

Orthopaedic Surgery – Medical Student Research

<i>Medical Student Research</i>		
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Contributing Factors to Length of Stay Following Total Knee Arthroplasty in Urban vs. Rural Hospitals in New York

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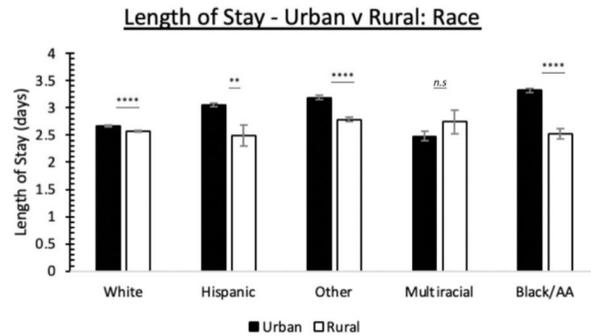
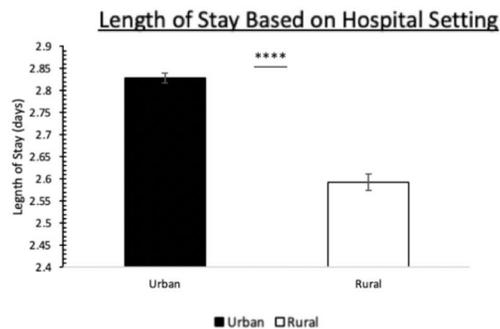
Introduction: Total knee arthroplasty (TKA) is one of the most widely performed surgeries in the United States. As such, factors that contribute to postoperative outcomes should be identified to optimize both hospital resources and patient outcomes. A key measurement of this is postoperative length of stay (LOS). We hypothesize that when comparing urban and rural hospitals, LOS will be shorter in urban settings and within majority populations when compared to minority groups.

Methods: Using the NYU Statewide Planning and Research Cooperative System (SPARCS) database, we examined data retrospectively for patients who underwent TKA in New York hospitals (2017). Our primary variable was hospital county, with urban counties being defined as having a population greater or equal to 200,000 (rural <200,000). Our secondary variable was patient race/ethnicity, defined as White/Non-Hispanic, Hispanic, Black/African American, Multiracial, and Other. The dependent variable in both cases was LOS, measured in days. All statistical analyses were performed using Microsoft Excel. Two-tailed t-tests were used and results are represented as Mean \pm SEM. Results were considered significant if $p < 0.05$.

Results: Of the 57 counties in New York State, 50 were represented in this study (rural $n = 32$, urban $n = 18$). A total of 42,066 cases were collected (rural $n = 5948$, urban $n = 36118$). Our results showed that LOS following TKA was significantly greater for patients in urban as opposed to rural hospitals ($p < 0.0001$), and significantly greater across all racial/ethnic groups (except the Multiracial group) in urban as opposed to rural hospital settings. When analyzing urban hospital settings alone, we found that LOS was significantly lower in White/non-Hispanic and Multiracial races, and significantly higher in Hispanic, "Other", and Black/African American race groups when compared to the urban average. Within rural hospital settings, only "Other" race groups were found to have significantly longer LOS when compared to the rural average.

Conclusions: We initially hypothesized that we would observe a lower LOS in urban county hospitals, given their higher amounts of funding and overall more up-to-date facilities. However, our data reflected the opposite, where LOS was significantly lower in rural counties. From a financial standpoint, LOS discrepancies between urban and rural hospitals translate to \$18.8M in added costs for urban hospitals. These data can be used to help significantly optimize both patient experience and hospital resource management.

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Evaluation of Low Albumin as a Risk Factor for Postoperative Admission, Unplanned Readmission, and Extended Length of Stay after Anterior Cruciate Ligament (ACL) Reconstruction.

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Introduction: Anterior Cruciate Ligament Reconstruction (ACLR) is a common procedure frequently performed in the outpatient setting. Malnutrition has been shown to be negatively associated with outcomes in many orthopedic procedures.¹⁻⁶ However, the impact of malnutrition, as assessed by preoperative serum albumin <3.5 g/dL, has yet to be established in patients undergoing ACLR.

Methods: A retrospective review of the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database was performed for patients undergoing ACLR between January 2016 to December 2021. Binary logistic regression models were used to calculate the odds of postoperative admission, readmission, and extended length of stay.

Results: 32,943 total cases were identified, of which 3,475 (10.5%) included serum albumin levels drawn within 90-days pre-procedure. Of the 3,475 cases with serum albumin data, 114 (3.3%) cases had serum albumin <3.5 g/dL. After controlling for age, sex, ASA class, race, BMI, and diabetes mellitus status, multivariate regression analysis showed that preoperative hypoalbuminemia significantly increased the adjusted odds ratio for postoperative admission (adjusted odds ratio 3.272, CI 2.031-5.269, $p < 0.001$), unplanned readmission (adjusted odds ratio 5.981, CI 1.931-18.527, $p = 0.0017$), and extended length of stay (adjusted odds ratio 4.301, CI 2.238-8.265, $p < 0.001$).

Conclusion: Preoperative malnutrition, as defined by preoperative serum albumin <3.5 g/dL, is significantly associated with increased odds of postoperative admission, unplanned readmission, and extended length of stay in patients undergoing ACLR. This highlights the importance of screening for malnutrition as a preoperative risk factor.

Impact of Resident Involvement in Orthopedic Shoulder Surgery: An Analysis from the American College of Surgeons National Surgical Quality Improvement Program Database

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Introduction: The impact of resident involvement in various subspecialties of orthopedic surgery has been well documented. However, the literature concerning resident involvement in shoulder surgery is limited. The purpose of this study was to examine whether resident involvement across all orthopedic shoulder surgeries is associated with adverse 30-day outcomes.

Methods: We conducted a search of the American College of Surgeons National Surgical Quality Improvement Program database for all patients who underwent orthopedic shoulder surgery from 2010 – 2012. Data extraction included pre-operative demographics

and comorbidities, operative characteristics, and 30-day post-operative outcomes. Cases were categorized into “Attending alone” and “Attending and resident in operating room” groups. Independent t-test and Chi-square or Fischer’s exact test were used for continuous and categorical variables, respectively. A logistic regression model using propensity scores was used to calculate adjusted odds ratios for outcomes.

Results: We analyzed 5,648 patients who underwent orthopedic shoulder surgery; 3,455 patients were in the “Attending alone” group, while 2,193 were in the “Attending and resident in the operating room” group. Resident presence in the operative room was significantly associated with any complication, defined as any medical, surgical, or other complication within 30 days of the initial operation (OR 1.37, CI = 1.12 - 1.67, $P = .002$). Resident presence in the operating room was not associated with any individual medical, surgical, or other complication, except for bleeding transfusions ($P = <.001$).

Conclusion: This is the first study to analyze the impact of resident involvement on 30-day outcomes in all orthopedic shoulder surgeries. Our findings show that resident involvement across all orthopedic shoulder surgeries does not present an increased risk for 30-day complications. Our study can aid surgeons in counseling their patients who express concern about a resident’s participation in their surgery.

Orthopaedic Surgery – *Surgical Resident Research*

Embracing Wide Awake Techniques in Pediatric Orthopaedic Surgery

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Introduction: Wide awake anesthesia is a technique increasingly utilized, particularly in hand surgery. Benefits include decreased health care costs, less environmental waste, decreased healthcare worker personnel requirements (particularly beneficial since the Covid-19 pandemic onset), intraoperative assessment of active limb function, less postoperative pain, improved postoperative rehabilitation, and improved physician-patient interaction. While its benefits and feasibility are well documented in the adult hand surgery literature, descriptions of its use in pediatric settings is lacking. This retrospective review of a single surgeon’s pediatric hospital based practice details its utility in children and young adults.

Methods: A retrospective electronic medical record query was created to capture orthopaedic surgery cases performed between July 2018 and June 2022. Charts were reviewed for patient demographic data, procedural information, and complications. All data was deidentified and encrypted in compliance with HIPAA standards.

Results: 81 patients were identified to have undergone wide awake orthopaedic surgery in a pediatric hospital or surgery center. 66 patients were between 10 and 18 years of age, with the remaining between 19 and 43. Lengths of surgery varied between 35 and 213 minutes. No intraoperative or postoperative complications occurred. The majority of procedures were soft tissue only, such as trigger digit releases and excision of upper extremity lesions. More complex procedures included cubital tunnel release with ulnar nerve transposition, revision tendon transfers, and nerve/tendon repair. Bony procedures included percutaneous pinning of hand fractures, excision/grafting/fixation of pathologic fracture from enchondroma, excision of an exostosis, and a removal of hardware. The majority of surgeries were on the upper extremity. Lower extremity surgeries included peroneal nerve decompression at the fibular neck, foot extensor repair, and osteochondroma excision from the fibula. No procedures had the presence of an anesthesiologist nor converted into a different anesthesia category.

Conclusion: Wide awake orthopaedic surgery is feasible and safe in a pediatric healthcare setting. Nuances of patient selection, preoperative counseling, administration of local anesthetic, and operating room staff management are keys for successful incorporation of wide awake procedures.

Postsurgical Trigger Point Injections in Complicated and Uncomplicated Orthopedic Surgical Patients with Persistent Postoperative Pain: A Comparative Study

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Introduction: Persistent postsurgical pain is defined as pain that continues beyond three months after the surgery, emanating from either the incision site or a referred pattern (i.e., along a nerve distribution or dermatome), excluding organic causes of pain (such as infections or malignancies). Complex regional pain syndrome (CRPS), whereby the patient's pain and inflammation are excessive and persist for longer than 6 months after any injury, may also develop in cases of poorly managed postsurgical pain.

Methods: Surgical incisions, retractions during procedure, intraoperative/perioperative positionings of the patient, sutures, connective tissue ruptures, and scar formation can all create tender and knotty areas in muscles (derived from fascial/myofascial contractions and adhesions) called trigger points. Our study aims to characterize the efficacy of trigger point injection use in patients with persistent postsurgical pain in reducing the progression to CRPS, comparing complicated and uncomplicated orthopedic surgical experiences. Patients with orthopedic disorders including trauma, malignancies, diseases, and infectious processes of the musculoskeletal system who underwent surgery and experience persistent surgical pain three months postoperatively will be included in the study. Trigger point injections will consist of a corticosteroid (cortisone) in combination with the anesthetic (lidocaine). Injections will be made into the trigger points that share the same dermatome of the incision sites and into the incision sites, and if the somatosomatic/viscerosomatic reflexes responsible for the muscle spasms remain, we will subsequently inject at the vertebral levels that correspond to the myotomes of the incision sites. Two study groups—complicated surgical course and uncomplicated surgical course patients, will be compared for the palliative effect of the injections. The number of case progressions into CRPS will be quantified in each group.

Results: Injections made to the trigger points that share the same dermatome as the incision sites and directly into the incision sites have shown significant amelioration of postsurgical pain. Injections at the vertebral levels that correspond to the myotomes of the incision sites have also been effective.

Conclusion: Ineffective perioperative pain control may yield chronic persistent postsurgical pain refractory to medical interventions, resulting in long-term physical, emotional, psychological, and social duress. 10% of the patients with chronic pain attempt suicide due to underlying psychiatric implications. It is therefore important for surgeons and other pain management healthcare professionals to probe further into pain management strategies when patients go under the knife. Our study hopes to offer insight into postoperative pain control and minimize the negative consequences associated with development of chronic, refractory pain and permanent nerve damage, and help patients make a smooth, quick recovery to normal functions.