Risk-Stratified Outcomes of Robotic-Assisted MIDCAB: Analysis Across STS Predicted Mortality Categories

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Abstract

- RA-MIDCAB is an increasingly utilized method for minimally invasive coronary reperfusion.
- Minimal data exists on the outcomes of higher risk patients.
- At our rural tertiary care center we aim to explore our outcomes of this procedure against national STS standards.

Introduction

- Robotic-Assisted MIDCAB (RA-MIDCAB) has evolved into a reproducible method of coronary revascularization.
- There is little data exploring the outcomes of RA-MIDCAB for patients of an STS risk greater than 5%.
- Our objective is to evaluate outcomes of RA-MIDCAB across STS mortality categories and determine whether high-risk patients experience acceptable outcomes compared with predicted operative risk.

Materials & Methods

- Retrospective analysis was performed on 240 RA-MIDCAB from 2019–2025.
- Patients were stratified by STS predicted operative mortality into low (<2%), medium (2–5%), and high (>5%) risk groups.
- Demographics, perioperative variables, postoperative outcomes, and 30-day mortality were compared across groups.
- Observed-to-expected (O/E) mortality ratios were calculated against STS predicted risk.

Characteristic	Low Risk n=180	Medium Risk n=47	High Risk n=13	Overall n=240
Age, years	64.8 ± 10.1	71.9 ± 10.0	72.5 ± 15.2	66.2 ± 11.4
Ejection fraction, %	54.9	51.8	50.0	54.0 ± 11.7
Male sex	135 (75.0%)	28 (59.6%)	6 (46.2%)	169 (70.4%)
Urgent status	69 (38.3%)	18 (38.3%)	10 (76.9%)	97 (40.4%)
Diabetes	85 (47.2%)	28 (59.6%)	9 (69.2%)	122 (50.8%)
Cerebrovascular disease	27 (15.0%)	16 (34.0%)	7 (53.8%)	50 (20.8%)
30-day mortality	0 (0%)	2 (4.3%)	1 (7.7%)	3 (1.25%)
O/E mortality ratio	0.00	1.44	1.01	0.75
Postoperative atrial fibrillation	19 (10.6%)	13 (27.7%)	2 (15.4%)	34 (14.2%)
Conversion to open surgery	10 (5.6%)	5 (10.6%)	2 (15.4%)	17 (7.1%)
Intraoperative blood products	7 (3.9%)	5 (10.6%)	5 (38.5%)	17 (7.1%)
Postoperative blood products	9 (5.0%)	7 (14.9%)	3 (23.1%)	19 (7.9%)
Hospital readmission	21 (11.7%)	12 (25.5%)	4 (30.8%)	37 (15.4%)
LOS, days	4.6 ± 6.1	5.8 ± 4.5	5.8 ± 2.7	4.9 ± 5.7

Results/Outcomes

- 180 low-risk (LR), 47 medium-risk (MR), and 13 high-risk (HR) patients.
- Hypertension and diabetes were the most common comorbidities with CVD being the third.
- Overall 30-day mortality was 1.25%.
- 30-day mortality by group: 0% LR, 4.3% MR, 7.7% HR
- Overall O/E for all groups was .75
  - O/E by risk group: 0 (LR), 1.44 (MR), 1.01 (HR)
- Postoperative atrial fibrillation occurred in 14.2% of patients overall.
  - 10.6% (LR), 27.7% (MR), 15.4% (HR)
- Conversion to open surgery occurred in 7.1% of cases overall.
  - 5.6% (LR), 10.6 (MR), 15.4% (HR)
- Only 3 patients required return to the operating room
- Intraoperative blood products were required in 7.1% of patients overall and increased with operative risk.
- Overall length of stay increased with STS risk, from 4.6 days to 5.8 days but was 5.1 days amongst elective cases.
- Among elective cases (n=143), length of stay increased with STS risk, from 4.8 days to 7.0 days in high-risk patients.

Conclusion

- RA-MIDCAB is a safe and effective strategy for surgical revascularization across all STS risk categories defined in this study.
- 30-day mortality was clinically low at 1.25% with an O/E mortality ratio of 0.75.
  - This demonstrates that the observed mortality for the entire cohort was lower than predicted by the STS model.
- High risk patients demonstrated an O/E ratio of 1.01, reflecting observed mortality similar to STS predicted risk although this was limited by low sample size.
- This suggests that RA-MIDCAB may offer a practical and safe surgical option in higher-risk coronary patients, which warrants further prospective investigation.

References