 48 hours (p< 0.001). There were no differences in nausea or sleep within the first 24 hours, length of stay, cumulative opioid consumption or pain scores with activity over 7 days, or 90-day complication rates between groups.

Conclusion: High dose (16mg) IV dexamethasone in TKA leads to reduced opioid consumption and vomiting in the first 24 hours after surgery. However, outcomes including total opioid consumption, sleep and nausea are comparable beyond 24 hours for all doses.

Notes

AAHKS Surgical Techniques and Technologies Award

Synovial Fluid Metal Ions: Diagnostic Markers for Aseptic Loosening in Cemented TKA

Aleksander P. Mika, MD, Courtney E. Baker, MD, Jacob M. Wilson, MD, Jaquelyn S. Pennings, MD, Stephen M. Engstrom, MD, Gregory G. Polkowski II, MD, MSc, J. Ryan Martin, MD

Introduction: Diagnosing aseptic loosening following primary cemented total knee arthroplasty (TKA) remains a challenging clinical dilemma. Radiographic features may be absent, and no reliable preoperative test exists to confirm the diagnosis. The purpose of this study was to examine if synovial fluid metal ion levels could be used to diagnose aseptic loosening.

Methods: We prospectively enrolled forty-three patients (mean age = 66.6 years, 51% female) undergoing revision of a cemented TKA. Revisions for any indication were included. Synovial fluid was obtained at the time of revision surgery and was analyzed for concentrations, in parts per billion (ppb), of Barium, Zirconium, Titanium, Cobalt and Chromium. The diagnostic utility of each ion for detecting loosening was assessed with area under the curve (AUC) and 95% confidence intervals.

Results: Twenty (47%) patients had intraoperatively confirmed aseptic loosening. Patients with aseptic loosening had elevated levels of zirconium (median levels: 8.6 ppb vs. 0.0 ppb, p=0.004) and cobalt (median levels: 13.9 ppb vs. 1.5 ppb, p< 0.001) compared to patients without loosening. The most accurate synovial metal ion levels for diagnosing aseptic loosening were Cobalt (AUC=0.82 (0.67-0.92), p< 0.001) and Zirconium (AUC=0.75 (0.59-0.87);, p=0.001). In patients with known or suspected Zirconium-based bone cement, the AUC increased to 0.84 (95%CI=0.62-0.96); p< 0.001). Barium, Titanium and Chromium levels were not diagnostic of aseptic loosening.

Conclusion: Synovial fluid Cobalt and Zirconium levels appear to be valuable indicators of aseptic loosening. In the absence of available confirmatory tests, synovial fluid analysis appears to offer a promising diagnostic modality. To further improve the reliability and accuracy of this diagnostic approach, the study will be expanded to include a larger patient cohort. Ultimately, this could lead to better patient outcomes and more effective detection of aseptic loosening following primary cemented TKA.

Notes

AAHKS Clinical Research Award

Intraosseous Regional Diclofenac for Post-Op Pain Management in Total Knee Arthroplasty

Jian-Sen Ng, MBBS, Bert Van der Werf, Lance Nicholson, MBBS, William Farrington, FRCS, Simon W. Young, FRACS

Introduction: Postoperative pain management is important in primary total knee arthroplasty (TKA). Intraosseous regional administration (IORA) of antibiotics for prophylaxis in TKA is known to result in higher local tissue concentrations. We investigated using IORA Diclofenac to improve postoeprative pain management in TKA, compared to intravenous (IV) Diclofenac.

Methods: Forty-six patients (23 per group) undergoing primary TKA were enrolled in a double-blinded randomised controlled trial. The intervention group received 75mg IORA Diclofenac and IV normal saline placebo. The control group received 75mg IV Diclofenac and IO normal saline placebo. Both groups received standard protocol IORA Vancomycin. The primary outcome recorded was pain using a Visual Analogue Scale (VAS-P), measured out to seven days post-operatively. Secondary outcomes included opioid use (morphine milligram equivalent - MME), quality of recovery (QoR-15 survey), impact of pain on walking and sleep (numerical rating scale - NRS), length of admission, patient satisfaction (NRS), the Knee Injury and Osteoarthritis Outcome Score for Joint Replacements (KOOS Jr), and Oxford Knee Score (OKS).

Results: Postoperative VAS-P scores (mm,[95% CI]) were lower in the Intervention group compared to the Control group at one (21.2 [16.3,31.4] vs. 40.2 [30.8,50.8]; p=0.007), twelve (18.2 [12.1,25.6] vs. 36.5 [27.6,46.6]; p=0.002), twenty-four hours (21.3 [14.6,29.2] vs. 39.5 [30.2,50]; p= 0.003), and postoperative day (POD) one (23.5 [17.8,30] vs. 35.4 [28.3,43.3]; p=0.01). The Intervention group also demonstrated reduced postoperative opioid consumption from POD0 to POD3 (p< 0.01), higher QoR-15 survey scores (p=0.04), reduced impact of pain on walking (p=0.001) and sleeping (p=0.003) on POD1, as well as higher KOOS JR scores (p=0.03) and improved patient satisfaction (p=0.04) at two weeks postoperatively.

Conclusion: IORA Diclofenac demonstrates enhanced early postoperative pain relief, leading to reduced opioid consumption, alongside improved recovery post-anaesthesia, less impact on early walking and sleeping ability, better early knee functionality and patient satisfaction.

Notes

Paper #29

Impact of Stem Designs in Periprosthetic Fracture Risk After Arthroplasty for Femoral Neck Fractures

Panayiotis Megaloikonomos, MD, John Antoniou, MD, David Zukor, MD, Olga Huk, FRCS, Laura Epure, PhD, Gianni De Petrillo, BS, Camille Caron, BS, George Laggis, BS, Mohit Bhandari, MD, PhD

Introduction: In this study, we tried to evaluate how stem design influences the risk of fragility femoral neck fractures (FNFs) after hemiarthroplasty (HA) or total hip arthroplasty (THA) for low energy FNFs.

Methods: We performed a secondary analysis to the HEALTH trial, a multicenter, prospective randomized control trial which assessed THA vs. HA for low-energy FNFs. A total of 1374 patients (414 male, 960 female) with a mean age of 80 years were assessed. The incidence of FNFs was compared between cemented vs. cementless stems. Within the cemented group (n=896), we further analyzed the effect of taper-slip (n=482) vs. composite-beam (n=414) designs, while within the cementless group (n=478), we assessed the impact of single-wedged (n=206) vs. metaphyseal filling stems (n=272). The role of collars (n=87) was also examined, within the press-fit stems. Student's t-tests were used to assess continuous variables, and chi-squared tests for categorical variables. Statistical significance was set at $p<0.05$.

Results: Seventy-two patients sustained FNF (5.2 %). Early FNFs (< 90 days) were recorded in 57 and late fractures (>90 days) in 15 patients. Cemented stems had significantly lower incidence of FNFs, compared to their cementless counterparts (2.6% vs. 10.3%, $p< 0.001$). There was no difference in fracture rates between taper-slip and composite-beam stems (2.3% vs. 2.9%, $p>0.05$). Most of the composite-beam FNFs occurred early (83%), while most of taper slip FNFs were late (55%). There was no difference between the examined press-fit stems, while the presence of a collar did not show protective results ($p>0.05$).

Conclusion: In this population, cementless stems have a very high FNF rate, regardless the type of stem or the presence of collar. Cemented fixation is the safest option. Composite beam stems have higher early FNF rate. Taper-slip stems are responsible mostly for late fractures, raising concerns about their performance in longer follow-up.

Notes

Paper #30

Cementless Hemiarthroplasty Complication Risk Does Not Support Contemporary Utilization Patterns

Robert A. Burnett, MD, Anne J. Hakim, MD, Michael J. Archibeck, MD, Christopher E. Pelt, MD, Lucas A. Anderson, MD, Brenna E. Blackburn, PhD, Christopher L. Peters, MD, Jeremy M. Gililland, MD

Introduction: Hemiarthroplasty (HA) is a common treatment for femoral neck fractures in elderly patients. The femoral component may be press fit or cemented into the femoral canal, with consideration given to operative time and patient factors such as bone quality and medical comorbidities. The purpose of this study was to compare cemented and cementless hemiarthroplasty utilization and complications.

Methods: A retrospective analysis was performed on a multicenter hip fracture database. During 2010-2019, cementless HAs (577, 58.6%) were more commonly performed over cemented HAs (407, 41.4%). Demographics and surgical details were compared. The primary outcome of this study was revision due to periprosthetic fracture. Secondary outcomes included surgical complications and mortality. Logistic regression analysis was performed to compare risk of various complications, adjusting for age, sex, BMI and comorbidity status.

Results: There was a trend towards increasing cemented fixation over the study period ($p< 0.001$). Cementless HA patients were younger (77.7 vs. 81.8, $p< 0.001$). Operative times were shorter for cementless HAs (90.5±35.7 vs. 105.0±38.7 min, $p< 0.001$). Cementless HA patients were less likely to return to independent ambulation (8.2% vs. 19.2%,$p< 0.001$), and patients with cementless HA were significantly more likely to undergo revision surgery for periprosthetic fracture (2.6% vs. 0.3%, $p=0.004$; Odds Ratio (OR) 11.06, 95% Confidence Interval (1.43-85.38), $p=0.021$). Dislocation rates were higher with cementless HA (6.1% vs. 2.7%, $p=0.014$; OR 2.29(CI 1.13-4.67), $p=0.022$). Ninety-day mortality was lower with cementless HA (10.8% vs. 19.2%,$p< 0.001$), however mortality rates were comparable at final follow up (OR 1.23(0.94-1.62), $p=0.130$).

Conclusion: The surgical complication risk of cementless hemiarthroplasty for femoral neck fracture is higher than cemented HA with an 11-fold increased risk of periprosthetic fracture compared to cemented HA. Surgeons should consider routine use of cemented fixation for hemiarthroplasties performed for femoral neck fractures to decrease risk of periprosthetic fracture.

Notes

Paper #31

Is Bone Cement Implantation Syndrome Really Caused by Cement? A Review Using Bradford-Hill Criteria

Nadim Barakat, BA, James A. Browne, MD

Introduction: Debate surrounding the use of cemented femoral components in hip arthroplasty persists. One proposed risk of cement fixation is bone cement implantation syndrome (BCIS), a phenomenon characterized by intra-operative hypotension, hypoxia and/or cardiovascular collapse. The purpose of this study was to analyze the literature to determine if enough evidence exists to support a causal relationship between cementation and BCIS.

Methods: A systematic review of articles on BCIS published from 2010 to 2023 was performed. Using the Bradford-Hill criteria, a set of nine epidemiological principles developed to evaluate the relationship between an exposure and outcome, two reviewers independently reviewed the articles and determined the level of support for each criterion and the overall cement-BCIS relationship.

Results: Based on 52 eligible articles, there was little to no support for five criteria: strength of association, specificity, dose-response relationship, coherence, and experiment. There was moderate support for temporality and plausibility and strong support for consistency and analogy. Although intra-operative hypotension, hypoxia, and/or cardiovascular collapse may manifest during cemented surgeries, their occurrence is not exclusive to cement utilization and can be attributed to multiple other potential causes. Furthermore, the diagnosis and timeline of BCIS is highly ambiguous, and the clinical significance of non-fatal BCIS is unclear.

Conclusion: Given the data supporting BCIS as a true phenomenon attributable to cement were weak and largely observational, there was insufficient evidence to determine a causal link between cement and BCIS. Orthopaedic surgeons and anesthesiologists should exercise caution when attributing intra-operative complications solely to cement usage and consider alternative explanations. The term “BCIS’ itself may be a misnomer. Until there is stronger evidence to establish a causal link between cement use and BCIS, avoidance of BCIS does not appear to be a strong argument against cementation.

Notes

Paper #32

Cementless Collared Metadiaphyseal-Filling Stems vs. Cemented Fixation for Total Hip Arthroplasty

Mackenzie Kelly, MD, Ryland Kagan, MD, Vishal Hegde, MD, Adam A. Sassoon, MD, Isabella Zaniletti, PhD, Ayushmita De, PhD, Harpal S. Khanuja, MD

Introduction: Periprosthetic femur fracture (PPFx) is a known complication after total hip arthroplasty (THA). Among cementless femoral designs, collared metadiaphyseal-filling implants have a lower associated risk of PPFx. Yet it remains unclear how this subset of stems compares to cemented fixation, which has traditionally been thought to have the lowest PPFx rate. We examined the risk of PPFx after THA comparing collared metadiaphyseal-filling cementless stems vs. cemented femoral implant designs.

Methods: We analyzed the American Joint Replacement Registry data from January 2012 to March 2022 in patients >65 years, linked to Centers for Medicare and Medicaid data. We identified primary THAs with a diagnosis of osteoarthritis and excluded those with missing or unreliable data. Patients were stratified into two groups: those with collared metadiaphyseal-filling stems (n=52,288) and those with cemented fixation (n=16,609). Cumulative Incident Function curves and cause-specific Cox models evaluated the risk of revision for PPFx, adjusting for sex, age, body mass index (BMI) and Charlson Comorbidity Index (CCI).

Results: Cemented patients were older (mean age 79.3 vs.73.5, p<.001), more likely to be female (79.8% vs. 61.3%, p<.001), to have a severe CCI (34.2% vs. 18.9%, p<.001) and to have a BMI < 35 (90.6% vs. 86.2%, p<0.001). After controlling for age, sex, BMI and CCI, cementless metadiaphyseal-filling collared stems showed a lower risk of revision for fracture (HR=0.38; 95% CI=0.25,0.59 p<.001).

Conclusion: In this cohort of primary hip osteoarthritis patients undergoing THA, cementless metadiaphyseal-filling collared stems showed a lower risk of revision for fracture compared to cemented stems. If cementless femoral fixation is used for THA in patients 65 years or older, surgeons should consider collared metadiaphyseal-filling stem designs for the potential benefits of cementless fixation without the associated risk of PPFx.

Notes

Paper #33

Pre-Operative Surgical Prep Is Not Effective at Eliminating C. Acnes Prior to Total Hip Arthroplasty

Kristen I. Barton, MD, PhD, Roseann M. Johnson, BS, Todd Michael Miner, MD, Charlie C. Yang, MD, Douglas A. Dennis, MD, Jason M. Jennings, MD

Introduction: Cutibacterium Acnes (C. Acnes) is of growing concern in prosthetic joint infections following total hip arthroplasty (THA). The dermal colonization rate of C. Acnes with various pre-operative cleaning protocols in THA has yet to be elucidated. The purpose of the study was to investigate the effect of different pre-operative skin cleansing protocols on colonization rate about the hip in patients undergoing elective THA.

Methods: Patients were recruited and randomized into either 1) standard (STD) surgical prep (4% chlorhexidine gluconate), or 2) STD + benzoyal peroxide (BPO) gel (4 doses of 5% BPO gel). On the morning of biopsy collection, a final application of 5% BPO gel was applied. Intraoperatively, all patients had the skin prepped with standard prep (Duraprep). Six 3-mm punch skin biopsies were performed per patient for both an anterior-based hypothetical incision a more lateral/posterior incision. Samples were cultured for 14 days.

Results: Of the n=2,022 biopsies, 11% had a positive culture. 38% of the patients in the STD group and 41% of the patients in the BPO group had a positive culture (p=0.612). 17% of the patients in the STD group and 20% of the patients in the BPO group had a positive culture for C. Acnes (p=0.512). C. Acnes was more commonly cultured in both the STD and BPO groups, as compared to Staph Aureus and Bacillus Species. There were no differences between positive culture biopsies between anterior or lateral sampling locations (p=0.615 STD group and p=0.711 BPO group).

Conclusion: There was a high rate of patients that demonstrated C. Acnes colonization prior to THA. There was no difference in positive culture rate with anterior or lateral sample locations. Pre-operative surgical prep was not effective at eliminating C. Acnes from the surgical site prior to THA and different skin preparations should be considered.

Notes

Paper #34

Risk Factors for Wound Complications in Direct Anterior Total Hip Arthroplasty: A 10-Year Analysis

Benjamin Schaffler, MD, Muhammad Haider, BS, Amit K. Manjunath, MD, Michelle Richardson, MD, Roy I. Davidovitch, MD, Matthew S. Hepinstall, MD, Joshua C. Rozell, MD

Introduction: The purpose of this study was to identify risk factors associated with wound complications following DAA THA and to evaluate the incidence of these wound issues when negative pressure wound therapy (NPWT) was used as the primary surgical dressing.

Methods: We reviewed 725 patients from five different surgeons at a single institution who underwent THA through a DAA from 2011-2023. Medical records were reviewed for demographics, comorbidities, surgical details and a broad set of criteria denoting wound complications or dehiscence. Univariate and multivariate analyses were performed to identify potential risk factors. Secondary outcomes included PJI, 90-day emergency room visits, readmission and all-cause revision rates.

Results: 83 (11.4%) patients developed a wound complication based on criteria. Univariate analysis showed that increased BMI (mean 30.4 vs. 27.8, P<0.001), surgical time (138.0 vs. 108.5 mins, P<0.001), hospital length of stay (50.4 vs. 40.6 hours, p=.013), DAA surgeon experience of less than one year (p=0.012) and use of NPWT (25.3 vs. 11.6%, P<0.001) were associated with wound complications. Multivariate analysis further demonstrated BMI (OR 1.06 [1.01-1.11] p=0.016), longer surgical time (OR 1.01 [1.00-1.01] p=0.004) and NPWT use (OR 2.1 [1.2-3.9], p=0.016) as risk factors. Patients with wound complications had higher rates of 90-day emergency room visits (10.8 vs. 4.4%, P=0.018), readmissions (15.7 vs. 3.9%, P<0.001), all-cause revision (19.3 vs. 2.8%, P<0.001) and PJIs (13.3 vs. 0.5%, P=0.005).

Conclusion: Obesity, length-of-stay, longer surgical time and surgeon DAA experience less than one year were identified as risk factors for wound complications following DAA THA in our series. Prophylactic use of NPWT did not mitigate the risk of wound complications and was associated with increased risk in our cohort. Patients with wound complications had higher rates of PJI, readmission and reoperation.

Notes

Paper #35

Three-Month Infection After Vancomycin and Iodine Irrigation in High-Risk THA: A Multicenter RCT

Hayley E. Raymond, BA, Farouk Khury, MD, Carlos A. Higuera, MD, Douglas A. Dennis, MD, Richard S. Yoon, MD, Brett R. Levine, MD, MS, Nicolas S. Piuzzi, MD, William J. Long, MD, Antonia F. Chen, MD, MBA, Ran Schwarzkopf, MD, MSc

Introduction: Periprosthetic joint infection (PJI) remains a devastating complication following total hip arthroplasty (THA), placing significant burden upon patients and providers. Specific risk factors predispose certain patients to the development of PJI, and these patients may benefit from additional protocols to mitigate infection risk. This study aimed to investigate the effects of four different combinations of wound irrigation protocols for THA patients at high risk for infection.

Methods: A multicenter, randomized controlled trial was performed, including only high-risk patients as defined by: over 75 years old, body mass index greater than 35 kg/m2, active smoker, American Society of Anesthesiologists score greater than 2, immunosuppression, diabetes mellitus, or colonization with Staphylococcus aureus. A total of 821 patients were randomized into one of four treatment cohorts: povidone iodine and topical vancomycin powder (220 patients), povidone iodine alone (215 patients), topical vancomycin powder alone (199 patients), or saline alone (187 patients). We collected demographic and surgical data, as well as data on three-month wound complications, infections, and surgical outcomes.

Results: There were no differences in rates of persistent wound drainage or dehiscence across the four groups (P=0.98). There were no differences in rates of cellulitis or abscess (P=0.81). There were no differences in three-month infection rates across the four groups (P=0.14), nor were there differences in the type of septic revisions performed (P=0.51). While approaching statistical significance, there were no differences in aseptic revision rates across the four groups (P=0.07). There were no differences in emergency department visits or readmissions across the four groups (P=0.61 and P=0.78, respectively).

Conclusion: There were no statistically significant differences in PJI or other related complications following THA among the study cohorts. Therefore, the use of such prophylactic measures including povidone-iodine and vancomycin powder can be left up to surgeon discretion.

Notes

Paper #36

Rapidly Progressive Osteoarthritis After Hip Corticosteroid Injection: You Must Exclude Infection

Joshua P. Rainey, MD, Logan Radtke, MD, Adam J. Taylor, MD, Amanda Crawford, MD, Brenna E. Blackburn, PhD, Lucas A. Anderson, MD, Christopher L. Peters, MD, Jeremy M. Gililland, MD, Christopher E. Pelt, MD

Introduction: Rapidly progressive osteoarthritis (RPOA) has been associated with hip corticosteroid injections (CSIs), but septic arthritis also demonstrates similar erosive findings. This retrospective review evaluated all patients with RPOA of the hip following CSI who underwent total hip arthroplasty (THA) and assessed best screening practices for infection.

Methods: All radiographic reports concerning for RPOA were retrospectively identified at a single, academic referral center from January 1st, 2014 to January 1st, 2023. A total of 4,279 reports were identified, and after removing duplicates, 2,175 patients were individually chart reviewed. Patients were included if they received a hip CSI followed by chondrolysis of at least 2 millimeters per year or 50% of joint space loss within one year. Patients with prior malignancy, septic arthritis, oral steroid use, or documented prior femoral head avascular necrosis were excluded. Descriptive statistics included means and standard deviations (SD).

Results: Ultimately, 82 patients, with mean follow-up time of 2 years, underwent THA for RPOA following CSI with an average time between CSI to THA of 183.6 days (SD = 140.2 days). Preoperative infectious workup was performed in 31 patients with inflammatory markers and 8 patients with a hip aspiration. The mean aspiration cell counts and polymorphonuclear percentages were 1410.8 (SD = 1574.2) and 52.3% (SD = 23.3), respectively. Cultures were negative in all aspirations. All eight patients had negative aspiration and negative intraoperative cultures, and none developed PJI. Two patients developed PJI within one month following THA. Of interest, neither patient had received preoperative screening laboratories, aspiration or intraoperative cultures. Aside from the two PJIs, no other patients underwent repeat surgery.

Conclusion: RPOA of the hip following CSI was associated with an estimated 2.5% risk of PJI. Preoperative screening with inflammatory markers and possible joint aspiration should be considered prior to THA for patients with CSI-related RPOA.

Notes

Paper #37

Risk Factors for Dislocation After Direct Anterior Total Hip Arthroplasty

Lincoln F. Pratson, MD, Devon Pekas, MD, Mehmet Kilinc, BS, Neel Patel, BS, Joseph T. Moskal, MD, FACS, Murillo Adrados, MD

Introduction: Dislocation is a leading indication for revision total hip arthroplasty THA. Several patient factors, implant choices and radiographic outcomes including abnormal spinopelvic motion, have been linked to instability following posterior approach THA. To date, no study has analyzed these factors in an exclusively Direct Anterior Approach (DAA) cohort. Objective: This study aims to identify demographic, radiographic, and implant-related factors associated with postoperative dislocation in patients undergoing primary THA through the DAA.

Methods: Patients who underwent primary THA via DAA for osteoarthritis from January 2012 to December 2022 complicated by post-operative dislocation (THA+D) were retrospectively reviewed. Demographics, surgical variables, and radiographic parameters were recorded. THA+D patients were matched 2:1 on age, gender, BMI and Charleston Comorbidity Index to a control group who underwent THA via DAA without post-operative dislocation (Controls). Univariate analyses were performed to compare diUerences between groups.

Results: Twenty-seven THA+D patients were identified and matched to fifty-four controls. THA+D patients had a higher prevalence of lumbar fusion (odds ratio [OR] 7.16, 95% confidence interval [CI] 1.72-29.84, p=0.005). There were no significant diUerences in implant (head size, acetabular size, neck length) or radiographic characteristics (leg length or offset change, acetabular inclination) between the groups.

Conclusion: While the DAA may be protective against instability after THA, this study demonstrates that spinal fusion remains a potential risk for dislocation. Furthermore, radiographic and implant-related factors were not found to be associated with post-operative dislocation.

Notes

Paper #38

Dislocated Dual-Mobility Hips: High Risk for Fail Closed Reduction With Increased Risk for Revision

Janyne Mallender, DO, Joseph B Walker, MD, Kendall Schwartz, BS, Paulo Castaneda, MD, Christian Leber, BS

Introduction: Periprosthetic joint infection (PJI) remains a devastating complication following total hip arthroplasty (THA), placing significant burden upon patients and providers. Specific risk factors predispose certain patients to the development of PJI, and these patients may benefit from additional protocols to mitigate infection risk. This study aimed to investigate the effects of four different combinations of wound irrigation protocols for THA patients at high risk for infection.

Methods: A multicenter, randomized controlled trial was performed, including only high-risk patients as defined by: over 75 years old, body mass index greater than 35 kg/m2, active smoker, American Society of Anesthesiologists score greater than 2, immunosuppression, diabetes mellitus, or colonization with Staphylococcus aureus. A total of 821 patients were randomized into one of four treatment cohorts: povidone iodine and topical vancomycin powder (220 patients), povidone iodine alone (215 patients), topical vancomycin powder alone (199 patients), or saline alone (187 patients). We collected demographic and surgical data, as well as data on three-month wound complications, infections, and surgical outcomes.

Results: There were no differences in rates of persistent wound drainage or dehiscence across the four groups (P=0.98). There were no differences in rates of cellulitis or abscess (P=0.81). There were no differences in three-month infection rates across the four groups (P=0.14), nor were there differences in the type of septic revisions performed (P=0.51). While approaching statistical significance, there were no differences in aseptic revision rates across the four groups (P=0.07). There were no differences in emergency department visits or readmissions across the four groups (P=0.61 and P=0.78, respectively).

Conclusion: There were no statistically significant differences in PJI or other related complications following THA among the study cohorts. Therefore, the use of such prophylactic measures including povidone-iodine and vancomycin powder can be left up to surgeon discretion.

Notes

Paper #39

Formal Physical Therapy Clearance is Not Necessary for Safe Home Discharge After Primary TJA

Sumon Nandi, MD, Jaime Harris, ATC, Brooke Merchant, BA

Introduction: Conventionally, physical therapy (PT) clearance is sought prior to total joint arthroplasty (TJA) discharge. However, PT staffing limitations may preclude same-day discharge in patients having late surgery. We developed a novel protocol for discharging TJA patients without PT clearance. Our aims were to determine if our novel protocol: 1) allows safe home discharge and 2) preserves patient satisfaction and patient-reported outcomes.

Methods: Departmental billing database was queried for primary TJA performed by a single surgeon at 3 hospitals from 2020 to 2023 (n = 325). Patients were divided into 2 study cohorts based on conventional (n = 242) or novel (n = 83) discharge protocol. In our novel protocol, PT administers gait and stair training immediately preoperatively. Patients are discharged home after ambulating with recovery room nurses trained by PT. Primary study endpoint was 30-day postoperative falls. Secondary endpoints were 90-day emergency room (ER) visits and readmissions. Patient-Reported Outcomes Measurement Information System (PROMIS) and Surgical Satisfaction Questionnaire (SSQ-8) were recorded 6 weeks postoperatively. Endpoints and outcomes of interest were compared between cohorts. Multivariable logistic regression was utilized to assess association between discharge protocol and endpoints while controlling for factors including age, gender, BMI, surgical site, and hospital.

Results: There was no difference in 30-day postoperative falls between conventional and novel TJA discharge protocols; 90-day ER visits and readmissions did not differ between protocols either ($P > 0.05$). We did not find any differences between discharge protocols across any domains of the PROMIS or SSQ-8 ($P > 0.09$).

Conclusion: Our novel discharge protocol allows primary TJA patients to be safely discharged home day-of-surgery without postoperative PT clearance. Maximizing same-day discharge by removing bottleneck of PT staffing limitations minimizes risks associated with longer length-of-stay. Unnecessary hospital bed occupancy, which increases costs and limits throughput for surgeries requiring admission, is also avoided.

Notes

Symposium VI

The Complex Primary THA: A Roadmap to a Successful Outcome

Moderator: Ran Schwarzkopf, MD, MSc

Hip arthroplasty is a highly successful operation that improves patients' quality of life. The indications for THA have been extended over the years to include patients with complex fractures and severe deformities. There has also been expansion for the indications to include age groups at the two ends of the spectrum, from adolescents to octogenarians. The expansion of the indications created a category called difficult primary THA. The difficulty here is not only in achieving good early results but in maintaining success with what are called lifelong implants. On the acetabular side, acetabular bone defects resulting from fractures, protrusion, dysplasia or arthrodesis represent a challenge. Each of these categories has its difficulties that need attention to the details of reconstruction, restoring bone stock and implant choice. On the femoral side, deformities, fractures, abductor insufficiency and infected hardware/implants are different categories of difficulties that need special attention.

Learning Objectives:

1. Review the options for THA post acetabular fractures in the chronic and acute setting.
2. Address THA in adolescents (indications, techniques and outcome).
3. Look at the best protocols for THA post failed fixation of proximal femoral fractures.
4. Provide the outcome for different bearing surfaces and methods of fixations in different age groups.

Outline:

Introduction
Ran Schwarzkopf, MD, MSc

THA Post-Acetabular Fractures: Patients with Pre-Existing Arthritis, Bone Defects/Reconstruction and Pelvis Discontinuity
Mahmoud Abdel Karim, MD

THA in Adolescents: Indications, Techniques, Bearing Surfaces and Expected Outcomes
Ran Schwarzkopf, MD, MSc

Conversion THA to Salvage Failed Fixation of Proximal Femoral Fractures (Protocols, Abductor Insufficiency, Dual Mobility)
Ayman Ebied, MD

The Dysplastic Hip: How to Restore the Hip Center, Subtrochanteric Osteotomies and Complications
Gregory G. Polkowski II, MD, MSc

Discussion
All Faculty

Notes

Paper #40

Women in Arthroplasty: Trends and Barriers

Nicole Honey, MD, Ramzy I. Meremikwu, MD, Eric Guo, MD, Elizabeth A. Dailey, MD

Introduction: Within the field of orthopaedics, total joint arthroplasty is among the orthopaedic subspecialties with the lowest female representation with female membership reportedly as low as 0.5% in the Knee Society and 0.6% of the hip society. The purpose of this study is to define variables important to orthopaedic surgeons when choosing a subspecialty with the intention of improving access to joint replacement surgery as a career for women.

Methods: A self-administered survey to evaluate multiple factors that may influence subspecialty choice was distributed electronically to ACGME- accredited orthopaedic surgery institutions across the country as well as through social media. The survey was completed by 92 female and 61 male orthopaedic surgeons who have applied to fellowship. Factors inquired included general interest in the subject, mentorship, work-life balance, physical labor, radiation exposure, and bone cement exposure. Respondent attitudes regarding the impact of various factors in choosing a subspecialty were assessed using a 5-point Likert scale from “not influential at all” to “very influential” with an option for “not applicable.” A ranked T-test was used to determine differences between men and women as well as ANOVA test to compare differences across generations.

Results: No statistically significant difference was found between genders when asked about the influence of different factors. There is a statistically significant trend towards increased influence of work-life balance the more recent the respondent applied to fellowship in all genders combined (p value = 0.02). The influence of the amount of physical labor on subspecialty choice is statistically significant for men over time (p value=0.01).

Conclusion: Previous theories of why women choose a subspecialty or avoid arthroplasty may not be accurate. More research is needed to undercover true barriers for women in order to lessen the gender gap within the field.

Notes

Paper #41

Insufficient Mandatory Reporting Rates at an Academic Hospital Despite Increased Resource Allocation

Robert A. Burnett, MD, Brenna E. Blackburn, PhD, Michael J. Archibeck, MD, Lucas A. Anderson, MD, Christopher L. Peters, MD, Jeremy M. Gililland, MD, Christopher E. Pelt, MD

Introduction: Beginning July 1, 2024, the Centers for Medicare and Medicaid Services (CMS) is mandating at least 50% compliance of institutional reporting of patient reported outcomes (PROs) for Medicare fee-for-service patients undergoing inpatient, elective arthroplasty. The purpose of this study was to quantify a single academic institution's PRO capture rates ahead of the deadline and determine risk factors for non-compliance.

Methods: 2,692 patients underwent primary elective hip and knee arthroplasty at a single institution from 2021-2022. Demographic and compliance data (PRO collected in the preoperative window within 90 days of surgery and/or postoperative window at 365 ± 60 days) was recorded. Compliance was compared prior to and after the introduction of a text-based service designed to collect PROs. Multivariable analysis was performed to determine independent risk factors for noncompliance with completing PROs.

Results: Overall, less than half of patients (N=1329, 49.1%) completed preoperative PROs within 90 days of surgery and only 25.8% of patients (N=695) completed postoperative PROs at postoperative days 305-425. Compliance with both pre- and postoperative PROs was 14.1% (N=380). Compliance with both pre- and postoperative reporting increased from 7.9% to 19.6% following the introduction of a text-based platform reminding patients to complete the surveys. Risk factors for non-compliance include non-English primary language (Odds ratio (OR) 4.96, 95% Confidence Interval [1.43-17.21], P=0.012), higher comorbidity burden (OR 1.1 [1.03-1.18], P=0.005) and not receiving a text reminder to complete the survey (OR 2.84 [2.15-3.76], P< 0.001).

Conclusion: The low rate of compliance with the new CMS mandate for PRO collection, even at an academic center with a high desire to collect and study patient outcomes with PROs, suggests the mandate may be overly burdensome. Initiatives designed to increase patient engagement can improve compliance.

Notes

Paper #42

Achieving the CMS-Defined Substantial Clinical Benefit Following TKA and THA in MARCQI

Hamza Raja, BS, Brian R. Hallstrom, MD, Richard E. Hughes, PhD, Huiyong Zheng, PhD, Michael A. Charters, MD

Introduction: The Centers for Medicare and Medicaid Services (CMS) began a mandatory requirement to report patient-reported outcome measures (PROMs) for inpatient hip and knee arthroplasty procedures on 7/1/2024, comprising of a 0-90 day preoperative score and a 300-425 day postoperative score. The requirement urges collection of PROMs for ≥ 50% of all the fee-for-service part A claims, with > 60% of patients achieving substantial clinical benefit defined as a 22-point increase in HOOS-JR score for THA and a 20-point increase in KOOS-JR score for TKA. This study analyzes the success rates of collection of the CMS-required PROMs across Michigan Arthroplasty Registry Collaborative Quality Initiative (MARCQI) participating sites.

Methods: Patients in the MARCQI database who underwent primary TKA or THA between 1/1/2022 and 6/30/2022 were identified, and PROM collection rates and SCB were collected according to pre-defined CMS criteria. The collection rate of 'matched pairs' of patients with CMS-defined preoperative and postoperative PROMs were determined for each of the 81 MARCQI sites.

Results: There were 8,826 THA and 12,210 TKA performed. 22% of the patients identified had matched pairs of preoperative and postoperative PROMs. 91% (74/81) MARCQI sites collected ≥ 50% preoperative PROMs. 7.4% (6/81) MARCQI sites had ≥ 50% matched pairs to meet the CMS requirement and 14.8% (12/81 sites) had ≥ 33% matched pairs. Of the 73 MARCQI sites that had matched pairs of PROMs, 90% of sites would meet the CMS improvement threshold of 60% patients achieving SCB.

Conclusion: In a statewide registry that has emphasized PROM collection since 2018, as of 2022 there are only a minority of sites that are able to collect ≥ 50% matched pairs to meet the CMS requirement. Of the sites that have collected matched pairs, 90% of sites would meet the CMS improvement threshold of 60% patients achieving SCB.

Notes

Paper #43

Patient-Reported Outcomes Collection and Mandatory CMS Inpatient THA PRO-Performance Measures

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Introduction: The Centers for Medicare and Medicaid Services (CMS) is mandating as part of the Inpatient Prospective Payment System that PROM reporting will be mandatory for THA starting on July 1, 2024, and will impact reimbursement in 2027. The financial penalty for not reporting a complete data set for 50% of all eligible patients is 25% of the Annual Payment Update (usually 2-4%) for ALL the hospital's Medicare Fee-for-Service Part A claims, including non-orthopaedic claims. Additionally, the hospital will be disqualified from participation in all Medicare value-based purchasing programs. The hospitals will be scored by CMS on the percentage of patients who achieve a substantial clinical benefit (SCB). The SCB for THA patients will be 22 points on the HOOS Jr. This study presented our process for complying with these mandates.

Methods: We have elected to employ a three-prong approach in a twelve-hospital enterprise. We use PROM collection methods through a web-based PROM collection system through Patient Gateway, an IPAD in-person collection system and a patient engagement platform.

Results: Since 2019, we enrolled 2,774 THA patients in a patient engagement platform, and 2,615 (93%) have opted in and used the platform. Five percent of our patients did not have access to email. Seven of nine providers chose to use the platform with their patients. Percentages of PROMs completion were 91% preop, 75% at three months, 72% at six months, and 77% at pne year. Patient satisfaction scores averaged 4.67 out of 5 at 90 days. HOOS JR. scores improved on average from 51.8 preop to 86.76 at one year.

Conclusion: Using a three-prong approach to comply with the CMS Inpatient TKA PRO-Performance Measures will meet the standards of 50% paired PROMs reporting and the SCB of 22 points on the HOOS JR. Using a patient engagement platform alone.

Notes

Paper #44

Are Commercial Value-Based Care Programs Still Viable for Hip and Knee Arthroplasty?

Elizabeth A. Abe, BS, Nihir Parikh, BS, Daniel A. Nemirov, MD, Michael B. Held, MD, MBA, Matthew B. Sherman, BS, Chad A. Krueger, MD, P. Maxwell Courtney, MD

Introduction: Unlike Medicare bundled payment programs for total hip (THA) and knee arthroplasty (TKA), which have little variance in facility reimbursements, few publications have studied value-based care (VBC) partnerships with commercial insurers. Site of care can be an opportunity for cost reduction with more procedures shifting to lower cost specialty hospitals and ambulatory surgical centers (ASCs). The purpose of this study was to determine whether demand matching appropriate patients to lower cost facilities resulted in reduced costs in our commercial VBC program.

Methods: We reviewed a consecutive series of 4,285 primary THA and TKA patients between January 2020 and April 2023 as part of a VBC program with a single payer, including both commercial and Medicare Advantage (MA) plans. Demographics, facility, and 90-day episode-of-care claims data were collected from our clinical and payer cost databases. Facility utilization, episode-of-care costs, and revenue surplus were stratified by insurance type (commercial vs. MA) and trends compared over the four-year study period.

Results: There were 1,369 patients (32%) with MA and 2,916 (68%) with private insurance. Among commercially insured, the 90-day episode-of-care ($33,455 vs. $27,433, $p< 0.001$) and mean facility costs ($25,068 vs. $18,385, $p< 0.001$) both declined from 2020-2023, while the revenue surplus ($6,216 vs. $13,090, $p< 0.001$) increased. Among MA patients, total episode ($17,809 vs. $17,235, $p< 0.001$), and mean facility costs ($13,491 vs. $13,151, $p< 0.001$) had only a minimal decrease, while VBC revenue surplus also declined ($7,928 vs. $4,073, $p< 0.001$). ASC utilization increased among both groups from 2020-2023 (1% vs. 20% for commercial, 0.3% vs. 12% for MA, $p< 0.001$).

Conclusion: Practices can still have successful VBC partnerships with private insurers by demand matching appropriate commercial patients to lower cost facilities. Our cost-reduction efforts did not have the same success with MA plans. Further studies should evaluate whether continued cuts to MA programs will threaten access.

Notes

Paper #45

Outcomes of a Novel Longitudinal Bundle Between an Academic Medical Center and a Single Payor

Michael P. Bolognesi, MD, William A. Jiranek, MD, Thorsten M. Seyler, MD, PhD, Maggie Horn, PhD, Sean P. Ryan, MD, Samuel S. Wellman, MD

Introduction: We report on a pioneering longitudinal care bundle agreement established between a single payer and a major academic medical center, with a specific focus on conservative and operative interventions for patients suffering from arthritis in the hip, knee and shoulder.

Methods: 783 eligible episodes were tracked within the longitudinal care bundle agreement made between a single commercial payor and our institution. Financial performance was assessed by comparing the total target spend of $4.4 million against actual expenditures. The study period encompassed the duration in which patients received care, with an average member months of 8.2. Projections were made based on current expenditure patterns to estimate the potential favorable variance by year-end. Rate of surgery, physical therapy utilization and diagnosis type was included in the analysis.

Results: The financial performance of the initiative remains notably positive, with only approximately $2.3 million expended to date. Projections indicate a potential favorable variance of $748K by year-end, representing a significant savings created from the bundle. Patients with involvement of multiple joints (by diagnosis type) exhibit higher average spending and constitute the sole cohort with a negative spend variance to target. Notably, 15.1% of patients have undergone surgery, with a subset (30.5%) having received prior physical therapy.

Conclusion: These findings underscore the complex treatment trajectories of arthritis patients within this novel care model. Despite the promising financial outcomes, the observed higher average spending among patients with multiple joint involvement suggests potential areas for optimization. This longitudinal care bundle agreement has provided valuable insights into our institution's utilization patterns of conservative and operative interventions for arthritis management. We hope further participation will help us optimize our care delivery in this new model. There is likely an unrealized opportunity for the orthopaedic surgeon when the amount of musculoskeletal care is considered.

Notes

Paper #46

Low-Level Evidence Used to Substantiate Insurance Coverage Policies for Knee and Hip Arthroplasty

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Introduction: In recent years, access to total knee arthroplasty (TKA) or total hip arthroplasty (THA) has become more regulated by commercial health care insurance policies that require specific criteria be met prior to authorizing surgery as medically necessary. The purpose of this study was to examine references from coverage policies to assess whether they justify the pre-surgery criteria mandated by insurance providers for approval of TJA in patients with symptomatic knee and hip degenerative disease.

Methods: The largest private commercial insurance providers in the United States were identified, of which nine had publicly accessible coverage policies for total knee arthroplasty (TKA) or total hip arthroplasty (THA). Coverage criteria for procedural approval and respective references were retrieved. Three coverage criteria were identified: (1) diagnosis of osteoarthritis, 2) nonsurgical treatment (e.g. preoperative physical therapy, nonsteroidal anti-inflammatories, etc.), and 3) exclusion criteria (e.g. BMI thresholds < 40). Three reviewers graded references by level of evidence (LOE) and type of reference.

Results: In total, out of 824 references, only 450 (54.6%) references were relevant to primary TKA and THA. Of the 824, 259 (31.4%) contained information pertinent to the diagnosis of osteoarthritis, 84 (10.19%) to nonsurgical treatment and 107 (12.99%) applied to exclusion criteria. Of the 84 references relevant to nonsurgical treatment, only 16 (19.05%) had a LOE I-III. Among all references related to nonsurgical treatment, only four specifically tested the efficacy of nonoperative modalities, representing 0.49% of all references. However, only one had results that were applicable to the clinical management of end-stage osteoarthritic patients.

Conclusion: Current criteria found in prior authorization policies for TKA and THA are unsubstantiated. Insurance companies that implement prior authorization criteria should be held to a standard in which recommendations are grounded in evidence-based medicine. This is currently not the case.

Notes

Paper #47

Patient Expectations for PROs After TKA Surpass Actual Outcomes and Correlate With Dissatisfaction

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Introduction: Unmet patient expectations are associated with dissatisfaction after total knee arthroplasty (TKA). No prior studies have quantified patient expectations with the same PRO metric used to assess patient outcome and MCID to allow direct comparison.

Methods: This was a prospective study of patients undergoing TKA with five fellowship-trained arthroplasty surgeons at one academic center. Baseline PRO scores (PROMIS Physical Function (PF), PROMIS Pain Interference (PI), KOOS-12, VR-12 MCS and PCS) were assessed. Expected PRO scores were determined prior to surgery by asking patients to indicate the response they expected to have for each PRO question at 12-months postoperatively. 12-month postoperative PROs and satisfaction were assessed. MCID values were used from the literature. T-tests compared MCIDs, actual and expected outcomes. Point-biserial correlation investigated interactions between these variables and satisfaction.

Results: The cohort included 64 patients (mean age 66.3±9.3, mean BMI 31.1±5.6, 54.7% female). Patients had significantly higher expected PROs than actual 12-month PROs for every PRO except for VR-12 MCS ($p< 0.05$). Expected improvements were significantly higher than actual improvements and MCIDs ($p < 0.0001$). The satisfaction rate was 87.5%. Satisfaction correlated positively with actual improvement in KOOS-12 (coeff=0.46, $p< 0.001$), VR-12 PCS (0.45, $p< 0.001$), and PROMIS PI (0.44, $p< 0.001$). Having higher expected improvement than actual improvement negatively correlated with satisfaction for KOOS-12 (-0.67, $p< 0.001$), VR-12 PCS (-0.46,< 0.001), and PROMIS PF (-0.25, p=0.047). Having actual improvement greater than MCID positively correlated with satisfaction for KOOS-12 (0.29, p=0.02), VR-12 PCS (0.38, $p< 0.01$), and PROMIS PI (0.50, $p< 0.01$). There was no association between satisfaction and differences between expected PRO improvements and MCID.

Conclusion: This study is the first to quantify preoperative patient expectations and outcomes using the same metric to allow for direct comparison to each other and MCID. Mean pre-operative expectations significantly exceed both MCIDs and actual post-operative outcomes and having higher expected improvement than actual improvement correlated with dissatisfaction.

Notes

Paper #48

Preoperative Expectations & Outcomes for Primary Knee Arthroplasty Vary Based on Health Literacy

Mary Ziemba-Davis, BA, Jared A. Zanolla, BS, Kevin A. Sonn, MD, Leonard T. Buller, MD

Introduction: Health literacy (HL) is essential for understanding and managing medical conditions including primary TKA. We evaluated the relationship between HL and preoperative expectations for improvement following TKA, as well as variations in other patient-reported preoperative measures based on HL.

Methods: Elective primary TKAs (n=202) performed between 06/2023 and 04/2024 for osteoarthritis were prospectively enrolled. The sample consisted of 66% women, with average age and body mass index (BMI) of 66 (range 45-88) years and 35.6 (range 20.9-67.9) kg/m2. Validated preoperative measures included a single item assessment of HL, expectations for pain and functional improvement, joint health and mental and physical health care quality of life. Covariates included patient sex, race, age, BMI, and ASA-PS classification. Bivariate and multivariable analyses controlling for covariates were conducted.

Results: 152 patients responded “extremely” or “quite a bit” (high HL) when asked how confident they are filling out medical forms by themselves with 50 responding “somewhat”, “a little bit”, or “not at all” (lower HL). High HL was associated with modestly higher preoperative expectations for TKA ($\bar{x}$ 14.1±1.4 vs. 12.9±2.6 out of 15 points, P=.003) including pain relief (P=.010), improvement in activities of daily living (P=.019), and recreational activities (P=.002). High HL also was associated with better joint health ($\bar{x}$ 44.8±12.4 vs. 39.1±18.1 out of 100 points, P=.042) and higher mental ($\bar{x}$ 49.5±8.3 vs. 46.7±8.4, P=.039) and physical ($\bar{x}$ 40.4±6.8 vs. 37.2±5.3, P=.001) health standardized T-scores. In multivariable analysis, age, BMI, and/or ASA-PS classification also influenced preoperative outcomes, with HL remaining a significant predictor.

Conclusion: It is established that preoperative expectations influence patient-reported postoperative outcomes, which will soon be tied to surgeon payment. Findings suggest that preoperative expectations and other baseline outcomes are influenced by HL, potentially influencing patient-reported postoperative outcomes. Preoperative patient education may benefit from a better understanding of individual differences in HL.

Notes

Symposium VII

Strategies for Achieving Success in the CMS PROMs Program

Moderator: James I. Huddleston III, MD

This symposium will explore both the intended and unintended consequences of the Centers for Medicare and Medicaid Services' (CMS) Inpatient Quality Reporting Performance Measure (IQR PM) mandatory program. Faculty will discuss the value of patient-reported outcome measures (PROMs), early experiences from different practice settings and how the program will affect the value proposition for PROMs collection and usage in the care of patients with hip and knee arthritis.

Learning Objectives:

1. Examine early experiences with CMS' IQR-PM mandatory program across a variety of practice settings.

Outline:

Review of CMS IQR PRO-PM program
James I. Huddleston III, MD

Why PROMs?
Kevin J. Bozic, MD, MBA

Academic Experience
Michael P. Bolognesi, MD

Employed, Rural Community Hospital Experience
Jeffery D. Angel, MD, MFIN

Private Practice Experience
Wendy W. Wong, MD

Unintended Consequences at a Safety-Net Hospital
Meghan A. Whitmarsh-Brown, MD

How Does this Affect the Value Proposition
Richard Iorio, MD

Discussion
All Faculty

Notes

Paper #49

Standard vs. Constrained Liners in Custom Triflange Acetabular Components: A Five-Year Multicenter Study

Aleksander P. Mika, MD, Jacob M. Wilson, MD, J. Craig Morrison, MD, Jaquelyn S. Pennings, MD, Michael J. Christie, MD, David K. DeBoer, MD, Stephen M. Engstrom, MD, Gregory G. Polkowski II, MD, MSc, J. Ryan Martin, MD

Introduction: Custom triflange acetabular components (CTACs) are effective for managing patients with severe acetabular bone loss. However, instability remains a primary cause for reoperation and revision following these complex revisions. Primarily constraining these patients is an attractive option to minimize instability risk, but this approach theoretically increases stress on implant fixation, potentially leading to failure. This study aimed to compare outcomes between patients managed with standard vs. constrained liners at the time of CTAC implantation.

Methods: This retrospective multicenter study identified 81 patients treated with CTACs for severe acetabular bone loss, with a mean follow-up of five years (range 2-15). Patients were divided into two cohorts based on liner constraint: standard (n=37) and constrained (n=44). The primary outcome was aseptic CTAC failure, defined as fixation failure requiring revision surgery of the CTAC. Secondary outcomes included any CTAC revision, revision of arthroplasty components distinct from the CTAC (head, liner, or femoral component), reoperation for all causes and dislocation.

Results: Kaplan-Meier survival estimates showed no significant difference between standard and constrained liners in terms of aseptic CTAC survival (p=0.8) or revision of the custom implant for any cause (p=0.7). Additionally, there were no significant differences between the cohorts in the revision of arthroplasty components distinct from the CTAC (p=0.8), reoperation for all causes (p=0.9) or dislocation (p=0.2).

Conclusion: Primarily constraining CTACs does not lead to an increase in aseptic failure, component revisions or reoperation. Given this, the use of acute constrained liners represents a safe and appropriate option in patients with substantial risks of instability without increased risk of component failure at mean five-year follow up. Therefore, we recommend consideration of constrained liners in high-risk instability patients requiring CTAC.

Notes

Paper #50

Low 10-Year Risk of Cup Fixation Failure Using Constrained Liners in Acetabular Component Revision

Faisal Al Fayyadh, MD, Michael E. Neufeld, MD, MSc, FRCSC, Lisa C. Howard, MD, Bassam Masri, MD, Nelson V. Greidanus, MD, Donald S. Garbuz, MD

Introduction: There remains concern regarding simultaneous constrained liner (CL) implantation in acetabular component revision in revision total hip replacement (rTHA) due to potential fixation loss at the bone-implant interface. Scarce long-term data reports on this technique. This study aimed to determine the survivorship free from aseptic cup loosening (fixation failure) and all-cause re-revision when a CL was implanted concurrently with acetabular cup revision.

Methods: We retrospectively identified all consecutive rTHA in which a CL was implanted simultaneously with acetabular cup revision at our institution between 2001-2021. Exclusions included failed hemiarthroplasties, custom triflanges, and <2-year follow-up. We included 174 revisions with a mean follow-up of 8.7 years (range 2-21.7). Mean age was 70.7 years and 60.9% were female. Ten percent had Paprosky Type 1 bone loss, 68.4% had Type 2A-C, and 21.3% had Type 3A-B. The main indications for acetabular revision were instability (35%), second-stage reimplantation (26.4%), and loosening (17.2%). Only 25% of revisions used modern highly porous revision shells. Two-thirds of CLs were manufactured by one implant company and one-third by another. Twenty-three (13%) were cemented into the revised cup. Screw fixation was evaluated. Kaplan-Meier survival was determined with revision for cup aseptic loosening and all-cause re-revision as endpoints.

Results: Thirty-two (18.3%) patients underwent re-revision at a mean of 2.9 years. Three (1.7%) required re-revision due to acetabular component fixation failure. Acetabular component survival free from re-revision due to fixation failure was 98.9% at five years and 98.1% at 10 years. There were no acetabular component fixation failures in modern highly porous shells. The all-cause re-revision-free survival was 84.9% at five years and 79.9% at 10 years.

Conclusion: Implanting a CL during revision of an acetabular component with stable fixation is safe with a very low risk of cup fixation failure. There were no cup fixation failures in highly porous shells.

Notes

Paper #51

High Rates of Reoperation and Dislocation With Contemporary PFR in Complex Revision THA

Sonia K. Chandi, MD, Colin C. Neitzke, BS, Jeffrey A. O'Donnell, MD, Elizabeth B. Gausden, MD, MPH, Peter K. Sculco, MD, Mathias P.G. Bostrom, MD, Brian P. Chalmers, MD

Introduction: Severe proximal femoral bone loss remains a challenging problem in revision total hip arthroplasty (THA). Proximal femoral replacements (PFR) are salvage options for severe bone loss in complex revision THA. The purpose of this study was to describe the survivorship and clinical outcomes of PFR for non-oncologic indications.

Methods: We performed a retrospective review of 49 patients who underwent 50 PFRs from January 2014 to May 2021 at a single institution. Indications for PFR included periprosthetic femur fracture (n=20), reimplantation after periprosthetic joint infection (PJI) (n=18), aseptic loosening with severe proximal femoral bone loss (n=10), heterotopic ossification (n=1) and instability (n=1). The mean age was 70 years. The mean BMI was 28 kg/m2 and 25 (50%) patients were female. The mean follow-up was three years. Kaplan-Meier analysis was used to assess survivorship free of reoperation, re-revision and dislocation.

Results: The two-year survivorship free from all-cause reoperation was 78% and the two-year survivorship free from re-revision was 87%, Overall, there were 11 (22%) reoperations, with indications including PJI (n=6), aseptic loosening (n=2), hematoma evacuation (n=1), instability (n=1) and delayed wound healing (n=1). There were eight (16%) patients who dislocated after PFR. The mean Hip Injury and Osteoarthritis Outcome Score for Joint Replacement (HOOS JR) increased from 48 preoperatively to 77 at two years postoperatively (P<0.001).

Conclusion: In this series of PFRs performed in complex revision THA, there was modest two-year survivorship free from all-cause reoperation (78%) and re-revision (87%). Further, the dislocation rate was high at 16%. However, only one patient (2%) was revised for femoral component aseptic loosening. This study highlights the complexity of these patients and the utilization of PFR as a salvage option.

Notes

Paper #52

A UK Study on the Clinical Outcomes of Proximal Femoral Replacement for Non-Oncological Condition

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Introduction: The purpose of this study was to determine clinical outcomes following Proximal femoral replacements (PFRs) for non-oncological indications.

Methods: A multicentre retrospective cohort study across six UK centers. All patients undergoing PFR between 08/10/2004-03/28/2023 were included, and those with oncological indications were excluded. Local institutional approval was obtained, and anonymised data on patient, treatment and implant-related factors were obtained. The primary outcome measure was the local complication rate. Secondary outcomes were return to baseline mobility status, return to baseline residence, six-month systemic complications rate, two-year reoperation rate, 30-day and one-year mortality rates. There were 230 PFRs with a median follow-up of 4.28 (IQR,1.9-7.2) years. The median age was 76.0 (IQR, 66.9-83.7) years. Indications for PFR were periprosthetic fracture in 62(27.0%), infective revision arthroplasty in 55 (23.9%), chronic/failed trauma in 41 (17.8%), aseptic revision arthroplasty in 38 (16.5%), acute trauma in 33 (14.3%) and complex primary arthroplasty 1 (0.4%). Median surgical time was 182 (IQR,136-216) minutes. Acetabular components were either dual-mobility or constrained in 133 (57.8%) patients. The median construct length was 150.0 (IQR,100.0-192.3) cm.

Results: The local complication rate was 27.0% (62) with dislocation 11.7% (27) and PJI 9.6% (22) being the most common. A return to baseline mobility and residence was observed in 55.2% (127) and 87.0% (200) respectively. The six-month systemic complication rate was 9.1%, and the two-year reoperation rate was 17.0%. The 30-day mortality rate was 1.7%, and the one-year mortality rate was 8.3%. Kaplan-Meir survivorship analysis demonstrated 78.7% implants survived to two years without developing a local complication. Binary logistic regression demonstrated that an increasing operative time was associated with reduced local complications following PFR [OR:0.993,95%CI:0.987-0.999,p=0.048]. There were no association between local complications and age, gender, ASA, indications for surgery, implant type, acetabular component or construct length.

Conclusion: This is the largest study that looks at PFRs for non-oncological conditions and demonstrates good implant survivorship. It is a suitable salvage option with complication rates lower than.

Notes

Paper #53

Does the Outpatient Arthroplasty Risk Assessment Score Predict Outcomes in Revision TJA?

Leonard T. Buller, MD, Evan R. Deckard, BS, R. Michael Meneghini, MD

Introduction: The Outpatient Arthroplasty Risk Assessment (OARA) Score was developed to identify surgically appropriate patients for outpatient total joint arthroplasty (TJA). Additionally, it has shown excellent predictive ability for length of stay following primary TJA, compared to other medical risk stratification systems. However, it has not been studied in the revision TJA patient population. This study evaluated the OARA Score's predictive ability on outcomes following revision TJA.

Methods: From 2017 to 2023, 366 revision TJAs (116 hips, 250 knees) performed across 17 locations were analyzed. Statistical models evaluated the predictive ability of the OARA Score on same or next day discharge, and complications and readmissions within 90-days. P-values ≤0.05 were considered statistically significant.

Results: Overall, 156 (51%) revision TJAs were discharged on the same or next day after revision TJA. A lower OARA Score was a significant predictor of same or next day discharge and proportionally less complications and readmissions (P≤0.035). A total of 71% of revision TJAs were discharged ≥2 days postoperatively when the OARA Score was ≥113. Likewise, complications (19.6 vs. 4.7%, P=0.002) and readmissions (13.0 vs. 3.4%, P=0.016) were ≥4.2 (95% CI, 1.4 to 12.8) times more likely when the OARA Score was ≥113. For all models related to length of stay, positive predictive values were great to excellent (range, 73 to 91%) while false positive rates were higher than ideal (range, 63 to 76%).

Conclusion: Study results demonstrate a lower OARA Score was predictive of same or next day discharge, and fewer complications and readmissions following revision TJA. As the burden of revision TJAs rise, future studies with higher sample size and accounting for revision etiology and number of components revised should be conducted to further test the OARA Score's utility in the revision TJA population.

Notes

Paper #54

Outcomes of Primary Cementless Femoral Stems used in Revision Hip Arthroplasty

Brian M. Curtin, MD, MS, Josef E. Jolissaint, MD, Alexander R. Dombrowsky, MD, Benjamin J Averkamp, MD

Introduction: An abundance of literature exists assessing outcomes of revision THA using diaphyseal engaging stems; however, there is little research into the use of primary-style femoral stems in revision THA. Primary stems may have benefits including cost reduction, maintenance of proximal bone stock and ease of potential future reconstructions. The purpose of this study is to evaluate the aseptic survival rate of revision THAs using primary femoral stems.

Methods: Review of our registry was performed to identify patients from 2010-2020 who underwent all-cause revision THA utilizing a primary metaphyseal-engaging stem for femoral reconstruction. Patients with a history of previous revision THA or those treated with cement or bone graft augmentation were excluded. Six patients were excluded due to lack of two-year follow up. Implant survival, complications requiring revision surgery and ambulatory status at final follow-up was documented. Seventy-eight unique patients (79 procedures) met final inclusion criteria. Mean follow up was 5.2 2.1 years.

Results: The most common indications for index revision were aseptic loosening (44%) or infection (34%). Pre-revision Paprosky classification was Type I in 41 patients (52%), Type II in 37 patients (47%), and Type 3A in 1 patient (1%). Overall, 13 patients (16.5%) required re-revision, five for periprosthetic fracture, six for instability, and two for recurrent infection. Of those, 7/13 (54%) required femoral component revision. When excluding recurrent infections, the aseptic femoral-component survivorship for the cohort was 94%. Three patients sustained a fracture requiring stem re-revision. One Vancouver B1 fracture sustained >2 years postoperatively and two for Vancouver B2 fractures sustained within six months postoperatively. There were no femoral re-revisions for aseptic loosening.

Conclusion: Primary metaphyseal-engaging femoral stems provide reliable fixation during revision THA in patients with preserved proximal metaphyseal bone with similar complication rates to those previously reported in the literature for revision THA.

Notes

Paper #55

Prophylactic Cabling of the Femur in Revision THA Lowers the Risk of Vancouver B2 and B3 Fractures

Nihir Parikh, BS, Michael B. Held, MD, MBA, Alan D. Lam, BS, Chad A. Krueger, MD

Introduction: Periprosthetic femoral fractures (PPFx) represent one of the most common causes of revision total hip arthroplasty (rTHA). Among PPFx, Vancouver B2, B3 and C are more challenging to manage, often requiring a re-operation and stem revision. Cables have shown to reduce stem subsidence, fracture propagation and stress during axial loading. However, there is a paucity of literature in the role of prophylactic cabling during rTHA. Therefore, the purpose of this study is to determine the acute PPFx rate and types of PPFx in rTHA for patients with prophylactic cables compared to those without.

Methods: This retrospective study identified all patients undergoing rTHA at a single institution. Current procedural terminology (CPT) codes and radiographic images were reviewed to group patients into the prophylactic cables or no cables cohorts. Primary outcome was the rate of acute PPFx (< 30 days postoperatively). Secondary outcomes were the Vancouver classification subtype of PPFx, re-operations for PPFx and all-cause re-revisions.

Results: 2,977 patients were identified, 192 with prophylactic cables and 2,785 without cables. There was no difference in acute PPFx rates between cables and no cables (1.56% vs. 2.08%, P=0.796). However, prophylactic cabling substantially lessened the more complex B2 and B3 fractures and re-operation rates. In the prophylactic cable group, 100% of fractures were B1 compared to 30-B1 (51.7%), 16-B2 (27.5%), 9-B3 (15.5%), and 3-C (5.2%) fractures in the no cables group. Re-operation rates for acute PPFx were significantly lower in the prophylactic cables cohort (33.3%) than in the no cables cohort (50.0%), P=0.022. All-cause re-revisions were also significantly lower in those with prophylactic cables (7.3% vs. 12.8%, P=0.038).

Conclusion: Prophylactic cabling for taper fluted, diaphyseal fitting stems protects against more complex Vancouver B2 and B3 fractures. During rTHA, surgeons should consider prophylactically cabling the femur to lessen the risk of re-operation and complex fractures.

Notes

Paper #56

Interprosthetic Femur Fractures: A Multi-Center Retrospective Study

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Introduction: Patients with ipsilateral THA/TKA interprosthetic fractures (IFFs) create the challenge of treating a periprosthetic hip and distal femur fracture simultaneously. This study aims to identify practices and determine factors that positively impact patient results.

Methods: An IRB-approved retrospective study was performed of patients that underwent ORIF of IFFs from 2011-2021 at 15 trauma centers. Patient demographics, comorbidities, treatments and outcomes were analyzed using descriptive statistics and univariate measures.

Results: 143 patients met inclusion criteria with 113 (79%) females and median age 78 [57-90]. Distal one-third fractures were most common and occurred in 68% of cases. All patients underwent ORIF with 7% treated with two plates and 8% treated with plate/IMN combination. 50% of patients were NWB with two months the average to FWB. 20% of patients were FWB after surgery. Dual plate combination was the fastest time to FWB ($p< 0.001$). 61% of patients returned to baseline. Patients treated with either dual plate or plate/IMN combinations healed faster ($p< 0.001$) and had improved rates of returning to baseline function ($p< 0.034$). Overall complication rate was 29%. The deep infection rate was 3.6%. 14% of patients underwent additional procedures. Patients that underwent single plate fixation were least likely to require additional surgeries at 16% ($p < 0.05$). The mortality rate was 13.1% and associated with >1 comorbidity ($p=0.002$).

Conclusion: ORIF with spanning lateral plate remains the most common treatment for IFF. Patients with dual fixation had higher rates of union and return to baseline ambulatory status, particularly IMN fixation. Patients who had plate fixation were least likely to require additional surgeries. The deep infection rate was lower than previously reported. Mortality rates at one year were lower than hip fracture data. Greater comorbidity burden was associated with higher mortality rate. These conclusions can help guide techniques and expectations regarding IFF treatment.

Notes

Paper #57

Cup-Cage Reconstruction for Pelvic Discontinuity: Encouraging Long Term Survival

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Thomas Robinson, MD, FRCS (ORTHO), Michael E. Neufeld, MD, MSc, FRCSC, Bassam Masri, MD,
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Introduction: Pelvic discontinuity (PD) poses a difficult challenge in revision total hip arthroplasty (rTHA). There is a paucity of evidence assessing long-term outcomes of cup-cage reconstruction for PD. This study aimed to review the survivorship and outcomes of cup-cage constructs for PD.

Methods: We retrospectively identified all cup-cage revisions for PD from our institutional database (1999-2022). Cases without PD or with <2 years follow-up were excluded. Forty-eight cup-cage revisions were identified with mean follow-up of 7.2 years (range 2-20). Mean age was 77 and 71% were women. Twenty-six patients died during the study period at mean seven years from rTHA. Kaplan-Meier analysis was used to determine survival with all-cause and aseptic loosening re-revision as endpoints. Secondary outcomes included radiological failures and patient reported outcomes (PROMs).

Results: All-cause re-revision survival was 80% (95% CI 0.70 – 0.93) at 5 years, and 68% (95% CI 0.54 – 0.85) at 10 years. Re-revision survival for aseptic loosening of the cup-cage construct was 95% (95% CI 0.89 – 1.00) at five years, and 85% (95% CI 0.74 – 0.98) at 10 years. Thirteen (27%) patients underwent re-revision at a mean of 45 months post rTHA (range one–112). Aseptic loosening prompted re-revision in 5/48 (10%) cases at a mean of 68 months (range 29-98). Of these, three required cup revision for loosening and two required isolated cage/liner revision with well-fixed cups. Three patients had resection arthroplasty for chronic infection. Three patients were revised for instability with liner exchange or femoral revision only as the cup-cage constructs had not failed. In two further radiological failures revision surgery was considered but not undertaken. Patient reported pain (mean WOMAC 83.5) and function (mean WOMAC function 75.4, OHS 71.2) were acceptable.

Conclusion: Cup-cage reconstruction is a good solution for PD with encouraging long-term fixation and acceptable survivorship and PROMs.

Notes

Symposium VIII

Pelvic Reconstruction for Complex Bone Defects in Revision THA

Moderator: Brett R. Levine, MD, MS

This symposium will provide the latest techniques on the management of complex pelvic bone defects in revision total hip arthroplasty (rTHA). Audience members will leave with an enhanced understanding of preoperative planning, available reconstructive options, and intraoperative pelvic reconstructive techniques using various surgical approaches in rTHA.

Learning Objectives:

1. Understand the Paprosky Classification and reconstructive options for the management of pelvic bone loss in rTHA.
2. Learn indications and surgical pearls for the utilization of cup-cage and custom triflange techniques through anterior and posterior approaches.
3. Understand the various options to mitigate the complication of postoperative hip instability while not compromising long-term component fixation.
4. Understand when and how to employ jumbo cups and augments with(out) pelvic distraction for complex pelvic bone loss.
5. Learn and apply surgical techniques for the management of bone loss in the setting of chronic infections and instability.

Outline:

Introduction
Brett R. Levine, MD, MS (Moderator)

All in the Head: Mitigating Instability in Revision Total Hip for Complex Pelvic Defects
Molly A. Hartzler, MD

Triflange and Cup-Cage Constructs
Robert A. Sershon, MD

Acetabular Distraction for Acetabular Bone Loss with a Chronic Pelvic Discontinuity
Neil P. Sheth, MD, FACS

Pelvic Pus...Why Me?
Brett R. Levine, MD, MS

Discussion
All Faculty

Notes

Notes

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NOTE: We are making available the full list of disclosures online.

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Speakers bureau/paid presentations: Si-Bone, Stryker, DePuy Synthes, Organogenesis
Researcher: Smith & Nephew, Organogenesis, Zimmer Biomet
Research support as a Principal Investigator (even when received and managed by the research institution): Biocomposites, Stryker, Si-Bone, LifeNet Health, Pacira, Organogenesis, Smith & Nephew
Paid consultant: DePuy Synthes, Stryker, Mi-Care, Si-Bone
Stock or stock options (including startups): WNT Technologies
Ownership interest: ORIntelligence
Medical/Orthopaedic publications editorial/governing board: AcademiaMedicine
Board member/committee member for a professional society: Foundation for Orthopaedic Trauma, Orthopaedic Trauma Association, AAHKS, Foundation for Physician Advancement

Simon W. Young, MD
Speakers bureau/paid presentations: Stryker
Research support as a Principal Investigator (even when received and managed by the research institution): Stryker, Smith and Nephew
Paid consultant: Stryker
Medical/Orthopaedic publications editorial/governing board: Journal of ISAKOS
Board member/committee member for a professional society: NZ Joint Registry

Brandon J. Yuan, MD
Paid consultant: Stryker, DePuy
Board member/committee member for a professional society: OTA, AAOS

Isabella Zaniletti, PhD
This individual reported nothing to disclose

Jared A. Zanolla, BS
This individual reported nothing to disclose

Michael J. Zarski, JD
This individual reported nothing to disclose

Huiyong Zheng, PhD
Paid employee: University of Michigan

Mary Ziemba-Davis, BA
This individual reported nothing to disclose

Notes

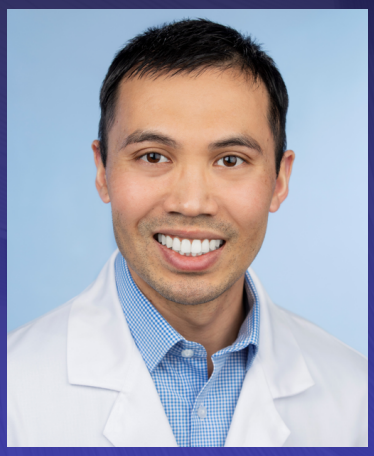
Notes

AAHKS CENSUS

EVERY MEMBER COUNTS

We were counted by AAHKS. Complete the Census today!

MUYIBAT A. ADELANI, MD
DIVERSITY ADVISORY BOARD CHAIR



ZACHARY C. LUM, DO
DIVERSITY ADVISORY BOARD VICE-CHAIR

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The Foundation for Arthroplasty Research and Education (FARE) facilitates the American Association of Hip and Knee Surgeons (AAHKS) mission to advance patient care through leadership in research and education. FARE is a 501(c)(3) non-profit organization. In conjunction with the AAHKS Research Committee, FARE awards approximately $200,000 in research funding each year to AAHKS members. Applications undergo a rigorous two-stage review by the AAHKS Research Committee.

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AAHKS
AMERICAN ASSOCIATION OF HIP AND KNEE SURGEONS

AAHKS 2024 ANNUAL MEETING

Future AAHKS Meetings

2025 AAHKS Spring Meeting
May 1–3, 2025
Hilton Scottsdale Resort & Villas
Scottsdale, AZ

2025 AAHKS Annual Meeting
October 23–26, 2025
Gaylord Texan Resort & Convention Center
Dallas, TX

2026 AAHKS Spring Meeting
April 30–May 2, 2026
Radisson Blu Aqua Hotel Chicago
Chicago, IL

2026 AAHKS Annual Meeting
November 5–8, 2026
Gaylord Texan Resort & Convention Center
Dallas, TX

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