

The Aging Consideration In Elective Total Hip Arthroplasty

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INTRODUCTION

Demand for total hip arthroplasty is increasing. In the context of an aging general population, the comorbidity burden of these surgical patients has been increasing overtime while postoperative complications have been decreasing. Here, questions arise about whether there should be an age cutoff point in risk stratification of total hip arthroplasty patients. We hypothesize that increasing age would impact the risk of all complications, especially after a specific age cutoff point.

METHODS

This study was approved by the Institutional Review Board at our hospital (IRB#2012-050). The requirement for written informed consent was waived given the de-identified nature of the data. Using the Premier Healthcare database, we identified 1,218,763 patients undergoing an elective total hip arthroplasty procedure between 2006 and 2022. Our primary goal was to assess the impact of age and Deyo-comorbidity index (DCI) on complications following a total hip arthroplasty procedure. We analyzed age (continuous, and <80 years versus 80+) and Deyo comorbidity index with the following complications: cardiac, pneumonia, acute myocardial infarction, acute renal failure, infection, central nervous system, and ICU admission. Additionally, we used Youden’s Index to estimate the cutoff age where the risk increased for each complication.

References
[1] Deyo RA, Cherkin DC, Ciol MA. Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases. J Clin Epidemiol 1992;45:613–9.

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Table 1. Odds ratio for age and Deyo-comorbidity index on various complications

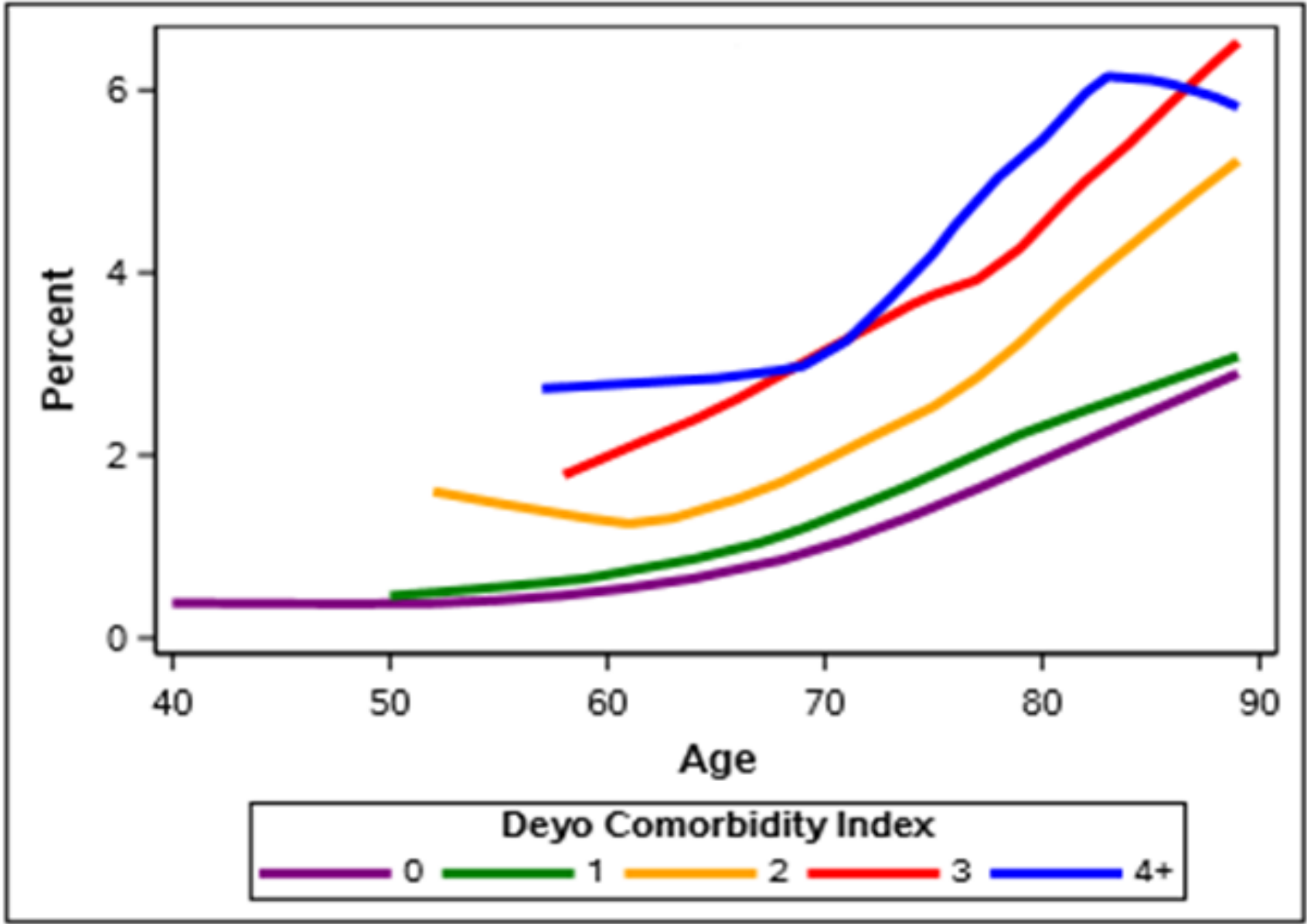
	Age (Continuous)	Age (<80 vs 80+)	Deyo-Index
Complications	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Cardiac complications	1.06 (1.06-1.06)	3.31 (3.19-3.43)	1.36 (1.34-1.38)
Pneumonia	1.03 (1.03-1.03)	3.00 (2.80-3.16)	1.86 (1.83-1.89)
Acute myocardial infarction	1.07 (1.07-1.07)	4.63 (4.26-5.04)	1.93 (1.87-1.98)
Acute renal failure	1.04 (1.04-1.04)	2.79 (2.70-2.87)	1.95 (1.93-1.96)
Infection	1.01 (1.01-1.01)	1.87 (1.81-1.94)	1.59 (1.56-1.60)
Central nervous system complications	1.08 (1.08-1.09)	5.33 (5.10-5.58)	1.49 (1.46-1.52)
ICU admission	1.02 (1.02-1.03)	2.45 (2.38-2.51)	1.68 (1.67-1.70)

Table 2. Age cutoffs for patients undergoing a total hip arthroplasty

Complications	Age Cutoff Estimate	AUC
Cardiac complications	72.0	0.69
Pneumonia	72.9	0.63
Acute myocardial infarction	72.0	0.74
Acute renal failure	70.9	0.65
Infection	71.9	0.59
Central nervous system complications	74.0	0.75
ICU admission	72.9	0.61

RESULTS

In separate analyses, we found that the risk of all complications increased with age and a higher DCI (Table 1, Figure 1). The odds ratios for age ranged from 1.01 to 1.07 across all complications, whereas the odds ratios for DCI ranged from 1.36 to 1.93. When analyzing age categorically, we found the risk of complications were more pronounced among patients aged 80+ versus <80 years, with odds ratios ranging from 1.87 to 5.33. Estimated age cutoffs among all complications ranged from 70.9 to 74.0 years (Table 2). The aging impact became more prominent when patients carried a higher DCI burden.



DISCUSSION

Across all age groups, increasing age can impact the risk of complications among total hip arthroplasty patients, and especially more significant among patients with a higher comorbidity index. Additionally, we found 70.9-74.0 as the estimated age where risks for complications started to increase more intensely across all comorbidity groups; these cutpoints are far from the generally used cutpoint of 65 years. As total hip arthroplasty procedures become more popular, understanding the impact of age and comorbidities on outcomes can provide valuable information needed to mitigate clinical decisions and potential risk.

