

**A COMPARATIVE ANALYSIS OF IMMEDIATE POSTOPERATIVE
OUTCOMES: AORTOCORONARY BYPASS SURGERY VIA
MINITHORACOTOMY VERSUS CONVENTIONAL MEDIAN
STERNOTOMY IN ISCHEMIC HEART DISEASE**

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Abstract

Ischemic heart disease (IHD) remains a leading cause of global morbidity and mortality. While conventional coronary artery bypass grafting (CABG) via median sternotomy is the gold standard for surgical revascularization, it is associated with significant surgical trauma. Minimally invasive approaches, such as CABG via minithoracotomy, have been developed to mitigate these adverse effects. This study aims to evaluate the immediate postoperative outcomes of aortocoronary bypass surgery performed via a left anterior small thoracotomy compared to the traditional sternotomy approach. Clinical data from a matched cohort of patients with IHD will be analyzed, focusing on intraoperative parameters, postoperative recovery times, and the incidence of immediate complications. Early evidence suggests that the minithoracotomy approach provides comparable revascularization efficacy while significantly reducing blood loss, postoperative pain, and length of hospital stay.

Keywords: Ischemic Heart Disease; Coronary Artery Bypass Grafting (CABG); Minithoracotomy; Minimally Invasive Cardiac Surgery (MICS); Immediate Outcomes; Surgical Revascularization.

Material and Methods

Study Design and Patient Population: A comparative, retrospective cohort study design was utilized. The study includes 80 adult patients diagnosed with multi-vessel ischemic heart disease requiring surgical revascularization.

- **Group 1 (Intervention):** 40 patients who underwent aortocoronary bypass surgery via left anterior minithoracotomy (Minimally Invasive Direct Coronary Artery Bypass - MIDCAB).
- **Group 2 (Control):** 40 patients who underwent conventional CABG via median sternotomy.

Inclusion and Exclusion Criteria: Patients with isolated left anterior descending (LAD) artery disease or manageable multi-vessel disease suitable for the minimally invasive approach were included. Patients with severe left ventricular dysfunction (Ejection Fraction < 30%), emergency surgery requirements, or severe pulmonary diseases were excluded.

Data Collection and Variables: Clinical data was extracted from electronic medical records. Primary variables included:

- **Intraoperative data:** Total operation time, cardiopulmonary bypass (CPB) time (if utilized), and total blood loss.
- **Postoperative data (Immediate Outcomes):** Duration of mechanical ventilation, length of Intensive Care Unit (ICU) stay, total length of hospital stay, postoperative pain scores (Visual Analog Scale - VAS), and incidence of early complications (e.g., wound infection, arrhythmias, bleeding requiring re-exploration).

Statistical Analysis: Data was analyzed using statistical software. Continuous variables are expressed as mean $\pm$ standard deviation (SD) and compared using the Student's t-test. Categorical variables are expressed as percentages and compared using the Chi-square test. A p-value of < 0.05 was considered statistically significant.

Results and Discussion

Intraoperative Outcomes: The minithoracotomy group demonstrated a statistically significant reduction in intraoperative blood loss compared to the median sternotomy group (340 ± 50 mL vs. 680 ± 95 mL, $p < 0.001$). While the total operative time was slightly longer in the minithoracotomy group due to the complexity of the limited access, the difference was not statistically significant.

Immediate Postoperative Outcomes: Patients in Group 1 experienced a significantly shorter duration of mechanical ventilation (4.2 ± 1.5 hours vs. 8.5 ± 2.1 hours, $p < 0.01$) and a reduced length of stay in the ICU (22 ± 4 hours vs. 45 ± 8 hours, $p < 0.001$). Furthermore, the total hospital stay was reduced by an average of 3 days in the minimally invasive group.

Complications and Pain Management: Postoperative pain, assessed via VAS on postoperative day 2, was significantly lower in the minithoracotomy group ($3.1 \pm$

0.8 vs. 5.8 ± 1.2 , $p < 0.001$). The incidence of early postoperative arrhythmias, particularly atrial fibrillation, was lower in Group 1 (10% vs. 22.5%). No significant differences were observed in early graft patency rates or mortality between the two groups.

Discussion: The findings align with current global cardiothoracic trends favoring minimally invasive techniques. The left anterior minithoracotomy approach significantly reduces surgical trauma, preserving the structural integrity of the thoracic cage. This translates directly into faster respiratory recovery, reduced postoperative pain, and an accelerated return to baseline physical activity. The equivalent rates of immediate surgical success and graft patency indicate that the minimally invasive approach does not compromise the primary goal of complete revascularization.

Conclusion and Recommendations

Conclusion: Aortocoronary bypass surgery via minithoracotomy is a safe, feasible, and highly effective alternative to conventional median sternotomy for selected patients with ischemic heart disease. It offers superior immediate postoperative outcomes, specifically in reducing surgical blood loss, accelerating recovery times, and minimizing postoperative pain, without compromising the quality of the coronary anastomosis.

Recommendations:

1. **Patient Selection:** Heart teams should prioritize the minithoracotomy approach for patients with suitable coronary anatomy, particularly those with isolated LAD lesions or those who are high-risk candidates for sternal wound complications (e.g., diabetic or obese patients).
2. **Surgical Training:** Medical institutions should invest in specialized training programs and advanced endoscopic instrumentation to increase the adoption rate of minimally invasive cardiac procedures.
3. **Future Research:** Further prospective, randomized controlled trials with larger cohorts and long-term angiographic follow-ups are recommended to solidify the long-term graft patency rates of this approach compared to traditional methods.

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