

Isolated Minimally Invasive Coronary Bypass Surgery in Obese Patients: Early and Five-Year Results

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Background

Obesity is traditionally considered a risk factor for coronary artery bypass surgery due to increased perioperative and postoperative morbidity. Data regarding the feasibility and mid-term outcomes of isolated minimally invasive coronary artery bypass (MiCAB) surgery in obese patients remain limited. We aimed to evaluate early and five-year outcomes of obese patients undergoing isolated MiCAB in a high-volume center.

Methods

All consecutive obese patients (body mass index ≥ 30 kg/m²) who underwent isolated multi-vessel minimally invasive coronary artery bypass surgery between 2020 and 2025 were retrospectively analyzed. The surgical approach consisted of MICS-CABG using arterial and/or venous grafting strategies. Primary endpoints included early postoperative outcomes and five-year major adverse cardiac and cerebrovascular events (MACCE). Secondary endpoints were operative mortality, conversion to sternotomy, length of intensive care unit and hospital stay, and the need for repeat revascularization.

Results

During the study period, a total of 457 patients underwent MiCAB surgery. Among them, 163 obese patients underwent isolated MiCAB and constituted the study population. The mean age was 59.9 ± 9.2 years; 25 patients were female and 138 were male. The mean body mass index was 33.3 ± 3.7 kg/m², and 12 patients had a BMI >40 kg/m². Obese patients demonstrated higher rates of cardiovascular comorbidities, while operative characteristics remained largely comparable between groups (**Table 1**). Representative perioperative images of the surgical technique and postoperative cosmetic outcomes are presented in **Figure 1 and 2**.

Revascularization strategies included LIMA–LAD bypass in 13 patients and multi-vessel bypass in 151 patients; full arterial revascularization was performed in 51 patients. There was no operative mortality, and no conversions to sternotomy were required.

Postoperatively, new-onset atrial fibrillation occurred in 16 patients, and one patient experienced a cerebrovascular event. The mean intensive care unit stay was 1.4 days, and the mean hospital stay was 5.1 days. One patient developed sudden cardiac arrest during intensive care unit follow-up and was considered an in-hospital death. During the second-year postoperative follow-up, two patients died: one from gastric cancer and one from pulmonary embolism. Early postoperative outcomes, including ICU stay, hospital stay, drainage, arrhythmia, revision, and conversion to sternotomy, were comparable between obese and non-obese patients (**Table 2**).

At the first postoperative-week follow-up, superficial wound infection was observed in 16 patients. Three patients developed deep wound infections requiring antibiotic therapy and vacuum-assisted closure treatment, followed by surgical wound revision.

During follow-up, six patients with atypical angina underwent conventional coronary angiography. Graft occlusion was detected in three patients: one involving both the RCA and OM grafts, one involving the RCA graft, and one involving a radial artery graft to the OM. These patients were successfully treated with PCI. Additionally, coronary CT angiography was performed in 65 patients for control purposes, revealing small-caliber radial arteries in two patients and radial artery occlusion in one patient. No patient required repeat CABG surgery. five-year freedom from MACCE was 2.45%.

Conclusions

In obese patients, isolated multi-vessel minimally invasive coronary artery bypass surgery can be performed safely with excellent early and two-year outcomes in experienced, high-volume centers. Obesity alone should not be considered a contraindication for multi-vessel MiCAB.

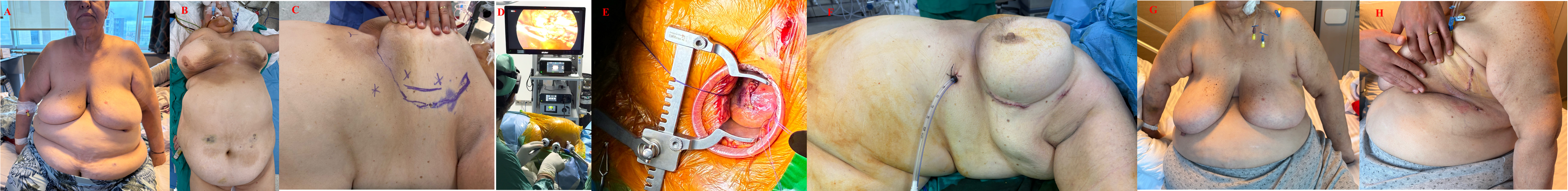


Figure 1. Patient A underwent MICS-CABG via lateral mini-thoracotomy (Istanbul Method).Perioperative images of a morbidly obese patient undergoing isolated multi-vessel MICS-CABG.(A) Preoperative anterior view of the patient.(B) Supine positioning before surgery.(C) Lateral mini-thoracotomy incision positioning and surgical marking.(D) Endoscopic harvesting of the left internal mammary artery graft.(E) Coronary target vessels and distal anastomosis through minimally invasive access. (F) Early postoperative appearance demonstrating chest tube placement and incision.(G) Postoperative anterior view demonstrating that the mini-thoracotomy incision is nearly invisible on frontal inspection. (H) Early postoperative appearance of the left mini-thoracotomy incision.

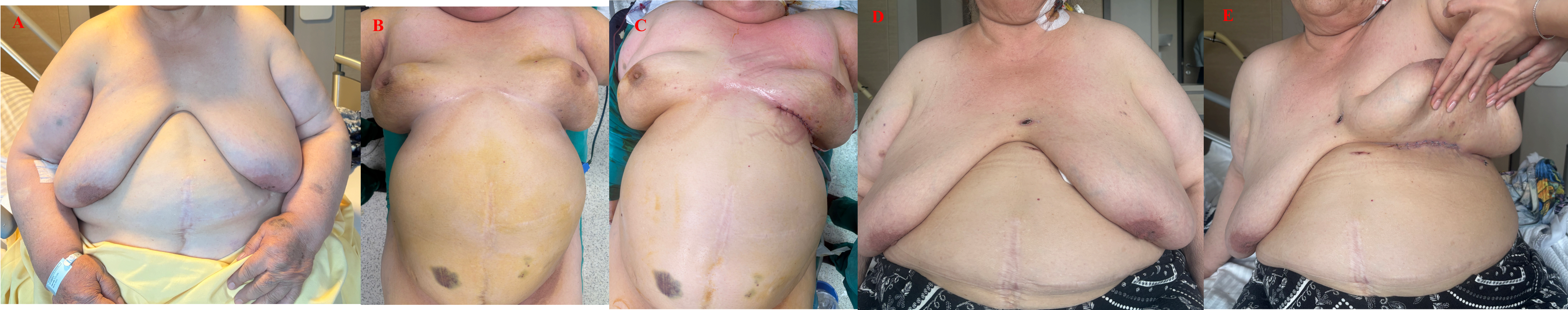


Figure 2. Patient B underwent MICS-CABG via submammary incision.Sequential perioperative and postoperative images of a morbidly obese patient undergoing isolated multi-vessel MICS-CABG via anterior thoracotomy.(A) Preoperative anterior view demonstrating morbid obesity. (B) Intraoperative anterior view demonstrating patient positioning for MICS-CABG.(C) Early postoperative view demonstrating the left inframammary mini-thoracotomy incision. (D) Postoperative anterior view demonstrating that the mini-thoracotomy incision is nearly invisible on frontal inspection.(E) Follow-up view demonstrating the barely visible left inframammary mini-thoracotomy scar.

Variable	Non-obese	Obese	p-value	Variable	Non-obese	Obese	p-value
Age (years)	61.69 ± 9.07	60.9 ± 9.1	0.070	ICU stay (days)	1.47 ± 0.86	1.49 ± 0.86	0.861
BMI	26.29 ± 3.69	32.8 ± 3.7	<0.001	Hospital stay (days)	5.10 ± 2.12	5.15 ± 2.12	0.837
Weight (kg)	75.61 ± 11.96	92.4 ± 12.0	<0.001	Drainage (ml)	421.9 ± 217.9	430.5 ± 217.9	0.429
Hypertension	184/282 (65.2%)	122/162 (75.3%)	0.001	Blood transfusion	115/284 (40.5%)	72/162 (44.4%)	0.198
Diabetes Mellitus	119/283 (42.0%)	93/162 (57.4%)	0.004	New onset arrhythmia	30/281 (10.7%)	18/162 (11.1%)	0.851
Hyperlipidemia	168/283 (59.4%)	114/162 (70.4%)	0.016	Technical complications	34/283 (12.0%)	20/162 (12.3%)	0.895
Carotid artery disease	48/285 (16.8%)	38/162 (23.5%)	0.018	Chest infection (VAC)	4/282 (1.4%)	5/162 (3.1%)	0.092
Peripheral arterial disease	24/284 (8.4%)	18/162 (11.1%)	0.129	Revision	12/283 (4.2%)	7/162 (4.3%)	0.960
EF (%)	55.43 ± 9.32	54.8 ± 9.3	0.486	Conversion to sternotomy	5/285 (1.7%)	3/162 (1.8%)	1.000
CABG number	2.91 ± 0.94	2.88 ± 0.94	0.636				
LIMA use	284/286 (99.3%)	160/162 (98.8%)	0.266				
Total operation time (h)	4.22 ± 1.08	4.46 ± 1.08	0.028				

Table 1. Baseline demographic, clinical, and operative characteristics of obese and non-obese patients undergoing isolated multi-vessel MICS-CABG.

Table 2. Early postoperative outcomes of obese and non-obese patients undergoing isolated multi-vessel MICS-CABG.