14TH ANNUAL RESEARCH SYMPOSIUM

June 14, 2017
6:45 a.m. – 1 p.m.
Potter Conference Room
About the Continuing Medical Education (CME) Program for Physicians

New England Baptist Hospital is accredited by the Massachusetts Medical Society to provide continuing medical education for physicians.

New England Baptist Hospital designates this educational activity for a maximum of two credits AMA PRA Category 1 Credit. Physicians should only claim credit commensurate with the extent of their participation in this activity.

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New England Baptist Hospital
14TH ANNUAL RESEARCH SYMPOSIUM
JUNE 14, 2017

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Dear colleagues,
Welcome to New England Baptist Hospital and our 14th Annual Research Symposium. As authors, educators and researchers, it is important that we collaborate, share knowledge and advance the field through research efforts. I congratulate everyone who has contributed over the past year.

Sincerely,

Trish Hannon
President and CEO

DIVISION OF RESEARCH MISSION STATEMENT

Coordinate, Develop and Lead Clinical and Translational Research and Research Education at NEBH

Facilitate the continued success of existing research groups at NEBH, and forge new collaborations with investigators within and outside NEBH in clinical, translational and patient centered outcomes research

Collaborate with clinical programs at NEBH to develop evaluations of outcomes and quality

Develop new and foster existing educational initiatives focused on training and mentoring a new generation of scientists

Expand collaborations within NEBH and develop new research initiatives and programs with Tufts Medical School and University, Boston University, Harvard Schools and other institutions

Pursue research relationships with government, foundations, philanthropists, professional organizations, industry, and potential research participants

Disseminate research findings, promoting NEBH as a center of excellence in musculoskeletal disease management

Support and advance the NEBH mission and work with integrity, inclusion, and respect for our team, research subjects, and sponsors
NEBH DIVISION OF RESEARCH STAFF

Ronna Berezin  
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Dr. Scott Tromanhauser  
Director of Research Administration

Dr. Steven Vlad  
Director, Study Design
SPEAKER BIOGRAPHIES

Nancy Phoenix Bittner, PhD, CNS, RN

Dr. Nancy Phoenix Bittner has a large range of experience in both professional and academic nursing settings. Dr. Bittner has held roles as Professor, Assistant and Associate Dean for the School of Nursing, Science and Health Professions, and Vice President of Education at Regis College in Weston, Massachusetts. Her practice-based roles have included critical care clinical nurse specialist and nurse research scientist. Dr. Bittner has been heavily involved in multiple organizations and committees focusing on addressing issues related to nursing educations. She has been involved in the Accreditation Commission for Education in Nursing, the Massachusetts Action Coalition, and the Nursing Leadership Coalition among numerous others. Her research focuses on critical thinking, delegation, and missed care and her most recent publications include articles regarding this line of research, in addition to other research on the nursing faculty shortage, global initiatives, and education. Dr. Bittner has given many presentations related to her research at the state, regional, national, and international levels.

Leonard D’Avolio, PhD

Dr. Leonard D’Avolio, PhD is an Assistant Professor in the Brigham and Women’s Division of General Internal Medicine and Primary Care. He is also the CEO and co-founder of Cyft, a company focused on optimizing machine learning and natural language processing to improve healthcare. Dr. D’Avolio has been involved with many other organizations including Ariadne Labs, the Helmsley Charitable Trust Foundation, and Youth Development Organization among others. With Ariadne Labs, he founded the informatics team and led the creation of a system designed to improve neonatal care in India through the use of mobile phones. He has been a speaker and a writer for TEDMED, InformationWeek, and Scientific American with most of his topics revolving around healthcare IT innovation. Dr. D’Avolio has also led informatics for the Department of Veterans Affairs precision medicine initiative and has won awards for putting health data to work for Veterans.
AGENDA

6:45 – 7:00 am
Welcome & Refreshments
Scott Tromanhauser, M.D, M.B.A., M.H.C.D.S.
Director of Research Administration

7:00 –  7:35 am
Nancy Phoenix Bittner, PhD, CNS, RN
Interprofessional Research

7:40 – 8:15 am
Leonard D’Avolio, PhD
Everything you always wanted to know about Big Data*

*But were afraid to ask

8:20 am
Breakfast

8:45 am – 1:00 pm
Poster Presentations
ABSTRACTS

Blood Pressure Cuffs and Electrocardiographic Telemetry Lead Disinfection using Hydrogen Peroxide 0.5% Wipes

AUTHORS: Riley Risteen1,2, Susan Cohen MT(ASCP)SM1, Lauren Mooney, BSN, RN, WCC 1, Erika Giovannelli, BSN, RN 1, Gerald B. Miley, MD1,3, Brian Hollenbeck, MD1, 3 (Corresponding Author)

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2 Trinity College
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INTRODUCTION: Disinfection of high-touch surfaces in the hospital environment is critical for ensuring safe care. Blood pressure cuffs and electrocardiographic telemetry leads are potentially more difficult to disinfect due to the intricate surface of the equipment. The purpose of this study is to evaluate the effectiveness of Hydrogen Peroxide 0.5% wipes in disinfecting the intricate surfaces of blood pressure cuffs and telemetry leads.

OBJECTIVE: To determine the efficacy of Hydrogen Peroxide 0.5% wipes in cleaning and disinfecting inpatient hospital surfaces. This study will compare the effectiveness of the hydrogen peroxide wipes in disinfecting the smooth surfaces of patient trays and callbells, to the intricate surfaces of blood pressure cuffs and telemetry leads. From this information the study will evaluate the current cleaning protocols.

METHODS: A prospective cohort study of an inpatient telemetry ward at 118-bed orthopedic specialty hospital was designed to measure persistence of an ultraviolet indicator and presence of bacterial colonization on electrocardiographic telemetry leads and blood pressure cuffs. Call buttons and patient trays were used as control surfaces; these are high-touch smooth surfaces that are easy to disinfect using standard practices. 392 cultures were collected between July 11 and August 3, 2016 from 80 objects.

RESULTS: Of the cultures collected, 247/392 (63%) grew at least 1 Colony Forming Unit. No cultures grew MRSA, VRE, or Pseudomonas aerogenosa. Univariate analysis showed significant difference between all objects (p = 0.033). Blood pressure cuffs and call buttons were significantly cleaner than telemetry leads and patient trays. In a multivariable analysis after adjusting for other variables, odds of contaminated surface after terminal cleaning with hydrogen peroxide 0.5% wipes were 3.70 times greater for the patient tray than for blood pressure cuffs (p = 0.029), and 3.80 times greater for the telemetry lead than for blood pressure cuffs (p = 0.041). UV indicator persisted longer on blood pressure cuffs and telemetry leads than on the patient tray and call button (p < 0.001).

CONCLUSION: Hydrogen peroxide 0.5% wipes are more effective in disinfection of blood pressure cuffs than telemetry leads. When comparing control equipment, the hydrogen peroxide 0.5% wipes are more effective in disinfection of call buttons than patient trays. However, the absence of resistant and typically pathogenic microorganisms on the fomites suggests that current cleaning protocols are sufficient.

SPONSOR: New England Baptist Hospital, Division of Infectious Disease

DISCLOSURE STATEMENT: No disclosures.

ACKNOWLEDGEMENTS: The nursing staff and management on the telemetry unit Jenks 4 East is to be thanked for their corporation in collecting telemetry lead data.

PRINCIPAL INVESTIGATOR NAMES: Brian Hollenbeck, MD and Riley Risteen

CO-INVESTIGATOR NAMES: Susan Cohen, Lauren Mooney, Erika Giovannelli, and Gerald B. Miley, MD
Critical shoulder angle can predict full-thickness rotator cuff tears in patients with glenohumeral osteoarthritis

AUTHORS: 1Mantell M., 2Lowe J., 1Nelson R., 1,2Jawa A.
1 New England Baptist Hospital, Boston, MA, USA
2 Boston Sports and Shoulder Center, Waltham, MA, USA

INTRODUCTION: The Critical Shoulder Angle (CSA) is the angle formed between the plane of the glenoid and the most lateral aspect of the acromion on a true AP shoulder radiograph. A higher critical shoulder angle is correlated with rotator cuff tears (RCTs), while lower CSA is correlated with glenohumeral osteoarthrits (OA). Our goal was to investigate whether patients with concurrent glenohumeral OA and full thickness RCTs demonstrate a higher CSA than patients with OA alone.

OBJECTIVE: To our knowledge, no study has looked at CSA values in patients with both glenohumeral OA and full-thickness RCTs. Given that research has demonstrated a positive correlation between CSA and RCT, we hypothesized that these patients would have a significantly higher CSA than those with only glenohumeral OA. We believe CSA may prove a useful tool to help surgeons determine when it is necessary to order a preoperative MRI to evaluate the rotator cuff when planning for shoulder arthroplasty.

METHODS: Using a 2-surgeon shoulder arthroplasty registry, we identified 31 patients with both glenohumeral OA and full thickness RCTs confirmed via plain radiograph and MRI, respectively. Sixty-two age and gender matched controls (1:2 ratio) with both glenohumeral OA and an intact rotator cuff were identified from the same registry. Two independent observers evaluated the radiographs for CSA and acromiohumeral index (AHI). MRIs were evaluated by board certified musculoskeletal radiologists.

RESULTS: The average CSA was 29.7º ± 4.0° in the OA control group and 35.0º ± 3.4º in the concurrent RCT/OA group (p<.0001). AHI was comparable between the groups (p = 0.13). Post hoc power analysis demonstrated that sample size was sufficient to achieve 99% power to detect a difference in CSA between the groups given the standard deviation of 4.5° and a mean difference of 5.3°. Interobserver reliability of the independent reviewers was excellent (κ = 0.89) (ρ = 0.95). The receiver operating characteristic curve for CSA demonstrated that a value >35º was 90% specific and 52% sensitive for a full thickness RCT in the setting of OA.

CONCLUSION: Concurrent glenohumeral OA and full thickness RCT is associated with greater CSA values when compared to patients with glenohumeral OA alone. Our results are consistent with the existing literature and lend further support to the utility of the CSA. The CSA measurement may be useful in determining the need for an MRI to assess rotator cuff integrity in the arthritic population when planning for shoulder arthroplasty.

DISCLOSURE STATEMENT: Dr Jawa has been a paid speaker for Don Joy Orthopaedics Global

PRINCIPAL INVESTIGATOR NAME: Andrew Jawa

CO-INVESTIGATOR NAMES: Matt Mantell, Jeremy Lowe, Ryan Nelson
Comparing Recovery Trends, Outcomes, and Treatment Efficacy of Primary Anatomic and Reverse Total Shoulder Arthroplasty

AUTHORS: 1Testa, E.J., 2Lowe, J.T., 3Jawa, A., MD
1 Tufts University School of Medicine, Boston, MA, USA
2,3 Boston Sports and Shoulder Center, Waltham, MA, USA
3 New England Baptist Hospital, Boston, MA, USA

INTRODUCTION: Recent literature underscores the controversy regarding outcomes following anatomic and reverse total shoulder arthroplasty (TSA and RSA). Although several studies suggest that RSA patients have inferior outcomes and recovery rates, there is increasing evidence that both procedures can yield comparable outcomes. Using a prospective registry, we sought to compare recovery trends through 2 years following primary TSA and RSA.

OBJECTIVE: 1) We hypothesized that RSA patients would have similar functionality as well as recovery trends when compared to TSA patients. 2) We hypothesized the efficacy, defined by the improvement from preoperative scores, would be similar between the two cohorts.

METHODS: We retrospectively identified 150 consecutive patients (153 shoulders), including 89 TSAs and 64 RSAs performed by a single surgeon. We compared outcomes amongst the cohorts using the American Shoulder and Elbow Surgeons (ASES) questionnaire and the short-form Disabilities of the Arm, Shoulder and Hand (QuickDASH), along with visual analog scale (VAS) pain and range of motion (ROM), at routine follow-ups. For each measured outcome (ASES total score (range, 0-100), ASES function (range, 0-50), VAS pain (range, 0-10), QuickDASH (range, 0 – 100), FF, ER, and IR) we performed used either a two-tailed T-test for independent samples (for normal distribution) or Wilcoxon sign-rank test (for non-normal distribution) to compare the cohorts. Analysis was performed independently for each outcome at the following time points: preoperative, 6 weeks, 3 months, 6 months, 1 year, and 2 years postoperatively. To compare differences in the treatment efficacy of primary RSA to primary TSA, improvement from preoperative PROM scores and ROM were compared at 6 months, 1 year, and 2 years following surgery.

RESULTS: One year postoperatively, ASES total score (RSA, 82.4; TSA, 87.1; \( p = 0.04 \)), ASES function (RSA, 35.9; TSA, 39.9; \( p = 0.04 \)), and ROM measurements were greater in the TSA cohort. These trends were largely maintained through 2 years. The amount of pre to post-operative improvement at 6 months, 1 year, and 2 years were similar between RSA and TSA, with the exception of rotational motion at 6 months and 1 year, as well as ASES function and external rotation at 2 years, at which time TSA outperformed RSA.

CONCLUSION: Both primary reverse and anatomic total shoulder arthroplasty demonstrate rapid improvements in pain, yet somewhat slower improvement in function, in most patients. Patients treated with TSA generally outperform those treated with RSA, achieving greater ROM and functional scores at short to mid-term follow-up. Despite TSA patients demonstrating superior overall functional outcomes, most measures of treatment efficacy were similar between the RSA and TSA cohorts through from 6 months through 2 years postoperatively.

DISCLOSURE STATEMENT: A. Jawa has been a paid speaker for DJO Global and a consultant for Wright Medical.

PRINCIPAL INVESTIGATOR NAME: Andrew Jawa, MD

CO-INVESTIGATOR NAMES: Edward J. Testa, Jeremiah T. Lowe
Factors Influencing Survivorship of Total Knee Arthroplasty in Vasculopathic Patients

Authors: Langfitt MK, Gad BV, Travers CS, Robbins C, Talmo CT, Bono JV

Introduction: The survivorship of total knee arthroplasty procedures in patients with peripheral vascular disease is not known and little has been written regarding comorbid factors that affect outcomes in total knee arthroplasty patients with peripheral vascular disease.

Objective: The purpose of this study was to examine factors that could potentially affect survival with the endpoint being a second operation on the operative knee. The authors hypothesized that preoperative ankle-brachial index values and the presence of vessel calcification on x-ray would be patient factors that would decrease survival.

Methods: 360 total knee arthroplasties were performed in 309 patients who were defined as vasculopathic between January 1, 2004, and December 31, 2013. Preoperative ankle brachial index (ABI), patient’s date of surgery, sex, age, body mass index (BMI), tourniquet use, American Society of Anesthesiologists (ASA) score, and follow-up data were obtained. Failure was defined as a re-operation on the operative knee. Patients were included if they experienced a failure or had at least two years of follow up data available for study. 92 total knee arthroplasties met inclusion criteria. Continuous variables and categorical variables were compared by Student’s T-Test and Chi Square or Fisher’s Exact Test respectively. Survival was calculated by Kaplan Meier analysis and cofactors affecting survival were accounted for. Odds ratios were calculated for patient factors; hazard ratios were calculated by Cox regression analysis.

Results: 92 total knee arthroplasties in 80 patients were included. 27 total knee replacements were performed in men. The average age was 68.3 years, the average BMI was 32.43, and the average ASA score was 2.43. Tourniquet was used in 77 patients. 68 CR total knees, 23 PS total knees, and 1 distal femoral replacement was performed. Mean ABI was 1.016. 8 patients had calcifications on x-ray prior to surgery. Overall Kaplan Meier Survival for the cohort was 9.378 years. With cofactors included, patients with a preoperative ABI of below 0.7 had a statistically significant difference in survival than those with an ABI greater than 0.7 (ABI <0.7, 6.854 years; ABI>0.7, 9.530 years; p =.015). Patients with a preoperative ABI below 0.7 also had greater odds of failure and were at higher risk for earlier failure (OR = 6.4 p=0.03, HR =1.668 p=0.047). When corrected for age, sex and BMI, the hazard ratio for patients with a preoperative ABI below 0.7 worsened (HR =1.913 p=0.036). Survival difference for patients with a preoperative ABI below 0.9 was also statistically significant (ABI<0.9, 7.755 years; ABI>0.9, 9.575 years; p =0.028). Hazard and odds ratios were not statistically significant. Survival analysis could not be calculated for patients with preoperative calcifications on x-ray because none experienced a failure during the study period. The remaining patient factors produced no statistically significant differences in survivorship, odds of failure, or hazard ratios.

Conclusions: No previous study has examined preoperative ABI as a risk factor for possible failure of total knee arthroplasty. This study has determined a threshold ABI of 0.7 where patients are at increased risk for second operation and decreased survival. Although there was a statistically significant difference in survival between patients with a preoperative ABI of below 0.9 and those above it, the odds and hazard ratios were not significant. This could be due to the small sample size in this study, or the relatively strict inclusion criteria. The presence of calcifications on x-ray was not found to be a factor that affected survival. Given that none of the 8 patients with preoperative calcifications who were included in the study experienced a failure, it is difficult to gain a meaningful conclusion from this data due to the small sample size. Other factors examined in this study were not hypothesized to be risk factors for failure, and the study also concluded this. A larger cohort would be beneficial to determine a more precise threshold as to when preoperative ABI and/or calcifications should be determined as contraindications for elective total knee arthroplasty.

Disclosure Statement: Dr. Bono has received funds for consulting and royalties for inventions and intellectual property with Stryker. Doctors Talmo, Langfitt, Gad, and Travers have not received compensation greater than $5000 from any company.

Acknowledgements: Special thanks to Dr. Bono for developing the study and allowing us to study his patients, to Dr. Talmo for his input and suggestions for improvement, and to Dr. Langfitt, Dr. Travers and Dr. Robbins for putting together the database and reviewing the charts.

Principal Investigator Name: James V Bono, MD

Co-Investigator Names: Maxwell K Langfitt, MD, Bishoy V Gad, MD, Chris S Travers, MD, Carl T Talmo, MD
Intraoperative Proximal Tibia Periprosthetic Fractures in Primary Total Knee Arthroplasty


1 New England Baptist Hospital, Boston, MA
2 Philadelphia College of Osteopathic Medicine, Philadelphia, PA

INTRODUCTION: The surgeons at NEBH perform about 1800 Stryker Triathlon total knee arthroplasties (TKAs) per year. We have identified and discussed eight intraoperative tibia fractures in our morbidity and mortality (M&M) conference between 1/1/2012 and 12/31/2016. This complication has been described previously in the literature, but never in this type of TKA design. Intraoperative fractures force the surgeon to alter the post-operative rehabilitation of the patient as well as change his intraoperative reconstructive plan. If we can determine risk factors to fracture then we can help prevent it from occurring in the future. There is a paucity of literature regarding intraoperative tibia fractures in TKA and none describing it in the Stryker Triathlon system.

OBJECTIVE: To determine the incidence of intraoperative tibial fractures in Triathlon TKA and to determine any risk factors associated with intraoperative fracture.

METHODS: Eight intraoperative tibia fractures have been identified and discussed in our M&M conference between 1/1/2012 and 12/31/2016. To determine the incidence we searched our Optum OR database for all Stryker primary cruciate retaining or posterior stabilized TKAs that were performed over that time period. To determine the risk factors associated with an intraoperative fracture we randomly selected 100 patients to act as a control group. We analyzed comorbidities, previous surgery, size of components used, and radiographic features of each patient. We analyzed the final radiographs to determine if there was any evidence of early failure related to the intraoperative fracture.

RESULTS: The total number of Stryker Triathlon TKAs performed in the study period was 7528 and the number of fractures was 8. The incidence of intraoperative tibia fractures is 0.11%. The risk factor identified was preoperative varus alignment. Average follow up of fracture patients was 349 days (50-1095).

CONCLUSION: The incidence of intraoperative tibia fractures with the Stryker Triathlon TKA is 0.11%. The risk factor identified was preoperative varus alignment.

DISCLOSURE STATEMENT: One of the authors (JVB) has received funding from Stryker as a paid speaker, presenter, and consultant, has received royalties for intellectual property from StrykerSpectra, has received royalties, financial or material support from Springer publishing. One of the authors (CTT) or their relatives has received funding from Astra-Zeneca as an employee, and acts as an editorial or governing board member for the Journal of Arthroplasty. One of the authors (CWD) or their relatives receives material support from Pfizer. The remaining authors (KP, JB, CER) have nothing to disclose.

PRINCIPAL INVESTIGATOR NAME: Carl T. Talmo, MD

CO-INVESTIGATOR NAMES: Christopher W. Damsgaard MD; Kevin Pinkos, DO; Jonathan Brown, DO; Claire E. Robbins, PT, DPT, MS; James V. Bono, MD
Prior Ipsilateral Shoulder Surgery Negatively Impacts Early Outcomes After Reverse Shoulder Arthroplasty

AUTHORS: 1Testa, E.J., 2Lowe, J.T., 3Menendez, M., MD, 4Kester, C., DO, 2,5Jawa, A., MD

1 Tufts University School of Medicine, Boston, MA, USA
2 Boston Sports and Shoulder Center, Waltham, MA, USA
3 Tufts Medical Center, Boston, MA, USA
4 Philadelphia College of Osteopathic Medicine, Department of Orthopaedics, Philadelphia, PA, USA
5 New England Baptist Hospital, Boston, MA, USA

INTRODUCTION: Reverse total shoulder arthroplasty (RSA) has become a widely utilized procedure for the treatment of rotator cuff insufficiency and arthropathy in the setting of glenohumeral osteoarthritis. Considering the end-stage nature of these conditions, patients have often previously undergone surgical intervention on the shoulder prior to an attempt at total joint replacement. The purpose of this study was to evaluate the relationship of prior shoulder surgeries on outcomes following a subsequent ipsilateral RSA.

OBJECTIVE: 1) We hypothesize that patients who have undergone any ipsilateral shoulder surgery prior to RSA will have inferior functional and patient-reported outcomes than those who have not had any prior surgical intervention on the ipsilateral shoulder. 2) We hypothesized that there would be a linear correlation between the number of prior shoulder surgeries and inferior outcomes following ipsilateral RSA.

METHODS: We retrospectively analyzed data from one surgeon’s shoulder arthroplasty registry, selecting patients who underwent RSA for the indication of rotator cuff arthropathy, insufficiency, or tear with concomitant glenohumeral osteoarthritis between 2013 and 2015 (n = 99). All revision arthroplasty patients were excluded. Outcomes were patient-reported, such as American Shoulder and Elbow Surgeon’s (ASES) total form score (0 to 100, with 100 being full function and no pain) and visual analog scale (VAS) pain (0 to 10 scale), as well as functional measurements recorded by the surgeon at one year of follow up. These included external rotation (ER) and forward flexion (FF), which were measured in degrees. We further categorized prior ipsilateral shoulder surgery into three subgroups: arthroscopic debridement, arthroscopic soft tissue repair, and open surgery. We performed regression analysis to determine if there was a correlation between number of prior surgeries and each outcome score at one year postoperatively.

RESULTS: Linear correlations were demonstrated between the total number of shoulder surgeries and ASES total score ($m = -5.1, R^2 = 0.11, p = 0.001$), VAS pain ($m = 0.4, R^2 = 0.10, p = 0.001$), and FF ($m = -4.7, R^2 = 0.05, p = 0.02$), but not ER ($m = -2.5, R^2 = 0.03, p = 0.09$). There were also linear relationships between the number of prior arthroscopic soft tissue repair surgeries and outcomes after RSA with respect to ASES total score ($m = -7.7, R^2 = 0.13, p = 0.0003$), VAS pain ($m = 0.7, R^2 = 0.12, p = 0.0004$), and FF ($m = -6.9, R^2 = 0.06, p = 0.01$), but not ER ($m = -2.7, R^2 = 0.02, p = 0.19$). There were no independent associations between either the number of prior arthroscopic debridements or number of prior open surgeries performed and outcomes after RSA at one year.

CONCLUSION: The results of the current study demonstrate an association between prior shoulder surgery and one year functional and patient-reported outcomes after ipsilateral RSA. Specifically, there is a weak negative correlation between the total number of prior shoulder surgeries and ASES total score, as well as forward flexion, demonstrating inferior outcomes in the prior surgery cohort. A similar, yet negative, correlation was visualized regarding VAS pain in this analysis, again demonstrating inferior outcomes in the prior shoulder surgery group. Comparable associations were demonstrated by the subgroup of patients who underwent prior arthroscopic soft tissue repair. However, we found no significant relationship between prior shoulder surgery and external rotation. Similarly, no significant correlations were found between the number of prior arthroscopic debridement or open surgeries with respect to outcomes after ipsilateral RSA.

DISCLOSURE STATEMENT: A. Jawa has been a paid speaker for DJO Global and a consultant for Wright Medical.

PRINCIPAL INVESTIGATOR NAME: Andrew Jawa, MD

CO-INVESTIGATOR NAMES: Edward J. Testa, Jeremiah T. Lowe, Mariano Menendez, MD, Christopher Kester, DO
Risk Factors for Wound Complication in Direct Anterior Approach Primary Total Hip Arthroplasty

AUTHORS: Counterman K2, Talmo C1, Shah V3, Van Flandern G3, Hollenbeck B1
1Division of Infectious Disease, New England Baptist Hospital, Boston MA
2Division of Research, New England Baptist Hospital, Boston MA
3Department of Orthopedic Surgery, New England Baptist Hospital, Boston MA

INTRODUCTION: Direct anterior approach primary total hip arthroplasty (DAA THA) offers benefits of decreased muscle injury and faster recovery time. Existing studies have identified obesity and diabetes as the predominant risk factors for wound complication. At New England Baptist Hospital, this procedure has primarily been limited to patients without these underlying conditions. In this exploratory study, we aim to identify additional risk factors for wound complication in our relatively healthy population of patients undergoing DAA THA.

OBJECTIVE: To identify risk factors for wound complication in DAA THA.

METHODS: We conducted a retrospective cohort analysis of all DAA THA cases performed between May 2013 and December 2016. Five hundred and sixteen DAA THA surgeries were performed during this time period. Patient demographics and procedure related variables were collected from our internal orthopedic registry. Patient’s perioperative colonization status was extracted manually from our microbiology records. Data on patient’s postoperative physical function was collected from our inpatient PT records.

The primary outcome of our study was postoperative wound complication after DAA THA. Wound complication was defined as mention of wound complication or wound dehiscence by a physician within 90 days of the procedure, and absence of stitch abscess. All patient data was entered into a REDcap database. Univariate and multivariable logistic regression analysis was performed in SAS (version 9.3, Cary NC). The univariate analysis was conducted to compare patient data using t-tests, and a Fisher Exact Test. A p-value of P ≤ 0.05 was considered statistically significant. Approval was granted by our institutional review board prior to the review of our records.

RESULTS: Twelve (2.36%) of the 508 patients used in our analysis developed postoperative wound complication. In the univariate analysis, being discharged to rehab significantly increased a patient’s risk of wound complication [OR=5.79 (1.48-22.63); P=0.005]. The multivariable logistic regression showed an association between wound complication and the number of stairs climbed on post operation day 1. Adjusted for age, BMI, gender, and diabetes, patients who climbed greater than 10 stairs on post operation day 1 demonstrated eleven times greater odds of wound complication compared to the patients who were unable to climb stairs (P=0.014).

CONCLUSION: Increased postoperative activity increases a patient’s risk of wound complication, as patients who climb more stairs postoperatively were at greater risk. It is our hypothesis that the mechanical stress on the anterior incision location can lead to complication when patients overexert themselves postoperatively. In addition, being discharged to rehab increased a patient’s risk of wound complication.

DISCLOSURE STATEMENT: None

PRINCIPAL INVESTIGATOR: Brian Hollenbeck, MD
Sustained Impact of Blood Management Strategies in Orthopedics: Continuous Quality Improvement

AUTHORS: LeVinus, LA, Deeney, M
New England Baptist Hospital, Boston, MA

INTRODUCTION: Transfusions are one of the most over-utilized treatments performed in any hospital setting (Choosing Wisely Campaign, April 2014, www.choosingwisely.org/societies/american-association-of-bloodbanks). Costs and risks attributed to transfusions are high and may have a significant impact on patient safety. In our institution we perform over 10,500 joint replacements and spine surgeries per year, making transfusion-associated costs very high. Since our last formal evaluation of the metrics used post implementation of Patient Blood Management Strategies, questions regarding the feasibility of continued transfusion reduction and sustainability of the program were raised by administration and key stakeholder physicians.

OBJECTIVE: The objective of this study is to determine what, if any, sustainable improvement to our blood utilization dashboard has occurred through the enhancement of our Patient Blood Management Program. The three metrics being evaluated: 1) Transfusion Rate per Discharge; 2) Length of Stay (LOS); 3) Purchased Blood Product Cost Center budget reduction.

METHODS: We monitored the following PBM strategies and where necessary made the following changes: 1) revised the Maximum Surgical Blood Ordering Schedule (MSBOS) specifically reducing primary Total Hip Arthroplasty and certain additional spine procedures from Type and Crossmatch to Type and Screen Only; 2) Revised Transfusion Thresholds (Hemoglobin level and clinical symptoms) based on transfusion data collected and through consensus of both medical and surgical physicians practice; 3) Promoted to both physician and administrative stakeholders our blood utilization dashboard which allowed quarterly review of the effects of the changes in policy and practice on transfusion rates at both Transfusion Safety Committee and Medical Executive Committee.

RESULTS: The sustainable impact of PBM strategies was monitored and measured with three organization wide metrics updated using data from FY13 as baseline through the first 6 months of FY17.

CONCLUSION: The data collected show that there has continued to be a reduction in transfusion rate, and blood expenditures through FY16. Length of stay has continued to be reduced, which is an indicator that a more restrictive transfusion strategy has not compromised quality outcomes. Further, continued monitoring of parameters, evaluation of changes to policy and practice related to transfusion medicine, and communication of findings to providers/administration will be the hallmark of our Patient Blood Management program and should provide continuous quality improvement in transfusion medicine for our patients into the future.

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PRINCIPAL INVESTIGATOR NAME: Linda LeVinus
CO-INVESTIGATOR NAMES: Michele Deeney
The Effect of a Skin Barrier Film Product on Incidence of Postoperative Skin Blister Development in Spine Surgery: A Randomized Study

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INTRODUCTION: Patient injury prevention is a core standard of practice provided within the perioperative process. Wound blistering at dressing margins is a recurrent problem that is under-researched despite it being the second most common adverse event related to orthopedic surgery behind infection. Tension blisters represent a separation of the epidermis from the dermis which occurs when adhesive strength exceeds skin strength. With the development of tension blisters, the patient experiences increased pain, delayed wound healing, and ultimately the hospital acquires an increased associated cost burden. The decrease in the occurrence of post-operative skin blisters on the other hand, has been shown to be correlated with a decrease in the associated risks of surgical site infections as well as a decrease in the need for an extended length of stay in relation to acquired skin blisters. Due to limited studies that examine the effects of different surgical dressings, there is no conclusive evidence that has prompted any recommendations for standardized dressing use to prevent tension blisters. At New England Baptist Hospital, wound blistering has not been recorded consistently and in a standardized fashion. This controlled trial randomized 188 surgical patients to either a standard wound dressing or one with an additional skin film barrier beneath it and systematically recorded wound blistering in an effort to determine whether addition of such a barrier could reduce the rate of blistering.

OBJECTIVE: To evaluate the effectiveness of utilizing a skin barrier film underneath the transparent film dressings and drapes in the prevention of post-operative skin blister development.

METHODS: Subjects were identified in OR Manager from a pool of 7 spine surgeons at New England Baptist Hospital. 188 surgical spine patients who underwent fusions, revision fusions, or multi-level laminectomies were randomized to one of two arms. In the treatment arm, upon closure of the wound the Duraprep (Betadine alcohol prep) was removed with alcohol swabs and left to dry per manufacturer’s instructions. Skin film barrier swabs were then used to apply the product (terpolymer based alcohol-free barrier film) onto the skin and left to dry for 30 seconds per manufacturer’s instructions, upon which the regular dressings were then applied. The control group received the standard dressing without the alcohol and skin film barrier. Subjects’ wounds were evaluated for tension blisters at their post-operative dressing change according to surgeon protocol—usually on post-surgical day 2 or 3. Trained investigators documented skin conditions and whether the skin was clean, dry and intact (C/D/I) or not intact (other: redness/tearing/blistering). All patient data was entered in to a REDCap database for secure storage and ease of data analysis. Univariate regression analysis was performed in SAS (version 9.3, Cary NC). A chi-square test was used unless an outcome resulted in 5 or less cases, which is when a Fisher’s Exact test was used. A p-value of p<0.05 was considered significant.

RESULTS: Of the 188 subjects enrolled 95 were randomized to the treatment group and 93 to the control group (table 1). We identified no difference in the distribution of pre-identified risk factors between the two arms. 29 (15.4%) of the total number of participating subjects had skin that was not classified as C/D/I at their post-operative dressing change according to surgeon protocol—usually on post-surgical day 2 or 3. Trained investigators documented skin conditions and whether the skin was clean, dry and intact (C/D/I) or not intact (other: redness/tearing/blistering). All patient data was entered in to a REDCap database for secure storage and ease of data analysis. Univariate regression analysis was performed in SAS (version 9.3, Cary NC). A chi-square test was used unless an outcome resulted in 5 or less cases, which is when a Fisher’s Exact test was used. A p-value of p<0.05 was considered significant.

LIMITATIONS: The trial may have been underpowered to detect a difference between the treatment arms.

CONCLUSION: We failed to show a statistically significant difference in blistering between the group that received the additional skin film barrier and the control group. Additional co-morbidities (nutrition status, diabetes, chemotherapy and long term steroid use etc.) that were identified before the study began were equally distributed between the two study arms. This research suggests that the addition of a skin film barrier under the adhesive dressings and drapes may not reduce the occurrence of tension blisters. The expenses associated with skin barrier use may be unnecessary as they may not prevent blistering in most patients. Nurses must be vigilant in the assessment of their patient’s needs using critical judgment based on the patient’s health and evidence based practice in the use of skin film barriers.
Tissue-Preserving Total Hip Arthroplasty: Comparing Tissue Damage in Superior and Anterior Approaches

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INTRODUCTION: Interest in tissue-preserving or minimally invasive total hip arthroplasty (THA) is increasing with focus toward decreased hospital stay, enhanced rehabilitation, and quicker recovery for patients. Two tissue-preserving techniques, the anterior and superior approaches to THA, have excellent clinical results, but little is known about their relative impact on the soft tissues. The purpose of this study was to evaluate the type and extent of tissue damage after THA with each approach, focusing on abductors, short external rotators, and the hip capsule.

OBJECTIVE: To evaluate the type and extent of tissue damage after superior THA versus anterior THA, focusing on abductors, short external rotators, and the hip capsule.

METHODS: Eleven fresh-frozen cadavers (22 hips) were used. They were randomized to an anterior THA performed on one side and superior THA performed on the other, in the senior authors’ standard technique. Post surgical dissections were performed by two independent examiners who graded the level of tissue injury. Muscle bellies, tendons, and capsular attachments were graded as intact, split, damaged (insignificant, minimal, moderate, or extensive damage), or detached based on direct visual inspection of each structure. Tissue injury was analyzed with either a chi-squared (≥5 qualifying structures) or Fisher’s exact test (<5 qualifying structures). P values <0.05 were significant.

RESULTS: The abductor muscles or tendons were intact or insignificantly damaged in 63.6% of anterior approach specimens compared with 84.1% of the superior specimens (p= 0.03). Specifically, the gluteus minimus tendon had moderate or extensive damage in 63.6% of anterior specimens compared with none of the superior specimens (p <0.01). Short external rotators (SERs) group, defined as both the muscle and tendon of the piriformis, conjoint, obturator externus, and quadratus, were intact or insignificantly damaged in 63.6% of anterior approach specimens compared with 80.5% of the SER group of superior specimens (p = 0.02). The femoral attachments of the anterior, posterior, and superior capsules were extensively damaged or detached in 90.9%, 81.8%, and 100% of anterior approach specimens respectively compared with 0%, 9.1% and 9.1% of superior approach specimens respectively (all p <0.01).

CONCLUSION: The superior approach to THA demonstrated significantly less soft-tissue destruction when compared to the anterior approach, specifically with respect to the gluteus minimus tendon, short external rotators, and capsule.

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Benefits and Challenges of Collecting PROs at Pre-Admission Screening: Acquiring a Critical Measure for the Success of NEBH Research Registry

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INTRODUCTION: The NEBH Orthopedic Research Registry, through its Registry Committee, tackled the task of strategically measuring patients’ pain score, by using Patient Reported Outcome (PRO) mobile-surveys at pre-admission screening. It is this baseline PRO measure that brings extraordinary value to the NEBH Registry and will enable cutting edge research in orthopedic arthroplasty and spine surgeries. The benefits and challenges encountered while implementing a successful PRO collection system at Pre-admission screening unit (PASU) are described here.

METHODS: The Registry Committee envisioned the implementation of a PRO collection system at PASU using secure iPads with electronic surveys, during a 15-minute window that is dedicated for research at PASU. The nursing managers in the PASU were invited to join the Registry Committee – they suggested using Patient Care Technicians as the staff members tasked with collecting the PROs as patients enter the exam room for their appointment. In order to add a PRO Collection System to the NEBH Orthopedic Registry, the Registry Committee filed IRB documentation including the following surveys: electronic HIPAA Informed Consent, VAS pain score, HOOS Jr., KOOS Jr., Oswestry and Neck Disability indices, and PROMIS Physical Function computer adaptive test. The system was implemented as a REDCap survey that is accessed through the PASU iPads from within the NEBH firewall. The Pre-Op PRO collection system was implemented in two-stages: beta-run, and a live-stage. Once the PRO data is captured in REDCap, it is migrated into the NEBH Research Registry on a monthly schedule. Most importantly, the surveys are structured such that every patient has a chance to accept or decline participation.

RESULTS: The PRO Collections System went live in December of 2016 with Joint PRO surveys and February of 2017 with Spine PRO surveys. Patients are able to complete the surveys in an average time of 9 minutes during their pre-operative appointment (times over 1 hour were excluded when calculating average, as this assumes an interruption during the survey). Since its implementation there has been an average of approximately 500 PRO records collected per month, with 5.81% of patients submitting a declined consent.

DISCUSSION: Pre-operative PROs provide a pain index baseline and enable earlier PRO research. In addition, PRO data (as Level III), complements the Level I and II data collected by the NEBH Research Registry. The challenges encountered after going live with the PRO Collections System are the following: 1) reduced WIFI access in some areas prohibited the use of all examinations rooms, 2) some patients are not comfortable with mobile technology and are not interested in participating, but do not record their decline consent in the iPad, 3) some patients recognize the PRO surveys from previous visits to their doctor and decide to decline the consent, 4) despite consenting to participate and providing pre-operative PRO data, some patients do not provide a follow-up email address, 5) PROMIS CAT experiences downtime every few months and the PRO Collection System is set on hold until services have been resumed, 6) occasionally an iPad protective case is damaged by regular use and that iPad has to be discontinued until the case is replaced, and 7) some patients ask for a second chance to improve their answers which can generate a second record for the same patient. The results indicate a strong PRO baseline has been obtained.

CONCLUSION: The implementation of a PRO Collection System was a success due to the attention to detail of Patient Care Technicians in PASU. The respect and care they show to each NEBH patient has brought added value to the PRO Collection System. Thanks to the professionalism of the NEBH Patient Care Technicians, the Registry Committee has achieved its goal and can now move toward implementing a Follow-up PRO Collections System.

SPONSOR: New England Baptist Hospital

DISCLOSURE STATEMENT: It is important to note that the NEBH Orthopedic Registry is not a clinical study, it does not have a research question, and thus it is not research - it is a data repository as stated by its approved IRB protocol. PHI data was fully de-identified, according to HIPAA standards before any data summaries were generated.

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