Comparison of Rates and Outcomes of Readmissions to Index Versus Non-Index Hospitals After Cardiac Surgery: A Nationwide Analysis

Objective: Increasing regionalization of cardiac surgery may lead to fragmented care if readmissions do not occur to the index hospital where the initial surgery took place. The magnitude and adverse effects of readmissions to non-index hospitals after cardiac surgery are unknown. We sought to determine the prevalence and impact of readmissions to index versus non-index hospitals.

Methods: In this multicenter, nationally representative sample of adults undergoing cardiac surgery, retrospective analyses were performed using the 2016 through 2018 Nationwide Readmissions Database. Descriptive analyses were performed to determine 30-day readmission characteristics, including timing, cost, and outcomes. Multivariate logistic regression was used to identify factors associated with index versus non-index readmissions. Additional regression models were used to identify differences in mortality, major complications, subsequent readmissions, and costs between readmissions to index versus non-index hospitals.

Results: A total of 448,351 patients were included in the study (mean [SD] age, 65 [12] years; 132,592 [29.6%] female). Index procedures included: isolated CABG (245,088 [54.7%]), isolated valve(s) (90,011 [20.1%]), CABG and valve (40,169 [9.0%]), aorta with or without CABG or valve (21,488 [4.8%]), heart transplant (2,255 [0.5%]), ventricular assist device (19,026 [4.2%]), and all others (30,314 [6.8%]). The overall 30-day readmission rate was 11.7%. Of the 52,329 first readmissions, 23.4% (13,705) were to non-index hospitals (Figure). Patients transferred to an index hospital during an initial non-index readmission were included in the index readmission category (orange in Figure). Factors known at the time of discharge from the index hospitalization that independently predicted a non-index readmission included: type of procedure, hospital location (rural vs. urban), and patient location (rural vs. urban). After risk adjustment, patients readmitted to non-index hospitals had 37.4% higher odds of mortality (OR, 1.37; 95% CI, 1.22-1.55), and 29.3% higher odds of having a major complication (OR, 1.29; 95% CI, 1.16-1.44). Subsequent readmissions and hospital costs were no different between groups.

Conclusion: In this nationwide analysis, approximately one in four readmissions after cardiac surgery were to non-index hospitals. Non-index readmissions were associated with higher mortality and morbidity compared to index readmissions likely due to loss of continuity of care. Interventions targeted at reducing non-index readmissions and improving care coordination are warranted.

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Readmissions to Non-Index vs. Index Hospitals

Index
76.6% (38,624)

Non-Index
23.4% (13,705)

Mortality

Major Complication

Odds Ratio
Non-Index vs. Index