

Is Re-Operative Robotic Assisted Cardiac Surgery Feasible and Safe? A Propensity Matched Analysis

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- BACKGROUND
- Robotic-assisted approach to primary valvular operations established as non-inferior with benefits including improved wound complication and return to function^{1,2}
 - Reoperative cardiac surgery associated with increased morbidity and mortality
 - Robotic-assisted approach viable and reproducible by experienced surgeons^{3–5}
- AIM
- In light of the increased technical demands, does a robotic assisted approach to reoperative cardiac surgery provide non-inferior clinical outcomes to re sternotomy?

- METHODS
- Queried Society of Thoracic Surgeons Adult Cardiac Surgery Database (ACSD) from 2 affiliated institutions
- Inclusion criteria
- Adults (age > 18) with prior sternotomy for cardiac surgery from 2014-2024
 - Operative intervention for structural operations (mitral or tricuspid valve, ASD, etc)

- Exclusion criteria
- Patients whose operation included redo CABG, adult congenital, or aortic procedure
- Propensity Score Matching (PSM)
- Significant preoperative variables chosen via logistic regression with entry p = 0.20 and stay p = 0.05
 - Robotic and open cases matched into 1:3 pairs if absolute difference between scores was ≤ 0.005.
- Comparative Statistical Analysis
- Wilcoxon Two-Sample Test for continuous variables
 - Chi-square or Fisher’s Exact Test for categorical variables

RESULTS

Figure 1: Flow Chart of Patient Selection Prior to PSM

Table 1: Select General Descriptive Statistics for Unmatched Cohort

Table 2: Select Clinical Outcomes Compared Before and After Propensity Score Matching

- SUBGROUP ANALYSIS
- Table 3: Direct Analysis of Patients with MV and TV Interventions
- | Variable | Resternotomy
n = 71 (%) | Robot Assisted
n = 21 (%) | p |
|------------------------|----------------------------|------------------------------|--------|
| Age (years) | 58 | 68 | 0.004 |
| BMI | 30 | 28 | 0.044 |
| Male | 18 (25.4%) | 13 (61.9%) | <0.001 |
| Preop ESRD | 6 (8.5%) | 0 (0%) | 0.084 |
| PAD | 7 (9.9%) | 2 (9.5%) | 0.482 |
| Bypass time (min) | 102 | 129 | <0.001 |
| Intraop RBC Txf (unit) | 1.6 | 1.5 | 0.257 |
| Total Ventilated hours | 59 | 31 | 0.114 |
| Total ICU hours | 157 | 80 | 0.018 |
| Postop LOS (day) | 11.8 | 9.8 | 0.150 |
| Reintubation | 10 (14.1%) | 2 (9.5%) | 0.293 |
| Stroke | 1 (1.4%) | 0 (0%) | 0.292 |
| Pneumonia | 6 (8.5%) | 0 (0%) | 0.084 |
| Postop ESRD | 6 (8.5%) | 2 (9.5%) | 0.439 |
| Atrial Fibrillation | 16 (22.5%) | 3 (14.3%) | 0.206 |
| 30 Day Survival | 65 (91.5%) | 17 (81.0%) | 0.085 |
- SUMMARY AND CONCLUSIONS
- Patients undergoing robotic structural heart operations tend to be older and have more co-morbidities than those undergoing re sternotomy
 - PSM subject to potential confounders not in match
 - Robotic approach to valvular operations in a reoperative field can provide non-inferior outcomes to re sternotomy

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