DIVISION OF ORTHOPAEDIC SURGERY
UNIVERSITY OF OTTAWA

HANS K. UHTHOFF ANNUAL RESEARCH DAY

FRIDAY, APRIL 28, 2017

UNIVERSITY OF OTTAWA
ROGER GUINDON HALL, AMPHITHEATRE A

VISITING PROFESSOR

Mark A. Glazebrook
B.Sc.(H) M.Sc. Ph.D. MD FRCS(C)

Professor of Orthopaedic Surgery
University of Dalhousie
Halifax, Nova Scotia

UNIVERSITY OF OTTAWA
ORTHOPAEDIC SURGERY

We are pleased to welcome

Mark A. Glazebrook
B.Sc.(H) M.Sc. Ph.D. MD FRCS(C)

as the 2017 Hans K. Uhthoff Visiting Professor

Dr. Mark Glazebrook is a full time Professor of Orthopaedic Surgery at Dalhousie University with a cross appointment to the School of Biomedical Engineering.

He completed his medical training in 1994 and completed specialty training in Orthopaedic Surgery in 1999 at Dalhousie. He then went on to complete a fellowship in Orthopaedic Foot & Ankle and Sports Medicine at the University of Western Ontario. This was followed with a PhD in Achilles Tendon Disease at Dalhousie University while working part time in his clinical practice.

Dr. Glazebrook devotes 80% of his working time to clinical practice focusing on Orthopaedic Foot & Ankle Reconstruction and Sports Medicine. During research time, focus is on outcome studies on Evidence Based Medicine, Ankle Arthritis, MTP Arthritis, Bone Graft Substitutes and Achilles tendon rupture care.

RESIDENT RESEARCH REQUIREMENTS

DIVISION OF ORTHOPAEDIC SURGERY

UNIVERSITY OF OTTAWA

1. All residents must participate in a minimum of two research projects during their residency.

2. Research plan and protocol is presented to the Research Visiting Professor in November/December.

3. Preliminary results are presented to the Division of Orthopaedic Surgery Research Committee in early April.

4. The final paper is presented at the H.K. Uhthoff Research Day in April/May.

5. Papers are chosen for submission to Collins Day in May.

6. Two completed manuscripts must be written in style of the Journal of Bone and Joint Surgery and submitted to the Chairman of the Resident Research Committee, one by the end of the PGY-3 year and one by the end of the PGY-4 year.

RESIDENTS/FELLOWS

DIVISION OF ORTHOPAEDIC SURGERY

2016-2017

PGY-5
Dr. Mitchel Armstrong
Dr. Aaron Frombach
Dr. John Morellato

PGY-4
Dr. Andrew Bodrogi
Dr. Paul Jamieson
Dr. Bogdan Matache
Dr. Caleb Netting
Dr. Kevin Rasuli
Dr. Andrew Stewart

PGY-3
Dr. Mahmoud Almasri
Dr. Olivier Gauthier-Kwan
Dr. Ivan Kamikovski
Dr. Lisa Lovse
Dr. Meaghan Marien
Dr. Manisha Mistry
Dr. Akshay Seth

PGY-2
Dr. Andrew Adamczyk
Dr. Kendrick Au
Dr. Kamal Bali
Dr. Youjin Chang
Dr. Megan Richards
Dr. Alison Suraci

PGY-1
Dr. Mohammad AlSaqabi
Dr. Alexandra Bunting
Dr. Micheal Cochran
Dr. Matthew Coyle
Dr. Amedeo Falsetto
Dr. Massimo Petrera
Dr. Alenko Šakanović

FELLOWS
Dr. Abdullah Alhazmi
Dr. Mohammed Al Sobeai
Dr. Hussain Alyousif
Dr. Christopher Dowding
Dr. Megan Gillis
Dr. George Grammatopoulos
Dr. Lisa Howard
Dr. Mazen Ibrahim
Dr. Hussam Jabri
Dr. Mark Macdonald
Dr. Matthew MacEwan
Dr. Meaghan Rollins
Dr. Enrique Sandoval-Rodriguez
Dr. Saad Surur
Dr. Sebastián Undurraga Agüero
Dr. Akintunde Watson

RESIDENCY TRAINING COMMITTEE

DIVISION OF ORTHOPAEDIC SURGERY

2016-2017

CHAIRMAN

Dr. Karl-André Lalonde (January-June 2017)

Dr. Joel Werier (July-December 2016)

MEMBERS

Dr. Robert Feibel
Dr. Braden Gammon
Dr. Wade Gofton
Dr. Ken Kontio
Dr. Allan Liew
Dr. Wadih Matar
Dr. J Pollock

RESIDENT REPRESENTATIVES

Dr. Meaghan Marien
Dr. John Morellato

RESIDENT RESEARCH SUPERVISOR

Dr. Braden Gammon

ACKNOWLEDGEMENTS

The Division of Orthopaedic Surgery greatly acknowledges the support of the Hans K. Uhthoff Research Day by the following companies:

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PROGRAM

0800 **Opening Remarks**
Dr. Karl-André Lalonde, Director of the Orthopaedic Surgery Residency Training Program
University of Ottawa

0805 **Welcome/Introduction of Dr. Mark A. Glazebrook**
Dr. Paul E. Beaulé, Head, Division of Orthopaedic Surgery, University of Ottawa

0810 **Ankle Arthritis: Current Treatment Recommendations Based on the Canadian Ankle Arthritis Database**
Dr. Mark A. Glazebrook, Visiting Professor

0830 **Discussion**

SESSION I

MODERATOR: Dr. Kevin Smit

0840 **1. Metal on Metal Hip Resurfacing in Patients 45 Years of Age and Less at a Minimum Five Year Follow Up**
Dr. Christopher Dowding, Clinical Fellow, Adult Reconstruction Arthroplasty

0848 **Discussion**

0852 **2. Learning New Skills in Practice: How Surgeons Adopt and Implement New Procedures**
Dr. Akshay Seth, PGY-3

0900 **Discussion**

0904 **3. Denosumab Treatment for Giant Cell Tumor: When Being One in a Million is Not a Good Thing**
Umar Akel, Medical Student, University of Ottawa

0912 **Discussion**

0916 **4. Lateral Trochlear Ridge: a Non-Articulating Safe Zone for Anterior-to-Posterior Screw Placement in Coronal Shear Fractures involving the Capitellum and Trochlea**
Dr. Bogdan Matache, PGY-4

0924 **Discussion**

0928 **5. The Adoption of a New EMR in a Pediatric Ambulatory Clinic**
Katie Garland, Medical Student, University of Ottawa

0936 **Discussion**

Refreshment Break, Atrium, Roger Guindon Hall, University of Ottawa

SESSION II

MODERATOR: Dr. Alberto Carli

1000 **6. Assessing the Need for Multidisciplinary Metastatic Bone Disease Clinic at a Tertiary Cancer Centre**
Dr. Mohammed Al Sobeai, Clinical Fellow, Musculoskeletal Oncology

1008 **Discussion**

1012 **7. Hip Arthroplasty in Metastatic Bone Disease - A Single Center Experience**
Dr. Mohammed Al Sobeai, Clinical Fellow, Musculoskeletal Oncology

1020 **Discussion**

1024 **8. A Prospective Cohort Study Assessing the Development of Cam Femoro-acetabular Impingement Morphology**
Dr. Paul Jamieson, PGY-4

1032 **Discussion**

1036 **9. Hemiarthroplasty Versus Total Shoulder Arthroplasty. A Retrospective Cohort Study.**
Dr. Caleb Netting, PGY-4

1044 **Discussion**

1048 **10. Prosthetic Joint Infection Etiology in Eastern Ontario: Are we Moving towards Superbugs?**
Dr. Enrique Sandoval-Rodriguez, Clinical Fellow, Adult Reconstruction Arthroplasty

1056 **Discussion**

1100 **11. Investigating the Feasibility of Using Bacteriophages as a Potential Therapeutic Agent for Patients with Peri-Prosthetic Joint Infection**
Dr. Ivan Kamikovski, PGY-3

1108 **Discussion**

1112 **12. The Acetabular and Spino-pelvic morphologies are Different in Subjects with Symptomatic Cam Femoro-acetabular Impingement**
Dr. George Grammatopoulos, Clinical Fellow, Adult Reconstruction Arthroplasty

1120 **Discussion**

1124 **13. Impact of Definition and Timeframe on Capturing Surgery-Related Readmissions After Primary Joint Arthroplasty**
Brian P. Chen, Medical Student, University of Ottawa

1132 **Discussion**

SESSION III

MODERATOR: Dr. Geoffrey Wilkin

1136 14. Bone Morbidity and Recovery in Children with Acute Lymphoblastic Leukemia
Dr. Leanne M. Ward
Senior Scientist, CHEO Research Institute
Research Chair in Pediatric Bone Health and Associate Professor, University of Ottawa
Pediatric Endocrinologist, Children's Hospital of Eastern Ontario

1144 Discussion

1148 15. A Scoping Review on Diagnostic Criteria for Diagnosing Femoroacetabular Impingement (FAI) as an Initial Step for Developing a Clinical Decision Rule (CDR)
Dr. Youjin Chang, PGY-2

1156 Discussion

Lunch, Atrium, Roger Guindon Hall, University of Ottawa

1300 Evidence Based Clinical Care and Research in Foot and Ankle Orthopaedics: The value of Level I and V Studies
Dr. Mark A. Glazebrook, Visiting Professor

1320 Discussion

1330 16. Reoperation Rate and Functional Outcome Scores of a Fixed Bearing Unicondylar Knee Replacement with Cross Linked Polyethylene at Minimum Four Years Follow Up
Dr. Megan Richards, PGY-2

1338 Discussion

1342 17. Comparison of In Vivo Performance of Re-melted versus Annealed Highly-Crossed Polyethylene
Dr. Alison Suraci, PGY-2

1350 Discussion

1354 18. Does Acetabular Coverage Influence the Clinical Outcome of Surgical Treatment of CAM Femoroacetabular Impingement?
Dr. Alexandra Bunting, PGY-1

1402 Discussion

1406 19. Comparing the Direct Anterior Approach with the Posterior Approach to the Hip: Early Stem Migration and Complications
Kathryn Culliton, Laboratory Technician/Engineer, Orthopaedic Biomechanics Laboratory

1414 Discussion

1418 20. Femoroacetabular Impingement: Does Corrective Surgery Affect Ground Reaction Force Symmetry during Squat Tasks?
Danilo S. Catelli, Graduate Student, School of Human Kinetics, University of Ottawa

1426 Discussion

1430 Refreshment Break, Amphitheatre A, Roger Guindon Hall, University of Ottawa

SESSION IV

MODERATOR: Dr. Joel Werier

1445 **21. Resident and Fellow Participation and Postoperative Technical Outcomes in Elective Anterior Cervical Spine Surgery**
Dr. Mahmoud Bedaiwy, Clinical Fellow, Spine

1453 **Discussion**

1457 **22. Blood Transfusion and Infection in Anterior Cervical Decompression Surgery**
Dr. Hussam Jabri, Clinical Fellow, Spine

1505 **Discussion**

1509 **23. Early Healing Following Pre-Operative Trephination: Results From a Randomized, Controlled Trial**
Dr. Lisa Howard, Clinical Fellow, Upper Extremity

1517 **Discussion**

1521 **24. A Point-Based Model To Predict Absolute Risk Of Revision In Shoulder Arthroplasty**
Dr. Meaghan Rollins, Clinical Fellow, Upper Extremity

1529 **Discussion**

1533 **25. Defining Safety of Outpatient Total Knee Arthroplasty: Examining Application, Barriers and Exclusions**
Dr. Megan Gillis, Clinical Fellow, Comprehensive Knee

1541 **Discussion**

1545 **26. A Decade's Experience with the Anterior Approach for Total Hip Replacement at a Tertiary Care Center**
Dr. Mazen Ibrahim, Clinical Fellow, Adult Reconstruction Arthroplasty

1553 **Discussion**

1557 **27. Evaluation of Cancer-testis Antigens as Targets for Immunotherapy to Sarcoma**
Anna Jirovec, Graduate Student, University of Ottawa

1605 **Discussion**

1609 **28. Oncolytic Maraba virus MG1 as a Treatment for Sarcoma**
Mohammed Selman, Graduate Student, University of Ottawa

1617 **Discussion**

1621 **29. Clinical Results of the Dynasty BioFoam® Acetabular Component in Primary Total Hip Replacement**
Dr. Hussain Alyousif, Clinical Fellow, Trauma

1629 **Discussion**

1633 **Closing Remarks**
Dr. Braden Gammon, Resident Research Supervisor, Division of Orthopaedic Surgery, University of Ottawa

ABSTRACTS

1. METAL ON METAL HIP RESURFACING IN PATIENTS 45 YEARS OF AGE AND LESS AT A MINIMUM FIVE YEAR FOLLOW UP

Christopher T. Dowding MD FRCSC, Johanna Dobransky BSc M.HK,
Paul Kim MD FRCSC, Paul E. Beaulé MD FRCSC

Introduction

While total hip replacement surgery is the treatment of choice in elderly individuals with advanced arthritis, the treatment algorithm becomes less clear in younger patients. Metal on metal hip resurfacing is an option for young and active individuals. However, the ideal patient population for this surgery has not been fully elucidated. While certain risk factors for failure have been identified, it is not known which age group stands to benefit most from this surgery. The purpose of this study was to analyze the survivorship of hip resurfacing procedures performed on patients aged less than 45 years at our center. Our goal was to investigate the longevity of these prostheses in a younger patient group with at least five years of follow-up, and to identify the most common modes of failure.

Methods

We performed a retrospective analysis of prospectively collected data. From May 2002 to May 2011, operative and follow-up data were recorded for consecutive hip resurfacing procedures performed by three surgeons. These consisted of 260 hips in 221 patients (168 males/53 females) aged 45 and less at the time of surgery (mean 40.1 years). Head size, surgical approach and demographic data were recorded. Follow-up data included radiologic measurements such as cup abduction angle, femoral stem-shaft angle, presence of notching and presence of osteolysis. Presence of revision surgery and reason for revision surgery were noted. Patients that had not been seen within the last three years were contacted to rule out unknown revision cases. Sixty-six patients completed self-administered functional questionnaires (Hip disability Osteoarthritis Outcome Score and UCLA activity score) at baseline and every year for a minimum of five years. Survivorship was calculated using Kaplan-Meier analysis.

Results

The mean follow-up for all comers was 6.5 years. There were 20 revisions from hip resurfacing to total hip replacement in 19 patients. Of these, two cases were revised for infection. Of the 18 cases of failure for non-infectious reasons, 11 cases had aseptic loosening of the cup, two had mal-positioned cups, two had unexplained pain and there was one case each of femoral neck osteolysis, fracture and adverse tissue reaction. No pseudo tumors were found. Survivorship was 93.5% at 5 years. Revision rate for non-infectious reasons was 6.92% and the average time until revision was 4.01 years. High cup abduction angle and female sex were risk factors for failure. For patients with functional data available, there were significant improvements at 5 years.

Conclusions

This study indicates that metal on metal hip resurfacing is a suitable option for young individuals, as demonstrated through improved functional scores and low revision rates. The survivorship of hip resurfacing in the less than 45 age group was similar to that of total hip replacement, as well as hip resurfacing in older patients. Given the proposed benefits of hip resurfacing, this procedure should be viewed as a viable option in patients aged less than 45 years. High cup abduction angles should be avoided, and female patients are at a higher risk for failure.

2. LEARNING NEW SKILLS IN PRACTICE: HOW SURGEONS ADOPT AND IMPLEMENT NEW PROCEDURES

Akshay Seth MD, Carol-Anne Moulton MBBS FRACS MEd PhD,
Timothy J. Wood PhD, Wade Gofton MD MEd FRCSC

Introduction

Surgeons regularly learn and integrate new skills, techniques and technologies into their practice to ensure they are providing high quality patient care. When faced with this challenging process, surgeons must determine when they are ready to overcome the associated risks. The objective of this study was to understand how surgeons experience risk when learning and integrating a new procedure into practice.

Methods

Eighteen surgeons were purposively sampled from two Canadian academic medical institutions. Using a modified constructivist, grounded theory approach, semi-structured interviews were conducted and interpreted through constant comparative analysis. Emergent themes were identified and a conceptual framework was developed for understanding the surgeon experience associated with learning and integrating a new procedure into practice. Sample size was determined by thematic saturation.

Results

Regardless of personal risk tolerance, surgeons described a similar approach to learning and implementing new skills. The experience of risk was one of several factors that affected their adoption of new techniques. They also described being influenced by individual, personality-driven factors, logistical considerations and the culture inherent to their departmental, institutional, professional and societal contexts.

Conclusions

A framework for understanding the surgeon experience when learning and implementing new skills was developed. The multifactorial interplay between a surgeon's individual perception of risk, his/her motivations and the environmental influences that serve to facilitate or hinder the implementation of a new surgical skill is central to this experience. An increased awareness of these factors can foster the development of guidelines to support surgeons learning and implementing new skills, techniques and technologies while maximizing patient safety.

3. DENOSUMAB TREATMENT FOR GIANT CELL TUMOR: WHEN BEING ONE IN A MILLION IS NOT A GOOD

Umar Akel Medical Student, Donna Johnston MD FRCPC, MaryAnn Matzinger MD FRCPC,
Raj Rampersaud MD FRCSC, Victor Konji Research Associate,
Joel Werier MD FRCSC, Leanne Ward MD FRCPC FAAP

Introduction

Giant cell tumours (GCTs) are rare, locally aggressive bone tumours. Recently, a novel human monoclonal antibody (denosumab) that inhibits a receptor activator of NF-kB ligand (RANKL) has been explored for its clinical utility in tumour regression. RANKL and its receptor, RANK, are expressed by the stromal cells and osteoclasts comprising GCTs and also by osteoclasts in adjacent bone tissue.

Methods

Patient 1 was a 16 year old boy with a large GCT of the distal femur; patient 2 was a 17 year old boy with a GCT of the T5 vertebral body and large soft tissue masses. The tumours in both boys were surgically challenging due to their size and location. Denosumab was administered at doses of 120 mg weekly for three weeks, followed by monthly dosing (for 8 months in Patient 1 and for one year in Patient 2; 11 to 15-fold higher drug exposure than the typical adult osteoporosis dose of 60 mg every 6 months). To mitigate hypocalcemia on denosumab, both boys were treated with 1,25-dihydroxyvitamin D3 as well as calcium and cholecalciferol supplements.

Results

In Patient 1, the tumour measured 11.6 cm (craniocaudal), 7.3 cm (transverse) and 6.2 cm (anterio-posterior); the tumour regressed by 20%, 18% and 10% in these dimensions on denosumab, with complete reconstitution of the deficient vertebral cortices. He then underwent successful resection of residual tumour and full recovery of mobility. A slow recurrence was noted (off denosumab) 2 years after the index surgery. In Patient 2, symptoms of lung and spinal cord compression (cough and right-sided lower limb weakness) resolved within 72 hours of denosumab administration; the tumour volume decreased by 3% (cradiocaudal), 24% (transverse) and 27% (anterior-posterior) on denosumab, followed by successful resection and spinal stabilization without recurrence in the following 2 years. Patient 1 experienced mild, asymptomatic hypocalcemia which responded to increasing doses of cholecalciferol whereas patient 2 remained eucalcemic throughout. Rebound hypercalcemia was absent in the 24 months following treatment discontinuation. Serum c-telopeptide of type I collagen Z-scores fell by 91% percent between baseline and the nadir at 1 week in both patients.

Conclusions

High dose denosumab can be a safe and effective approach to achieving GCT regression and symptom control in adolescents, allowing for surgery in patients with anatomically challenging or inoperable tumours.

4. LATERAL TROCHLEAR RIDGE: A NON-ARTICULATING SAFE ZONE FOR ANTERIOR-TO-POSTERIOR SCREW PLACEMENT IN CORONAL SHEAR FRACTURES INVOLVING THE CAPITELLUM AND TROCHLEA

Bogdan A. Matache MD, Youjin Chang MD, Kathryn Culliton B.Eng.,
Gregory O. Cron PhD, Hakim Louati MASc, JW Pollock MD FRCSC MSc

Introduction

Distal humerus capitellar shear fractures are rare yet difficult to treat due to the complex fracture patterns and osteochondral nature of the fragments, limiting optimal screw placement. Current instrumentation options (posteriorly-directed headless screws, retrograde screws) often result in poor fixation in these osteochondral fragments. The use of partially-threaded cancellous screw inserted in an AP direction without countersinking the screw head would potentially improve the fixation strength of this complex fracture pattern, but that such a screw would cause articular impingement. We set out to determine if there is there a safe zone of fixation in the lateral trochlea ridge using a cadaveric study model.

Methods

The region of interest was defined with three polymeric implants inserted in the inferior, middle and superior-most aspect of the lateral trochlear ridge through an EDC split approach in each elbow. The elbows were then mounted on a MRI-compatible compression frame, designed to control position and simulate muscle tension across the elbow joint during MR imaging. High resolution 7T MR scans were acquired with the elbow in 90°, 120° and 145o of flexion and at maximal pronation, neutral and maximal supination at each position of flexion. We then calculated the mean coronal and sagittal free space adjacent to each screw position in the coronal and sagittal planes.

Results

Four of eight elbows have been scanned thus far. All screw positions on the lateral trochlear ridge had non-articulating free space adjacent to them. The average coronal and sagittal distance adjacent to the inferior screw was 3.56-mm and 2.93-mm, respectively, 3.77-mm coronal by 4.3-mm sagittal distance for the middle screw, and 4.63-mm coronal by 5.47-mm sagittal distance for the superior screw.

Conclusions

We have successfully identified a region of the elbow consisting of the lateral trochlear ridge that, despite being covered with articular cartilage, is non-articulating and can be used for antegrade instrumentation without the need for countersinking. A standard 2.0-mm screw would be a safe size to use for fixation in the lateral trochlear ridge.

5. THE ADOPTION OF A NEW EMR IN A PEDIATRIC AMBULATORY CLINIC

Katie Garland Medical Student, Kevin Smit MD FRCSC, Sasha Carsen MD CM MBA FRCSC

Introduction

Electronic medical records (EMRs) have begun to replace paper charts, but little research has examined the actual effect that EMRs have on documentation. Our primary objective was to evaluate the effect of CHEO's new EMR on documentation in our clinics.

Methods

A retrospective chart review of 320 paediatric orthopaedic surgery patients was performed comparing the paper charts (6 months pre-EMR implementation) and the EMR (6 months post-EMR). 8 common diagnoses were included: anterior cruciate ligament tear, developmental dysplasia of the hip, adolescent idiopathic scoliosis, in-toeing, distal radius fracture, both bones forearm fracture, distal tibia fracture, and ankle fracture. 20 patients per diagnosis were randomly selected in both the Pre-EMR and the Post-EMR groups. All charts were reviewed and pre-selected data points pertinent to each diagnosis were evaluated for completeness of documentation. Statistical analysis was done using chi-square tests.

Results

33 categories were compared with no overall significant difference in completion. Both types of medical records showed similar discrepancies; 64% data completion in the EMR group and 74% in the paper chart group. Overall, there were no significant differences in information documented between the EMR and paper charts in 68% of data points. There was a significant decrease ($p<0.01$) of information documented in the EMR for past medical history, reason for referral, height, side of injury, imaging done, knee stability, range of motion, and allergies. There was a significant increase ($p<0.01$) of information documented in the EMR for prior treatments, duration of symptoms, and neurovascular status of all fracture patients.

Conclusions

EMR implementation led to improvement in certain aspects of patient documentation, while documentation of other vital data points decreased. These results highlight the importance of developing documentation templates. Moving forward, our institution should focus on the development of unique data templates for diagnoses seen in our clinics, and a further study should examine whether the implementation of these templates improves documentation.

6. ASSESSING THE NEED FOR MULTIDISCIPLINARY METASTATIC BONE DISEASE CLINIC AT A TERTIARY CANCER CENTRE

Mohammed Al Sobeai MD SB-Orth, Young Jin James Lee Medical Student,
Vinay Kansal Medical Student, Joel Werier MD FRCSC, Hesham Abdelbary MD MSc FRCSC

Introduction

Skeletal related event (SRE) is a bone metastasis that cause pathologic fracture or spinal cord compression and require radiation therapy, radiologic intervention and/or surgery. Early detection and timely management of SREs is crucial in improving quality of life for metastatic bone disease patients (MBD). The question of this study is to identify gaps in care delivered to MBD patients and assess the need for multidisciplinary metastatic bone disease clinic to bridge these gaps.

Methods

From January 2013 to December 2014, a total of 109 cases of MBD cases that required surgery was identified. A retrospective review of these cases was performed. The following information was extracted from the electronic medical records: primary cancer of bone lesion, age distribution, referral patterns, types of orthopaedic intervention, survival post-surgery, patterns of adjuvant radiotherapy, length of stay in hospital post-surgery.

Results

The most common primary site for MBD was breast followed by lung and prostate (40%, 21%, 9% respectively). In regards to referral patterns, approximately 50% of cases were referred from the emergency department (ED), and a referring source was not identified in 20% of cases. Out of all cases referred from the ED, 61% of patients had a previous known diagnosis of cancer with bone metastasis and 24% had known history of cancer, but without diagnosis of bone metastasis. Approximately 60% of cases presented with a pathologic fracture. In 18%, patients required more than a single operation to control their symptoms and the most common orthopedic intervention was plating, medullary nailing and joint prosthesis (35%, 34%, 21% respectively). Over 80% of patients survived over 3 months post-operatively. 52% of cases required a length of hospital stay greater than 10 days. Increased length of stay correlated with age, lack of radiotherapy as being referred from the ED.

Conclusions

From the data analysis, there was a lack of well-defined referral and clinical care pathway for MBD. This lack of standardization leads to significant gaps in care, increased length of hospitalization and delay in identifying patients requiring early surgical intervention. The data also indicated that length of hospital stay was prolonged with factors such as lack of standardized radiotherapy protocols and being referred form ED. This clinical data eludes to the important need to establish a multidisciplinary MBD program to provide rapid access to care and streamline clinical pathway. For patients, such program will improve their experience by decreasing anxiety and effort that they otherwise expend in a fragmented health system.

7. HIP ARTHROPLASTY IN METASTATIC BONE DISEASE – A SINGLE CENTER EXPERIENCE

Mohammed Al Sobeai MD SB-Orth, Yousif Atwan Medical Student,
Raman Bhuller Medical Student, Hussain Alyousif MBBS,
Hesham Abdelbary MD MSc FRCSC, Joel Werier MD FRCSC

Introduction

Hip arthroplasty is commonly used to manage metastatic bone disease affecting the femoral neck and peri-trochanteric region. It allows for good pain relief and immediate mechanical stability for early ambulation. Extensive bone loss from the tumoural process and soft tissue attenuation from soft tissue mass can make these reconstructions challenging. The patient population is at a higher risk for local and systemic complications. We present a single institution experience with complications for hip arthroplasty for metastatic hip fracture.

Methods

All pathologic hip fractures that underwent hemiarthroplasty (HA) or total hip arthroplasty (THA) from the period of October 2010 to September 2016 were retrospectively reviewed. All cases of hip pathologic fracture or impending fracture secondary to bone metastasis were included. Exclusion criteria included: pathologic fracture in metabolic or primary bone disease, no evidence of local hip metastasis despite a history of cancer, and patients reconstructed using megaprosthesis. Preoperative data collected included age, sex, primary pathology, neoadjuvant radiotherapy, and days waiting for surgery. Operative data included type of prosthesis (HA vs THA), cement utilization, length of stem, and intra-operative complication. Postoperative data collected including adjuvant radiation and overall survival. Postoperative complications were recorded including dislocation, infection, thromboembolic events, re-operation, fracture and local disease progression.

Results

Fifty-seven patients (58 hips) were included. The mean age at surgery was 69 years. There were 28 females and 29 males. The most common primary pathology was breast carcinoma (24.1%), followed by lung and prostate (19 % and 17.2% respectively). Multiple myeloma was diagnosed in 12 % of cases. Eighty-six percent of hips were reconstructed with hemiarthroplasty and 14% had THA. Cementing of the stem was done in 76%. All acetabular components for THA were cemented except one. Long stem prostheses were used when the subtrochenteric region is diseased (19%). A lateral approach was used in 41 patients and a posterior approach in 17 patients. Eight patients (13.6%) developed complications. Three cases (5%) had dislocations postoperatively and 2 of them required revision surgery. Two of the dislocations were from a posterior approach and one from a lateral approach. One patient developed early stem migration from a cement mantle fracture requiring revision to a longer cemented stem. One patient in this cohort developed a deep seated infection. Three patients developed postoperative periprosthetic fracture from fall. The cumulative re-operation rate was 8.6%. Mean survival after surgery was 285 days.

Conclusions

Hip arthroplasty in metastatic bone disease is associated an increased risk for perioperative complications (can reach >13% in less than a year post operatively). Posterior approach may have a trend towards increase dislocation rate. Understanding the bone and soft tissue deficiency is crucial to allow acceptable stable reconstruction. Although hemiarthroplasty remains a good option for patients with metastatic hip fracture, an increased dislocation rate exists and warrants careful intra-operative assessment of stability.

8. A PROSPECTIVE COHORT STUDY ASSESSING THE DEVELOPMENT OF CAM FEMORO-ACETABULAR IMPINGEMENT MORPHOLOGY

Paul Jamieson MD, Sasha Carsen MD CM MBA FRCSC, Kawan Rakhra MD FRCPC,
Kerri Highmore MD FRCPC, Leanne M. Ward MD FRCPC FAAP,
R. Baxter Willis, MD FRCSC, Paul E. Beaulé MD FRCSC

Introduction

Femoro-Acetabular Impingement (FAI) is an important cause of adolescent hip pain and is thought to be a major cause of adult hip osteoarthritis. Despite this, there is a paucity of literature regarding the incidence and aetiology of FAI. A 2014 pediatric cross-sectional study by Carsen et al. identified FAI morphology in 14% of post-physeal closure patients compared to 0% in the pre-physeal closure patients. Patients with evidence of cam morphology also had significantly higher daily activity scores, supporting the theory that physical activity is a risk factor for development of FAI. The purpose of this study is to identify the incidence of development of FAI morphology and, secondarily, to assess activity level as a risk factor for the development of FAI morphology.

Methods

This is a prospective cohort study of asymptomatic patients with open physes from the initial cross-sectional study. Average age at enrolment was 10.5 years old. Patients were followed for 6 years after which a second non-contrast MRI of both hips was performed according to FAI protocol. FAI morphology was defined as an alpha angle $\geq 50.5°$. Activity was quantified using the Hospital for Special Surgery Pediatric Functional Activity Brief Scale (HSS Pedi-FABS).

Results

Nineteen patients (8 males; 11 females) were included for analysis. The mean alpha angle was 38.09° and 41.24° at the initial and final MRI, respectively. FAI cam morphology was identified in at least one hip in 5/19 (26%) patients (4 males; 1 female). Mean HSS Pedi-FABS score was 18 in those with FAI morphology and 13 in those without.

Conclusions

This study helps to identify that period of skeletal maturity as a critical time for the development of radiographic FAI. The incidence of FAI morphology was 26% after skeletal maturity and more common in males (50%) than females (9%). FAI morphology was also associated with higher activity scores, supporting the theory that activity level may be an important modifiable risk factor. This study helps to better understand the causation of FAI morphology and may guide the development of interventions to modify its incidence.

9. HEMIARTHROPLASTY VERSUS TOTAL SHOULDER ARTHROPLASTY. A RETROSPECTIVE COHORT STUDY.

Caleb Netting MD, Meaghan D. Rollins MD, FRCSC, Carl Van Walraven MD FRCPC,
Meltem Tuna PhD, Anan Badar Eddeen, Peter L.C. Lapner MD FRCSC

Introduction

Both TSA and HA have demonstrated good long-term survivorship. No large-scale studies have directly compared survivorship of TSA with HHR. Our goal was to compare survivorship between total shoulder arthroplasty (TSA) and hemiarthroplasty (HA) and to determine which factors correlate with implant failure.

Methods

All patients who underwent shoulder arthroplasty in Ontario, Canada, were identified at the Institute for Clinical Evaluative Sciences (ICES) between April 2002-March 2015. Demographic variables included time to revision surgery (or death), age, sex, Charlson comorbidity index, income quintile, presence of rheumatoid or osteoarthritis (OA) and surgeon factors. Cumulative incidence function, and Fine and Gray's sub-distribution hazard model (time to event analysis) were used with death as a competing risk.

Results

During study period, 8,006 patients underwent either HHR or TSA and 424 (5.3%) underwent revision. Mean age at index surgery was 69.1 years. There were no differences in demographics between groups. There was no difference between groups in regards to revision rate. Higher patient age was associated with a decreased hazard of revision (HR: 0.79, 21% lower for every 10 years in non OA patients, $p<.001$). At age 50, hazard of revision for OA patients was 18% higher than patients without OA. At 80 however, the hazard of revision for OA patients was 36% lower than patients without OA (HR: 1.18, $p=0.017$ and OA Age Interaction HR: -0.02, $p=0.007$). Surgeon experience was associated with decreased risk of revision (hazard of revision 24% lower if surgeon had >25 years of experience (HR: 0.76, $p=0.045$)).

Conclusions

There was no statistical difference in revision rate between HHR and TSA. Long-term survival of shoulder arthroplasty was found to be significantly related to age at index surgery, diagnosis of osteoarthritis and surgeon experience. Surgeons may use these associations to discuss prognosis and revision rates with patients.

10. PROSTHETIC JOINT INFECTION ETIOLOGY IN EASTERN ONTARIO: ARE WE MOVING TOWARDS SUPERBUGS?

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Introduction

Recently, several studies have reported a concerning emergence of multidrug-resistant bacteria responsible for prosthetic joint infections (PJI). Our objective is to describe the etiological microorganisms responsible for PJI in our area; we hypothesized that the frequency of multidrug-resistant bacteria is increasing in Eastern Ontario.

Methods

We performed a cohort study within the three hospitals that form The Ottawa Hospital and also Kemptville Hospital from January 2011 to December 2015. Out of 5852 elective total joint arthroplasties (hip, knee and shoulder), we registered those cases considered as an infection following the criteria of the Workgroup of the Musculoskeletal Infection Society and in which an etiologic microorganism was identified. For this five-year period, the microorganisms causing PJI were assessed, analysing its susceptibility to drugs and the etiologic trends between the first and the second part of the study. The characteristics of the population were also described.

Results

A total of 63 cases presented with positive criteria for PJI during this period caused by an identified microorganism (1.08 % rate of culture-positive PJI). Of these, most were caused by *Staphylococci* (36 cases, 57%), followed by *Streptococcus* (12 cases, 18%) and *Enterococcus* (five cases, 8%). In five cases (8%) Gram-negative bacilli were identified as responsible for the infection. Interestingly, *Propionibacterium sp* caused also five PJI (8%), being the most frequent etiologic agent within shoulder (75% out of these joint infections). In 12 cases (19%) more that one microorganism was identified. There were no differences over time in relation to the etiology of PJI. The overall percentage of bacteria resistant to three or more antimicrobial categories was 10.5%, showing an increase of 1.1% between the first and the second part of the study. All Gram-negative bacilli were amongst multidrug-resistant bacteria. A 3.2% of the *S. aureus* were methicillin-resistant.

Conclusions

Although the etiology of PJI in Easter Ontario does not seem to show differences over time, there is a trend towards the increase of the prevalence of multidrug-resistant organisms.

11. INVESTIGATING THE FEASIBILITY OF USING BACTERIOPHAGES AS A POTENTIAL THERAPEUTIC AGENT FOR PATIENTS WITH PERI-PROSTHETIC JOINT INFECTION

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Introduction

Joint replacement patients are at risk of prosthetic joint infection (PJI). Treatment involves systemic antibiotics, which are unable to treat biofilms. This is due to the reduced permeability of the biofilm matrix preventing minimal inhibitory concentration (MIC) of antibiotics to be achieved, and to antibiotic resistance of the biofilm. Alternative strategies include using lytic phages against biofilms. Phages can penetrate and disrupt biofilm matrices; also, phage replication in the biofilm leads to high local concentrations. Our study assessed whether phage treatment enhances antibiotic effects against biofilm Staphylococcus aureus (SA) isolates from PJI patients treated at The Ottawa Hospital.

Methods

SATA-8505 a lytic phage specific for SA, and a biofilm SA reference (ATCC 35556) were acquired from the American Type Culture Collection (ATCC). The MBEC device was used to establish MIC and minimal biofilm eradication concentrations (MBEC) of Cefazolin. The ability of phage to boost antibiotic effect on biofilms was assessed on biofilms established over 24 hrs in 48-well microtiter plates, and exposed to four treatments: i) varying concentrations of Cefazolin (8–1024μg/ml), ii) phage alone (107 PFU/mL) iii) a combination of (i) and (ii) simultaneously, and iv) a combination of (i) and (ii) consecutively. Following treatment, the biofilm cells were scraped off the bottom of the wells, diluted, and plated on tryptic soy broth agar.

Results

MIC and MBEC results suggest that antibiotics were effective at eradicating planktonic bacteria (MIC 0.5ug/ml) but ineffective against biofilm (MBEC 512ug/ml). No differences were seen in viable cell counts of SA between biofilms treated with phage and Cefazolin simultaneously, and Cefazolin alone. When phage preceded Cefazolin, higher bacterial reductions up to 3-Log CFU were seen when compared to treatment with phage alone, antibiotic preceding phage, and the two applied simultaneously.

Conclusions

The sequential combo of phage and antibiotics has a more robust biofilm eradication potential than each individual agent, suggesting that phage can disrupt SA biofilms and enhance antibiotic bactericidal activity.

12. THE ACETABULAR AND SPINO-PELVIC MORPHOLOGIES ARE DIFFERENT IN SUBJECTS WITH SYMPTOMATIC CAM FEMORO-ACETABULAR IMPINGEMENT

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Introduction

Acetabular and spino-pelvic (SP) morphological parameters are important determinants of hip joint dynamics. This study aims to determine whether acetabular and SP morphological differences exist between hips with and without cam morphology and between symptomatic and asymptomatic hips with cam morphology.

Methods

A prospective cohort of 67 patients/hips was studied. Hips were either asymptomatic with no cam (Controls, n=18), symptomatic with cam (n=26) or asymptomatic with cam (n=23). CT-based quantitative assessments of femoral, acetabular, pelvic and spino-pelvic parameters were performed. Measurements were compared between controls and those with a cam deformity, as well as between the 3 groups. Morphological parameters that were independent predictors of a symptomatic Cam were determined using a regression analysis.

Results

Hips with cam deformity had slightly smaller subtended angles superior-anteriorly (87° Vs 84°, $p=0.04$) and greater pelvic incidence (53° Vs 48°, $p=0.003$) compared to controls. Symptomatic Cams had greater acetabular version ($p<0.01$), greater subtended angles superiorly and superior-posteriorly ($p=0.01$), higher pelvic incidence ($p=0.02$), greater alpha angles and lower femoral neck-shaft angles compared to asymptomatic cams ($p<0.01$) and controls ($p<0.01$). The four predictors of symptomatic cam included antero-superior alpha angle, femoral neck-shaft angle, acetabular depth and pelvic incidence.

Conclusions

Symptomatic hips had a greater amount of supero-posterior coverage; which would be the contact area between a radial cam and the acetabulum, when the hip is flexed to 90°. Furthermore, individuals with symptomatic cam morphology had greater PI. Acetabular- and SP parameters should be part of the radiological assessment of femoro-acetabular impingement.

13. IMPACT OF DEFINITION AND TIMEFRAME ON CAPTURING SURGERY-RELATED READMISSIONS AFTER PRIMARY JOINT ARTHROPLASTY

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Stéphane Poitras BSc MSc PhD, Alan Forster MD FRCPC MSc, Paul E. Beaulé MD FRCSC

Introduction

Readmission rate has emerged as an important metric to measure quality, but varying definitions and timeframes are used. We aimed to evaluate the impact of different readmissions definitions and timeframes on capturing surgery-related readmissions after primary total joint arthroplasty.

Methods

Patients who underwent primary total hip or knee arthroplasty between January 1, 2013 and December 31, 2015 were included in the study. Duplicate cases from the same patient were excluded. The following four definition-timeframe combinations were evaluated: 30-day postoperative, 30-day postdischarge, 90-day postoperative, and 90-day postdischarge. Based on surgery, discharge, and readmission dates, it was determined whether readmissions were captured by each definition-timeframe combination. Electronic medical records of readmitted patients were reviewed to determine whether a surgery-related event was most responsible for the readmission.

Results

2,586 patients were included. There were no differences in the proportion of readmissions that were surgery-related when comparing 30 and 90-day timeframes (postoperative: 74% vs. 64%, p=0.175; postdischarge: 72% vs. 65%, p=0.291). Greater proportion of readmissions between day 0-30 were for surgery-related reasons compared to readmissions between day 31-90 using both postoperative and postdischarge definitions (postoperative: 74% vs. 49%, p=0.007; postdischarge: 72% vs. 52%, p=0.030). Among 87 patients readmitted for surgery-related reasons within one year of discharge, 61% were readmitted within 30 days of surgery compared to 87% within 90 days ($p<0.001$). Similarly, 62% and 90% of readmissions were captured by the 30 and 90-day post discharge definitions, respectively ($p<0.001$).

Conclusions

There was no difference in the proportion of readmissions that were surgery-related captured by 30 and 90-day timeframes although there was a lower proportion of surgery-related readmissions in patients readmitted between day 31-90 compared to the first 30 days. A greater proportion of surgery-related readmissions occurring within one year of discharge were captured by the 90-day timeframe compared to 30-day.

14. BONE MORBIDITY AND RECOVERY IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA

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on behalf of the Canadian STOPP Consortium

Introduction

Osteoporotic fractures are an important cause of morbidity in acute lymphoblastic leukemia (ALL). We sought to determine the incidence and predictors of fractures and recovery from osteoporosis in childhood ALL.

Methods

This was a six-year national prospective cohort study. Children with ALL underwent evaluation within 30 days of chemotherapy initiation, including annual spine radiographs for vertebral fracture (VF).

Results

186 children with ALL were enrolled (median age 5.3 years, range 1.3 to 17.0). Thirty-six percent of children sustained at least one fracture over five years (including baseline). No fractures occurred in the sixth year and 71.3% of incident fractures occurred in the first two years. The cumulative incidence was 32.5% for VF and 23.0% for fractures at other skeletal sites (non-VF); 39.0% of children with VF were asymptomatic. Baseline VF, cumulative glucocorticoid dose and baseline lumbar spine bone mineral density (LS BMD) Z-score predicted both VF and non-VF. Vertebral body reshaping following VF was incomplete or absent in 22.7% of children. Those with residual vertebral deformity following VF were older compared to those without (median age 8.0 years at baseline (inter-quartile range 5.5, 9.4) versus 4.8 years (3.6, 6.2), p=0.04) and had more severe vertebral collapse (median maximum spinal deformity index 3.5 (1.0, 8.0) versus 0.5 (0.0, 1.0), p=0.005).

Conclusions

VF and low LS BMD Z-score at baseline as well as glucocorticoid exposure predicted incident VF and non-VF. Nearly 25% of children had persistent vertebral deformity following VF, more frequent in older children and those with more severe collapse.

15. A SCOPING REVIEW ON DIAGNOSTIC CRITERIA FOR DIAGNOSING FEMORO-ACETABULAR IMPINGEMENT (FAI) AS AN INITIAL STEP FOR DEVELOPING A CLINICAL DECISION RULE (CDR)

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Introduction

Accurate diagnosis of FAI continues to be a challenge due to wide discrepancy and variability in clinical and radiographic interpretation. The diagnostic accuracy may have been previously described in the literature; however, their implication on clinical utility for accurate diagnosis have not been established. We aim to conduct a stand alone scoping review to examine the extent, range and nature of the literature on FAI diagnostic criteria and to develop clinical decision rule (CDR) on diagnosing FAI.

Methods

We conducted a literature search using MEDLINE, Embase, and the Cochrane Library from inception to January 11, 2016. Inclusion and exclusion criteria are based on the PICOs framework. Disagreements among reviewers were resolved though consensus or third party adjudication.

Results

From 3917 records retrieved, 49 met inclusion and exclusion criteria, and hence were included in this report.
Based on a meta-analysis (4 studies, N=188), the diagnostic accuracy performance of flexion adduction internal rotation test (FADDIR) was reported as (MRA as the gold standard): sensitivity 0.94 (95%CI 0.9-0.97), specificity 0.09 (95%CI 0.02-0.23), and diagnostic odds ratio (OR) 5.71 (95%CI 0.84-38.86). When surgery was used as the gold standard (4 studies, N=319), the sensitivity was 0.99 (95%CI 0.98, 1.00), specificity 0.05 (95%CI 0.0-0.18), and diagnostic OR 7.82 (95%CI 1.06, 57.84).

Sensitivity and specificity for MRA as index texts were 22-100%, and 40-100%, respectively (surgery as the standard). Similarly, MRI, sensitivity was 0.07-87%, and specificity was 0.47-0.98% (various reference standards).

Conclusions

This scoping review identified evidence on diagnostic performance and imaging. This data could inform the choice of components to be used for developing CDR for diagnosing FAI depending on the tests' statistical and clinical importance.

16. REOPERATION RATE AND FUNCTIONAL OUTCOME SCORES OF A FIXED BEARING UNICONDYLAR KNEE REPLACEMENT WITH CROSS LINKED POLYETHYLENE AT MINIMUM FOUR YEARS FOLLOW UP

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Introduction

Historically, highly cross-linked polyethylene use in knee arthroplasties has been low compared to total hip arthroplasties. In vitro data with knee simulators suggest fewer and smaller wear particles are produced with the highly cross linked design that could lead to brittle polyethylene at risk for catastrophic failure. However, in vivo evaluation demonstrating this is lacking. Furthermore, there are various processing techniques to yield crosslinking. The sequential annealing process is particular to the X3 design in the Stryker PKR partial knee replacement and was evaluated in this study. To date there is little data demonstrating the long term survivorship of these implants. The primary objective of this study was to evaluate the major complication and failure rates of the Stryker PKR, outlined by reoperation rate, in particular those related to polyethylene wear and aspetic loosening. The secondary objective was to examine functional outcomes via standardized questionnaires.

Methods

This is a four-year REB approved prospective single-surgeon case series of 78 patients (87 knees) with medial unicompartmental osteoarthritis. Thirty-five males (38 knees) and 43 females (49 knees) (34 right, 53 left) were implanted with the Stryker Partial Knee Replacement (PKR) System between May 2010 and October 2012. Mean body mass index was 29.78 (SD= 4.95) and mean age was 64.4 (SD= 9.5). All study participants were asked to complete the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaires pre-operatively and at each year post-operatively. Complications were reported by overall reoperation rate. T-tests were run to determine significant differences in functional outcomes scores preoperatively and post-operatively.

Results

Six patients required revision surgery (6.90% of patients): One for cement extrusion, two for infection, one for trauma and ligamentous injury, one required debridement for medial meniscal pain, and one required reoperation for progression of arthritis. Not a single failure was due to polyethylene wear or implant loosening, demonstrating excellent early survivorship of Stryker PKR implant. Patient reported outcome measures indicate significant improvements (p value < 0.001) between pre-operative assessment (mean 51.76, SD= 17.67) and at one year (mean 81.14, SD= 19.56), at two year (86.71, SD= 14.98), at three year (mean 83.70, SD= 12.80), and at four year (mean 87.20, SD= 19.41).

Conclusions

These preliminary midterm results with this fixed bearing design and cross-linked polyethylene were encouraging. Patient outcomes were significantly improved with revision rates lower then registry reported results. Of note, there were no catastrophic failures of polyethylene. Our results demonstrate lower than average complications rate and significantly improved functional outcomes measures.

17. COMPARISON OF IN VIVO PERFORMANCE OF RE-MELTED VERSUS ANNEALED HIGHLY-CROSSED POLYETHYLENE

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Introduction

Excessive wear of the conventional polyethylene acetabular liner and the release of debris particles into the joint space have limited the survivorship of total hip arthroplasty (THA). Highly cross-linked polyethylene (HXPLE) has shown significant improvements in wear properties; however the cross-linking irradiation process has shown to induce free radicals and decrease oxidative stability. Re-melting and annealing are two thermal options used to counter this. The objective of this study was to measure and compare the early in-vivo wear performance of a commercial HXPLE liner of each thermal option.

Methods

182 THAs (169 patients) with HXPLE liner were done between January 2009 and 2014. 76 hips received uncemented acetabular shell with annealed HXLPE liner (Trident/X3, Stryker Inc.) and 106 hips received uncemented acetabular shell with a re-melted HXLPE liner (Lineage/A-Class, Microport Inc.). Only those that had a minimum two year follow-up and at least three postoperative AP radiographs were included in the analysis, leaving 60 hips in each group. The Martell Hip Suite program was used to measure linear and volumetric wear using three different measures: 1) Total wear including the bedding in period and 2) Steady state wear minus the bedding in period and 3) Steady state wear using linear regression of all follow up xrays.

Results

Mean follow up was 3.6±1 and3.5±1.8 years for annealed and re-melted groups, respectively. Mean total linear and volumetric wear at last follow up was 0.115±0.367mm and 134±191mm3 respectively for annealed group and 0.163±0.501mm and 158±202mm3 respectively for re-melted group. Mean steady state linear and volumetric wear rate using the 1 year to last follow up technique was -0.010±0.175mm and 11±79mm3 respectively for annealed group and 0.019±0.345mm and 34±140mm3 respectively for re-melted group. Mean steady state linear and volumetric wear rate using individual patient linear regression technique was 0.014±0.183mm and -13±76mm3 respectively for annealed group and -0.030±0.350mm and -31±143mm3 respectively for re-melted group.

Conclusions

Early to mid-term assessment of annealed and re-melted HXPLE acetabular liners did not show any differences in any of the wear parameters measured. Furthermore, annual wear rates for both of these commercial HXPLE liners are well below the osteolysis threshold of 0.1mm/yr. Both HXPE liners have low wear rates, but further research is required to explore effects of long-term wear.

18. DOES ACETABULAR COVERAGE INFLUENCE THE CLINICAL OUTCOME OF SURGICAL TREATMENT OF CAM FEMOROACETABULAR IMPINGEMENT?

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Introduction

There is limited literature reporting the prognostic factors of patients undergoing arthroscopy for femoroacetabular impingement (FAI). Our study aimed to determine the influence of acetabuluar coverage on post-operative functional outcomes of surgical treatment of cam type FAI. In addition, literature suggests that intra-articular pathology may be the main prognostic predictor of clinical outcomes1,2. Therefore, we also looked at the Beck index to determine the influence of intra-articular pathology, and a few other dysplasia indices to determine their effects on functional outcomes.

Methods

We included 97 hips that underwent arthroscopy for Cam deformity between the ages of 17-48. All arthroscopic procedures had a partial capsulotomy and cam resection. Fifty hips underwent partial labrum resection only, 35 hips underwent labrum repair, 6 hips underwent micro-fracture and labrum repair, and 6 hips underwent micro-fracture and partial labrum resection. Radiographs were taken pre- and post-operatively, and were used to calculate Tonnis Grade for osteoarthritis, femoro-epiphyseal acetabular roof (FEAR) index, acetabular coverage, lateral center edge angle (LCEA), acetabular index, and extrusion index. We also used novel software (Hip2Norm)3 to determine acetabular coverage in 3D. The intraoperative Beck score was included in all operative reports. Pre- and Post-operative Hip Disability and Osteoarthritis Outcome Score (HOOS) was obtained.

Results

The FEAR index and LCEA have a strong negative correlation coefficient $r=-.037$ ($p<0.001$). Beck 1 and 2 hips had HOOS score 53.08% compared to Beck 3, 4, and 5 hips which had a HOOS score of 29.3% (statistically significant $p=0.03$).

Conclusions

The Hip2Norm software allowed us to translate the 2D plain AP films to 3D data, which gave us statistically significant results compared to using 2D plain films alone. Patients with anterior and posterior acetabular under coverage seem to have better clinical outcomes on preliminary analysis of our data. The most significant prognostic factor looking at HOOS score was intra articular pathology, where functional outcome was inversely related to beck score, consistent with current literature.

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19. COMPARING THE DIRECT ANTERIOR APPROACH WITH THE POSTERIOR APPROACH TO THE HIP: EARLY STEM MIGRATION AND COMPLICATIONS

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Introduction

The direct anterior approach (DAA) to the hip for total hip arthroplasty (THA) has proven to be less invasive and to lead to faster recovery when compared to the posterior approach (PA). However, there remains concerns with regards to early complications, particularly femoral component under sizing and the association with migration and implant loosening. The objectives of this study were to 1) compare early stem migration rates following THA using the DAA with those done using the PA and 2) compare early clinical outcomes and complication rates in both cohorts.

Methods

All patients that underwent primary THA at our institution between January 1 2008 and December 31 2013 were reviewed. Inclusion criteria were: the use of a ProFemur TL stem (MicroPort), primary OA, and a metal-on-polyethylene head-liner combination. Subsidence was measured using EBRA-FCA, with a minimum follow-up of two years. The 1-year, 2-year subsidence rates, and the percentage of patients to reach a subsidence of -1.5 and -2.7 mm in the first two years were calculated. All patients were reviewed for femoral complications throughout the follow-up duration. Clinical outcomes (Harris Hip, WOMAC, UCLA and SF-12) were assessed preoperatively and at 2 year follow up.

Results

A total of 388 hips (352 patients) fit the inclusion criteria. EBRA-FCA based exclusions resulted in DAA and PA groups sizes of 71 and 97 hips respectively. There were no significant differences in the 1-year, 2-year subsidence rates, and total subsidence at 24 months between groups. A higher percentage of DAA hips reached subsidence values of -1.5 mm and -2.7 mm in the first two years compared to PA hips (25% vs 16% and 11% vs 4% respectively). Hips operated on using the PA had higher instances of dislocations, femoral fractures and a higher revision rate compared to hips operated on using the DAA. No results were statistically significant (All $p>0.05$). There was a significant increase in all clinical outcomes at 24 months with no differences between groups.

Conclusions

While, in this early follow up study, DAA treated hips trended towards greater early subsidence, there was no association between the DAA and any significant increase in femoral component migration. The DAA was not associated with an increase in complications or subsequent revisions, producing similar clinical outcomes to PA treated hips. Mid-term and long-term data is required to assess if there exists a true increased risk of aseptic loosening secondary to migration with the DAA.

20. FEMOROACETABULAR IMPINGEMENT: DOES CORRECTIVE SURGERY AFFECT GROUND REACTION FORCE SYMMETRY DURING SQUAT TASK

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Introduction

Cam femoroacetabular impingement (FAI) leads to pain and limited range of motion [1-3]. Corrective surgery is frequently performed in order to reduce/eliminate pain and further development of osteoarthritis [4]. It is still unclear whether it would lead to better mechanical symmetry. Using ground reaction forces during a squat task would help understand potential joint compensatory effects and symmetry between limbs of FAI patients. The purpose was to compare ground reaction force symmetry between the operated and non-operated limbs in FAI patients during controlled squat tasks. A healthy, age-matched cohort was included as a control group.

Methods

Eleven male patients (pre-op: 25.5±2.7 kg/m^2; post-op: 25.6±3.6 kg/m^2) and 11 male control participants (25.9±3.4 kg/m^2) were recruited from the surgeon's clinical practice and underwent motion analysis before and 2 years after surgery. Either arthroscopy or anterior minimally invasive approach was performed by the same surgeon. Participants performed five deep squat trials, divided into descent and ascent phases, with each foot on an individual force plate. Vertical ground reaction force data were collected and exported to calculate the ground reaction force symmetry between both limbs using the symmetry angle [5]. Non-parametric Wilcoxon signed rank paired tests compared symmetry angle for pre- and post-op conditions, and a Kruskal-Wallis test compared FAI patients with the controls (CI=95%).

Results

During descending, the FAI group showed a non-significant reduction from pre- (3.0±2.5%) to post-op (2.4±2.7%, p=0.41), while the control group showed a 2.4±1.3% asymmetry. During ascending, the FAI group showed a positive change in symmetry angle from pre- (2.9±2.4%) to post-op (4.1±3.7%, p=0.22) while the control group demonstrated a symmetry angle of 2.3±1.3%.

Conclusions

FAI corrective surgery did not affect ground reaction force symmetry during squat tasks. This result is important for a clinical aspect since it shows that FAI patients do not present a compensatory contralateral strategy while keeping their balance during a closed kinetic chain movement and that surgery does not affect this strategy afterwards. Furthermore, as FAI surgery is a preventive treatment to avoid osteoarthritis, it infers that the compensatory contralateral strategy may be developed while the patient is evolving to osteoarthritis.

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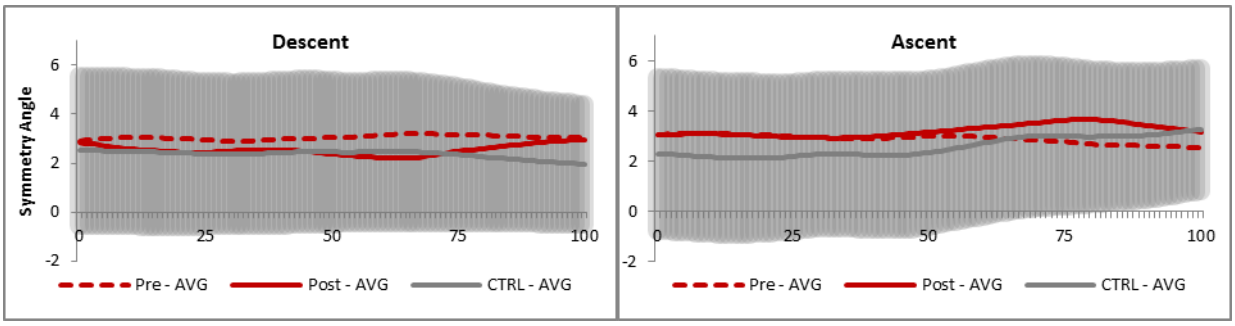
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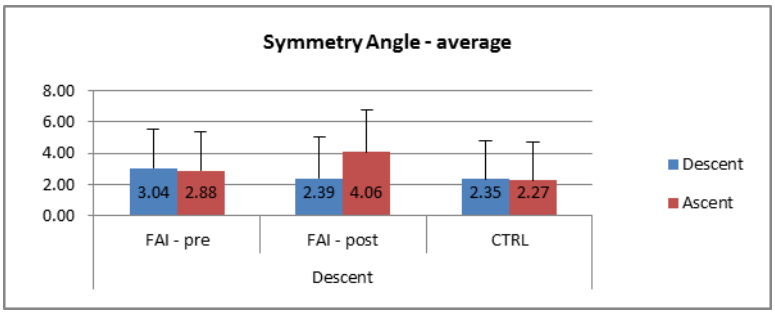
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21. RESIDENT AND FELLOW PARTICIPATION AND POSTOPERATIVE TECHNICAL OUTCOMES IN ELECTIVE ANTERIOR CERVICAL SPINE SURGERY

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Introduction

As awareness for quality control monitoring increases, concerns over integration of trainees into surgical care have been raised. The purpose of this study is to identify if resident participation in Elective Anterior Cervical Spine Surgery cases is associated with deleterious technical outcomes.

Methods

This is a retrospective study using the American College of Surgeons National Surgical Quality Improvement Program database. Data from patients undergoing elective anterior cervical spinal surgery between 2011-2012 were evaluated. Technical outcomes were defined as those that may be associated with intraoperative technique including surgical site infection (SSI), unplanned return to the operating room within 30 days. Duration of the operation was also compared. Unadjusted, multivariate (adjustments for age, gender, ASA and outpatient procedures) and subgroup analyses of potential interacting and confounding factors were performed to determine if resident or fellow participation was associated with significant differences in outcomes, compared with no trainee participation. Significant relationships were further evaluated by level of trainee (junior PGY1-3, senior PGY4-5, or fellow ≥PGY6) levels.

Results

1910 patients satisfied the inclusion / exclusion criteria. 1456 (76.2%) patients were operated on by the attending without a trainee in the room, 173 (9.1%) with a junior resident, 159 (8.3%) with senior resident and 122 Fellow: 122 (6.4%). There were no significant differences ($p = 0.40$) in technical complication rates in unadjusted (2.0% for attending only, 1.4% for trainees) and multivariate analysis. Although the numbers were too small to show a significant difference, the complication rate for orthopaedic trainees was 0.0% and neurosurgery trainees was 1.4%. OR time was significantly ($p < 0.0001$) longer (225 min+/- 93.3) for trainees compared to attending alone (165.1 min +/- 66.7). This difference remained significant after multivariate adjusted analysis and in subgroup analysis of outpatient only procedures. There were no significant differences between level of trainee.

Conclusions

Although resident and fellow participation does increase operative time, it does not appear to result in higher adverse technical outcomes in anterior cervical spine surgery.

22. BLOOD TRANSFUSION AND INFECTION IN ANTERIOR CERVICAL DECOMPRESSION SURGERY

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Introduction

Studies in transfusion of allogeneic blood have demonstrated an immunomodulating effect and may increase the risk of infection. Spinal surgery is considered to have an elevated risk of blood loss with significant associated transfusion requirements due to bone and epidural bleeding. However, there has been few studies on the issue of postoperative infections following transfusions.

Methods

We retrospectively analyzed the prospectively collected NSQIP database. Patients undergoing elective Anterior Cervical Decompression (ACD) between 2011-14 were identified. 12623 patients were analyzed after applying exclusion criteria. Infections were defined as: superficial wound infection, deep infection, wound dehiscence, organ space surgical site infection, sepsis, UTI or pneumonia. Multivariate logistic regression models were developed to adjust for confounding. Further subgroup analyses were performed to further adjust for confounding and to explore for interacting effects.

Results

55 patients received a transfusion and 240 patients had a postoperative infection. Age, weight, ASA class, duration of OR, preop. Alb., and preop. HCT were significantly associated with receiving a transfusion in univariate analysis. Unadjusted risk factors for infection included: transfusion (Unadjusted Odds = 13.4, 95%CI: 6.9-26.4), preop. HCT, preop. Alb., duration of OR, age, male sex, and ASA class. Multivariate models with all of the above significant factors demonstrated that transfusion remained significantly associated with postoperative infection (Adjusted Odds = 14.9, 95%CI: 1.1-187.5). Further subgroup analyses, based on duration of surgery, demonstrated that transfusion risks were still significant.

Conclusions

Allogeneic transfusion was significantly associated with increased risks of infections after elective ACD after adjusted analysis for known confounding factors. However, caution should be applied in inferring any causative effect due to other unknown confounding factors. Further study evaluating the effects of strategies to reduce blood transfusion may demonstrate a beneficial effect on reducing infection.

23. EARLY HEALING FOLLOWING PRE-OPERATIVE TREPHINATION: RESULTS FROM A RANDOMIZED, CONTROLLED TRIAL

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Introduction

Arthroscopic rotator cuff repair is highly effective at improving pain in patients with rotator cuff tears, but anatomic healing rates are variable. Current biologic approaches that aim to improve the healing rates through use of mesenchymal stem cells (MSCs) are labor intensive and expensive. Pre-operative bone trephination (microfracture of the tendon insertion site) is a novel approach to recruiting autologous MSCs to the site of cuff repair. Our hypothesis is that pre-operative bone trephination (microfracture) 5-7 days prior to arthroscopic rotator cuff repair increases the collagen content at early phase healing following cuff repair.

Methods

Patients undergoing arthroscopic rotator cuff repair were randomized to undergo a pre-operative bone trephination or a pre-operative sham bone trephination 5-7 days prior to the index surgery. The primary objective was to compare the collagen content at the rotator cuff enthesis as determined by 3-T MRI T2 mapping carried out 6 weeks following cuff repair. Secondary objectives included collagen and water content in 5 other regions of interest in the proximal tendon, sub-chondral bone, humeral head, cuff muscle, and control tendon. A sample size calculation determined that 84 patients provided 80% power with a 50% effect size to detect a statistical difference between groups.

Results

Baseline demographic data did not differ between groups including age ($p=0.4$), sex ($p=0.71$), affected side ($p=0.33$) and cuff tear size ($p=0.95$). Comparison of T2 maps between groups revealed that no statistical differences were detected ($p=0.70$). Secondary outcomes revealed no significant differences between the T2 maps across the other regions of interest.

Conclusions

No statistically significant differences in primary or secondary outcomes were identified between pre-operative bone trephination and sham bone trephination. Given the added time to complete the procedures and the added cost of the additional procedure, this trial does not provide justification for use of the pre-operative bone trephination technique.

24. A POINT-BASED MODEL TO PREDICT ABSOLUTE RISK OF REVISION IN SHOULDER ARTHROPLASTY

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Introduction

Shoulder arthroplasty has demonstrated good long-term survivorship, however younger age and osteoarthritis have been associated with early implant failure. We have aimed to construct a predictive model for risk of revision surgery after shoulder arthroplasty.

Methods

All patients who underwent shoulder arthroplasty in Ontario, Canada, were identified using data housed at the Institute for Clinical Evaluative Sciences (ICES). Demographic variables included time to revision surgery (or death), age, sex, Charlson comorbidity index, income quintile, presence of rheumatoid or OA and surgeon experience/volume. Cumulative incidence function was used to account for competing risk of death. Fine and Gray's sub-distribution hazard model (time to event analysis) was used with death treated as a competing risk. Discrimination of the model was assessed using Wolber's concordance index for models with competing risk. Concordance indexes at time points were estimated using bootstrap cross validation with 1000 bootstrap samples. Loss of predictive accuracy of the age based points scoring system was examined by regressing the incidence of revision on subjects' score.

Results

During the study period, 8,006 patients underwent either HHR or TSA and 424 (5.3%) underwent revision. Patient age (hazard ratio 0.974 $p<0.001$) and surgeon experience >25 years (HR 0.758, p-value 0.04.3) were associated with revision risk. Osteoarthritis and the interaction term between osteoarthritis and patient age<55 approached significance (osteoarthritis HR 0.815, $p=0.058$), interaction term HR 1.484 ($p=0.054$)). A point-based risk score was developed using age, osteoarthritis, and surgeon experience. Predictive curves were generated to calculate risk of revision. Each additional point score has an increased risk of revision of 12% (confidence interval 1.09-1.14). Highest concordance index achieved at year 10 was 0.63.

Conclusions

A predictive model was constructed to calculate absolute risk of revision of shoulder arthroplasty. Validation studies that apply this model to other cohorts should be done to test its performance across distinct populations.

25. DEFINING SAFETY OF OUTPATIENT TOTAL KNEE ARTHROPLASTY: EXAMINING APPLICATION, BARRIERS AND EXCLUSIONS

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Introduction

Limited healthcare resources challenge our ability to meet the increased demands for total knee arthroplasty (TKA) of a growing and aging population. Outpatient TKA allows us to perform more procedures without being hindered by limited inpatient bed availability and admission related costs. Studies have shown that complication rates are not increased for outpatient/short stay arthroplasty patients. Risk stratification is a key part of the selection process for same day discharge (SDD). Recent literature indicates that important risk factors predicting post-operative complications include cardiopulmonary disease, renal failure and liver cirrhosis. The objectives of this study are to estimate the ultimate proportion of TKA patients who can be safely booked for SDD, to identify barriers to SDD and better define appropriate absolute and relative exclusion criteria.

Methods

This is a retrospective review of 300 consecutive TKAs treated by the senior investigator (October 2015- March 2017). We determined the proportion of patients assigned to SDD and recorded reasons for exclusion: medical, no help at home and distance from hospital.

Results

For 300 consecutive TKA patients, 22% were assigned to SDD. Medical co-morbidity accounted for admission in 36%. Nearly 20% were excluded based on distance alone and less than 5% for lack of home support. The remaining 18% were admitted because surgery was done at a hospital that does not have capacity for SDD after TKA. There was no increase in emergency dept. visits and only two readmissions (≤90 days), one for deep sepsis requiring irrigation and liner exchange and another for manipulation for stiffness.

Conclusions

Based on our single-surgeon series, SDD can be applied safely to at least 20% of TKAs. A major barrier was distance to the treating hospital and lack of SDD program at all operative centers. Excluding these barriers, our data suggest that over 50% of patients are appropriate for SDD. This proportion will vary based on regional patient demographics and resources. Careful patient selection, education and a coordinated multidisciplinary team are essential. Recommended exclusion criteria include: cardiopulmonary disease, renal failure and liver cirrhosis. Further consideration must be given to distance from the treating hospital, as it is a major limitation for access to care. This could be addressed by utilization of less expensive care facilities, local community hospitals or even hotel accommodations, as is done for other outpatient procedures for patients living remotely.

26. A DECADE'S EXPERIENCE WITH THE ANTERIOR APPROACH FOR TOTAL HIP REPLACEMENT AT A TERTIARY CARE CENTER

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Introduction

The direct anterior approach for THA has gained popularity throughout the last decade. Early reports showed successful results with rapid functional recovery and low dislocation rates. However, concerns about learning curve and possible higher risk of revision. The purpose of our study is to report our 10-year experience in utilizing the anterior approach for THR operated by 4 senior surgeons either with the aid of the positioning table or regular table.

Methods

After IRB approval, we retrospectively reviewed the prospectively collected data through our electronic database for all patients underwent THR in the period between 2006-2016 (5562 hips), of which 1157 were primary THR were done using the direct anterior approach. The mean age at time of the index surgery was 60.84 years (SD=12.78). 470 (40.6%) were males and 687 (59.3%) females. The average BMI was 27.9 (SD=5.2). The primary diagnosis was in the majority cases degenerative OA 81%.

Results

Since 2006 our center's experience with DAA THR has grown from 1.5% to 55.6% of all THR currently averaging 20% over the years. The positioning table was used in 777 hips of which 449 females (57.8%) and 328 males (42.2%) with mean BMI 28.8 (SD=5.7). 380 hips were operated on the regular table, of which 238 females (62.6%) and 142 males (37.4%) with mean BMI 27.4 (SD=5.5). Intra-operative events were reported in 39 hips (3.4%): calcar crack (22 hips), femoral shaft fracture (3 hips) or perforation (5 hips) and trochanteric fracture (9 hips). 40 hips (3.5%) underwent revision surgery for: aseptic loosening in 11 hips, failed metal on metal in 11 hips, fractured ceramic linear in 2 hips, peri-prosthetic infection in 8 hips, peri-prosthetic fracture in 4 hips, instability in 3 hips and painful THR and intraarticular adhesion in one hip. Incidence of intraoperative events was 8% in the first 100 THR then reduced to 2.9%.

Conclusions

This study has shown the effect of the learning curve for THA using the direct anterior approach by analyzing the rate of intraoperative events and early revisions. The graduated introduction of the DAA for primary total hip replacement in a tertiary care center has an acceptable complication rate. The use of the positioning table favors a greater applicability of this approach to all patients. The limitation of our study included the variability of bearing surfaces utilized which affected the results in terms of early revisions.

27. EVALUATION OF CANCER-TESTIS ANTIGENS AS TARGETS FOR IMMUNOTHERAPY TO SARCOMA

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Introduction

T-cell based cancer immunotherapies are a promising alternative to traditional cancer treatments due to their ability to direct the immune system to target and eliminate cancer cells, leaving healthy cells unharmed. Our lab aims to develop a T-cell based immunotherapy for sarcoma. For this end goal, three aspects of tumors need to be identified/evaluated: 1) expression of targetable immunogenic sarcoma antigen; 2) human leukocyte antigen (HLA) expression on tumor cells as T cells can only recognize antigens (peptides) bound to HLA, and down-regulation of this molecule is one of the immune-evasion mechanisms employed by tumors; and 3) T cell infiltration of tumors. Cancer-testis antigens (CTA) are a group of proteins of great interest because of their tissue-restricted expression to germline cells and frequent expression in tumor tissues. As germline cells are immune-privileged because they do not express HLA, these proteins may serve as tumor-specific antigens for T cells recognition. The goal of this study is to screen for CTA and HLA expression, and tumor T-cell infiltration in human sarcoma specimens.

Methods

Expression of CTA, HLA, and T-cell infiltration was identified by immunohistochemistry (IHC). We evaluated the expression of NY-ESO-1, MAGE-A3, SSX and survivin in human sarcoma specimens to identify which antigen is most commonly expressed. Additionally, we quantified the level of expression of CTAs to 1) determine if CTAs are heterogeneously expressed in different sarcoma subtypes and 2) to identify the most highly expressed CTA in sarcoma.

Results

Quantification of IHC staining for CTAs revealed positive expression in 78.5% of samples. Further evaluation in each sarcoma subtype revealed a heterogeneous expression pattern of CTAs. MAGE-A3, SSX and survivin are expressed at intermediate to very high levels. Contrastingly, NY-ESO-1 is expressed at low levels in the majority of sarcoma samples (60%). Additionally, evaluation of HLA staining confirmed HLA expression in all sarcoma samples. CD3 staining revealed tumor T-cell infiltration in 76.5% of sarcoma samples.

Conclusions

High expression of MAGE-A3, SSX and survivin in sarcoma samples indicates that these CTAs could be used as immunotherapeutic targets. HLA expression and tumor T-cell infiltration in sarcoma samples suggests that T-cells generated in response to an immunotherapy may effectively infiltrate tumor and recognize HLA-antigen complexes on tumor cells. These results will contribute to the development of an immunotherapy for sarcoma.

28. ONCOLYTIC MARABA VIRUS MG1 AS A TREATMENT FOR SARCOMA

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Introduction

The poor prognosis of patients with advanced bone and soft-tissue sarcoma has not changed in the past several decades, highlighting the necessity for new therapeutic approaches. Immunotherapies, including oncolytic viral (OV) therapy, have shown great promise in a number of clinical trials for a variety of tumor types. However, the effective application of OV in treating sarcoma still remains to be demonstrated. Although few pre-clinical studies using distinct OVs have been performed and demonstrated therapeutic benefit in sarcoma models, a side-by-side comparison of clinically relevant OV platforms has not been performed.

Methods

Four clinically relevant OV platforms (Reovirus, Vaccinia virus, Herpes-simplex virus and Rhabdovirus) were screened for their ability to infect and kill human and canine sarcoma cell lines *in vitro*, and human sarcoma specimens *ex-vivo*. *In vivo* treatment efficacy was tested in a murine model.

Results

The rhabdovirus MG1 demonstrated the highest potency in vitro. Ex vivo, MG-1 productively infected more than 80% of human sarcoma tissues tested,, and treatment in vivo led to a significant increase in long-lasting cures in sarcoma-bearing mice. Importantly, MG1 treatment induced the generation of memory immune response that provided protection against a subsequent tumor challenge.

Conclusions

This study opens the door for the use of MG-1-based oncolytic immunotherapy strategies as treatment for sarcoma or as a component of a combined therapy.

29. CLINICAL RESULTS OF THE DYNASTY BIOFOAM® ACETABULAR COMPONENT IN PRIMARY TOTAL HIP REPLACEMENT

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Introduction

New porous interfaces for acetabular component fixation in primary total hip replacement have been introduced by a variety of manufacturers. A. The purpose of this study is to assess early clinical outcome with the *Dynasty BioFoam*® Acetabular component at a minimum of 2 years follow-up.

Methods

Between April 2010 and May 2014, 132 Dynasty *BioFoam*® (MicroPort, Memphis, TN) Acetabular component was used by 116 Patients. Mean age was 59.67 (21-93), mean BMI of 28.7 kg/m2 with 70 out of the 132 being females. Osteoarthritis was the most prevalent indication for the primary hip replacement of these patients (62%), followed by post-trauma/fracture (12%), childhood hip problems (12%), osteonecrosis (6%), inflammatory arthritis (4%), infection (2%), Tumour (1%), and Hip fusion (1%).

Functional scores and reoperations were recorded.

Results

At a mean follow-up to 47 months, eight (6%) patients required revision: five for aseptic loosening of the acetabular components, two for recurrent dislocation and one case due to painful metallosis.

In the acetabular loosening group, we had 2 cases where the shell was inserted in acetabulum with medial bone loss that required the augmentation with bone graft and screws. One shell was inserted in rheumatoid patient who has shallow acetabulum and another shell was inserted in a patient who has L1-L2 Fusion, 3 times revision of the contralateral hip and he has high hip centre with posteriosuperior Acetabular wall deficiency which was augmented with screws only. The fifth case of loosening was in a post traumatic patient who sustained anterior column fracture that received total hip replacement at the same setting of column fixation.

In regards to the two cases of recurrent dislocation, one case was in a patient who received the Dynasty *BioFoam*® in the setting of an posterior wall acetabular fracture dislocation, and the second case was in a patient who has long standing avascular necrosis complicated by superior acetabular Bone loss that was augmented with trabecular metal and screws. The only case of painful metallosis was seen in a patient who has degenerative primary osteoarthritis where the original acetabular component was malpositioned with excessive anteversion. Functional scores improved significantly with WOMAC going from 43.9 Pre-Operatively to 85.0 at 2 years fellow up and UCLA activity score from 4.49 to 6.67.

Conclusions

The Dynasty *BioFoam*® acetabular component has satisfactory performance at short-term follow up with excellent patient function.