

Identifying Risk Factors for Emergency Department Utilization Following Shoulder Arthroplasty in Osteoarthritis Patients through Predictive Modeling

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INTRODUCTION: Shoulder arthroplasty is a common surgical intervention for managing advanced shoulder osteoarthritis, aimed at alleviating pain and improving function. However, postoperative complications and the need for emergency care remain concerns, often leading to unplanned emergency department (ED) visits. Identifying risk factors that predispose patients to higher ED utilization post-surgery is crucial for optimizing postoperative care and reducing healthcare costs.

METHODS:

This was a retrospective cohort study within our institution. Our analysis included patients over 50 years who had required surgical management (arthroplasty) of their shoulder osteoarthritis between 2016 and 2023. The primary outcome of interest was hospital ED utilization within 90- and 365-days following surgery. We built logistic regression models to identify risk factors associated with the likelihood of readmission. For each model, we split the data with 50% for training and 50% for validation.

RESULTS: A total of 3,261 patients were included in this study: 1630 for training and 1631 for validation of the model. Patients with depression were 78% more likely to experience unplanned ED utilization within the 365 days post-shoulder arthroplasty for management of osteoarthritis (OR: 2.19, [CI: 1.37-3.50]). Also significantly affecting risk of ED utilization, patients with tobacco use disorder were 142% more likely to return to the ED during this same period (OR: 4.12, [CI: 1.95-8.69]). Finally, patients with congestive heart failure (CHF) were 96% more likely to utilize emergency services within one year of the shoulder arthroplasty (2.61, [CI: 1.18-5.77]). Depression and CHF were not significant risk factors for 90-day ED utilization. However, type 2 diabetes mellitus was a significant contributor (OR: 2.08, [CI: 1.07-4.07]). Given smaller sample size, the models demonstrated moderate predictive performance with area under the curves of 0.57 and 0.65 at 90 and 365 days, respectively.

DISCUSSION AND CONCLUSION:

This study highlights significant risk factors for ED utilization following shoulder arthroplasty in osteoarthritis patients. Depression, tobacco use disorder, and congestive heart failure were identified as major contributors to increased ED visits within a year, while type 2 diabetes mellitus was a significant factor within the first 90 days post-surgery. Despite the moderate predictive performance of the models, these findings provide valuable insights into patient management and resource allocation. Targeted interventions addressing these risk factors could potentially reduce ED visits, improving overall patient outcomes and optimizing postoperative care in osteoarthritis management.

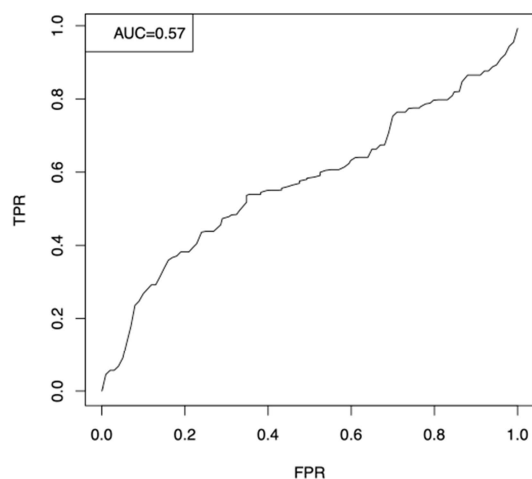


Figure 1: ROC of 90-Day Emergency Department Utilization

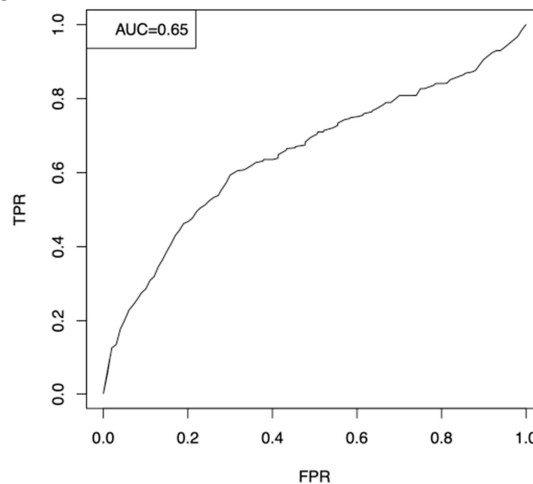


Figure 2: ROC of 365-Day Emergency Department Utilization