

Cost and Complications Associated with Total Joint Arthroplasty Patients

Zhong H MPA¹, Cozowicz C MD², Illescas A¹, Reisinger L^{1,2}, Poeran J³, Liu J^{1,4}, Memtsoudis S^{1,4}

¹Hospital for Special Surgery, Department of Anesthesiology, Critical Care & Pain Management, New York, USA

²Paracelsus Medical University, Department of Anesthesiology, Perioperative Medicine and Intensive Care Medicine, Salzburg, Austria

³Icahn School of Medicine at Mount Sinai, Institute for Healthcare Delivery Science, Department of Population Health Science and Policy, New York, US

⁴Department of Anesthesiology, Weill Cornell Medicine, New York, USA



INTRODUCTION

Total joint arthroplasty (TJA) is one of the most commonly performed procedures in the United States (US) with projections of continuous growth. TJA imposes a substantial economic burden on healthcare resources. The impact of major perioperative complications on this cost remains uncertain. Using a large database, we aim to describe the association between major complications and the costs associated with TJA.

METHODS

- This study was approved by the Institutional Review Board at our hospital (IRB#2012-050).
- We used the Premier Healthcare database to identify patients undergoing Total Hip and Knee Arthroplasty (THA/TKA) from 2006 to 2021
- Major complications were identified using International Classification of Diseases, Ninth and Tenth Revision (ICD-9/ICD-10) codes, including myocardial infarction, congestive heart failure, arrhythmia, pulmonary embolism, acute renal failure, delirium, and cerebral
- Total costs to treat the patient during the hospital encounter were adjusted over time to account for inflation, with the adjustments reflecting the equivalence in 2022 US dollars using the US Consumer Price Index for medical care expenses.
- Costs were presented as median and interquartile ranges (IQR), stratified by each complication only, two complications, three and more complications, and no complication and being discharged within 4 days of hospitalization.
- Mixed-effects models with a gamma distribution were applied to compare costs between complication groups and the no complication plus being discharged within 4 days of hospitalization group

Major complications are associated with significantly higher in-hospital costs for TJA patients compared to those without complications.

A single major complication can lead to an increase in costs ranging from almost 30% to 100% compared to patients with no complication.

RESULTS

Table 1. Mixed model outcomes for complications and costs stratified by TKA and THA cohorts

Complications	Total Knee Arthroplasty		Total Hip Arthroplasty	
Ref group= No complication and discharged within 4 days	% change (95% CIs)	p-value	% change (95% CIs)	p-value
Myocardial infarction only	94% (90%, 100%)	<.001	89% (85%, 93%)	<.001
Congestive heart failure only	57% (54%, 60%)	<.001	69% (65%, 73%)	<.001
Arrhythmia only	28% (28%, 29%)	<.001	27% (27%, 28%)	<.001
Pulmonary Embolism only	62% (60%, 64%)	<.001	71% (67%, 76%)	<.001
Acute renal failure only	38% (38%, 39%)	<.001	41% (40%, 42%)	<.001
Delirium only	32% (31%, 33%)	<.001	37% (36%, 38%)	<.001
Cerebral only	64% (60%, 68%)	<.001	69% (66%, 73%)	<.001
Two complications	85% (84%, 87%)	<.001	95% (93%, 97%)	<.001
Three and more complications	185% (180%, 191%)	<.001	204% (198%, 211%)	<.001

- The no complication group has a median cost of \$16,518 (IQR: \$13,528-\$20,562) for TKA and \$16,819 dollars (IQR: \$13,7667-\$20,791) for THA
- The lowest cost condition is arrhythmia only, which is associated with 28% (95% CIs: 28%-29%) and 27% (95% CIs: 27%-28%) increase in cost compared to no complication in TKA and THA respectively.
- The highest cost for a single complication is myocardial infarction, which is associated with 94% (95% CIs: 90%- 100%) and 89% (95% CIs: 85%- 93%) increase in cost in TKA and THA respectively.

DISCUSSION

Major complications are associated with significantly higher in-hospital costs for TJA patients compared to those without complications. Even a single major complication can lead to an increase in costs ranging from almost 30% to 100%. Future studies are warranted to explore in detail the specific areas contributing to these costs.

