Early Results of Minimally Invasive Aortic Valve Replacement via Partial Sternotomy or Right Thoracotomy: Insights in Acute Kidney Injury

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BACKGROUND

Minimally Invasive Aortic Valve Replacement (MI-AVR) offers outcomes comparable to conventional full sternotomy, with increased adoption due to lower complication rates. Direct comparisons between partial sternotomy (PS) and right thoracotomy (RT) in MI-AVR are limited. This study aims to compare the short-term clinical outcomes of these two approaches.

METHODS

We retrospectively reviewed data from patients who underwent isolated MI-AVR at Santa Maria Hospital, Bari, Italy, from 2017 to 2023. The primary outcome was 30-day mortality. Secondary outcomes included early postoperative results, acute kidney injury (AKI), and other major complications. AKI was defined per KDIGO classification. Multivariate logistic regression identified predictors of AKI, presented as odds ratios (OR) with 95% confidence intervals (CI).

RESULTS

Among 334 patients, 289 (86.5%) underwent PS, and 45 (13.5%) received RT. The overall 30-day mortality was 0.9%, with no difference between groups. AKI occurred in 40 cases (12.0%): 39 in the PS group (13.5%) and 1 in the RT group (2.2%) (p=0.026). Most AKI cases (60%) were stage 1. The multivariate model showed a borderline non-significant association between PS and AKI (OR 6.77, p=0.064). Preoperative creatinine was a significant predictor of AKI (OR 1.56; 95% CI 1.17-2.14, p=0.004). The PS group had a higher median area under the serum creatinine concentration-time curve (AUC) (1.64 [1.13-2.50] mg/dL vs. 1.21 [0.86-1.71] mg/dL, p=0.005) and C-Reactive Protein AUC, despite shorter cardiopulmonary bypass (73 [67-89] min vs. 86 [71-98] min, p=0.029) and cross-clamp times (50 [43-61] min vs. 63 [49-72] min, p=0.001). Other major complications did not differ between groups.

CONCLUSION

MI-AVR is a safe procedure with satisfactory short-term outcomes. No differences in 30-day mortality or major complications were observed between PS and RT. A non-significant trend suggested an association between PS and AKI, potentially due to higher postoperative inflammation, warranting further investigation.

Variable	Unit	Estimate	Odds Ratio	95% CI Lower	95% CI Upper	p-value
Intercept		-3.813	0.022	0.001	0.102	<0.001
Creatinine	mg/dL	0.442	1.556	1.167	2.140	0.004
Mini-sternotomy approach		1.881	6.561	1.350	118.414	0.068