

Evolution Of Surgical Expertise In Minimally Invasive Coronary Artery Bypass (mics-cabg). Experience Of 70 Consecutive Patients

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Background:

Minimally invasive procedures for coronary revascularization have been performed for over 20 years; however, their technical complexity, steep learning curves and absence of training programs explain the weak acceptance of these techniques. The aim of this study is to share our experience on how our peri and postoperative management of our MICS CABGs patients evolved over time by critically evaluating our initial 70 consecutive procedures. Moreover, we divided our cohort between initial 30 and late 40 patients and we compared their demographic data, peri and postoperative outcomes.

Methods:

All patients who benefited from an endoscopic atraumatic coronary artery bypass (Endo-ACAB) in our hospital, from July 2018 to October 2021 (n=70) were identified. Baseline demographics, peri, postoperative and laboratory data were extracted from each patient's medical records. Results were compared between our initial and late experience.

Results:

In our practice, we noticed a relationship between surgical team experience and better postoperative outcome, despite the adoption of more complex surgical revascularization strategies. The cutoff point seems to be the first 30 patients. Fifty-one patients were planned for a single Left Internal Mammary Artery (LIMA) to Left anterior Descending Artery (LAD) Endo-ACAB. The remaining nineteen had a multivessel Endo-ACAB. However, after our first 30 cases we experienced a shift of our activity towards more complex revascularizations with significantly more multivessel Endo-ACABs (2/30, 7% vs 17/40, 42,5%, p=0,003). A reduction was observed in 30-day Major Adverse Cardiac Event (MACE) rate between groups (3/30 vs 0/40, p=0,074). Other demographic, peri and postoperative data were similar and are reported in the annexed table. Moreover, our anesthesiologic management evolved over time, with a shift from double to single lung ventilation for all our patients after the 47th patient and the administration of spinal analgesia, systematically, after the 34th patient.

Conclusion:

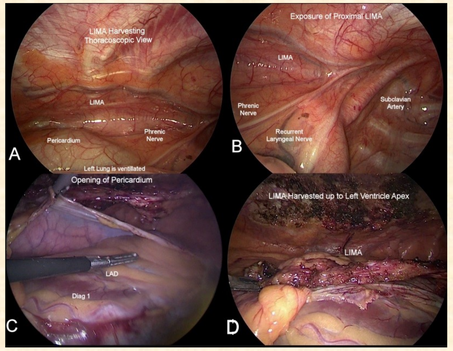
Endo-ACAB is a technically demanding operation. With ongoing experience, we attempted more complex surgeries along with better postoperative outcomes. A minimum learning exposure of 30 patients was necessary to obtain sufficient expertise with the technique.

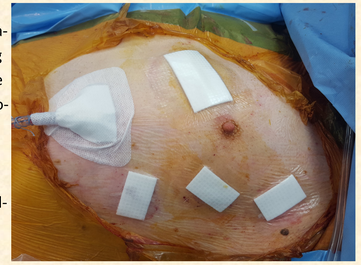
Central Message:

The new era of hybrid revascularization nudges cardiac surgeons to adopt new skills in coronary surgery. It is high time minimally invasive coronary bypass grafting (MICS-CABG) becomes the mainstream for at least one vessel disease. MICS-CABG can safely be introduced in centers with no previous experience with no extra cost in terms of morbidity or mortality. A learning period of at least 30 patients is necessary to address more complex revascularization strategies in a minimally invasive setting.

Keywords:

Endo-EACAB, MICS-CABG, Hybrid Coronary Revascularization





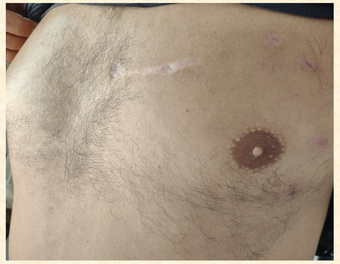








Table 1: Patients' Demographics

Abbreviations: BMI, Body Mass Index; AF, Atrial Fibrillation; NYHA, New York Heart Association; LVEF, Left Ventricular Ejection Fraction.

	EACAB, entire series (n= 70)	EACAB, initial experience (n= 30)	EACAB, late experience (n= 40)	*p* Value, Initial vs late
Age in years, median (IQR)	**63,7 (57,9- 71,6)**	**62,3 (57,3- 71)**	**64,1 (58,6- 72,4)**	**0,591**
BMI, median (IQR)	**27,3 (23,9- 30,4)**	**26,6 (23,9- 30,8)**	**27,4 (25,3- 34,6)**	**0,918**
Male Gender, n (%)	**54/70 (77)**	**21/30 (70)**	**33/40 (82,5)**	**0,258**
Euroscore II, median (IQR)	**1,12 (0,74- 1,6)**	**1,04 (0,68- 1,8)**	**1,14 (0,86- 1,57)**	**0,775**
Creatinine clearance, median (IQR) (ml/min)	**92,2 (67,4- 109,4)**	**94,1 (62,7- 110,2)**	**83,4 (72,3- 108,9)**	**0,967**
Dialysis, n (%)	**1/70 (1)**	**1/30 (3)**	**0**	**0,429**
Diabetes, n (%)	**19/70 (27)**	**8/30 (27)**	**11/40 (28)**	**1**
Tobacco history, n (%)	**43/70 (61)**	**19/30 (63)**	**24/40 (60)**	**0,809**
Hypertension, n (%)	**56/70 (80)**	**22/30 (73)**	**34/40 (85)**	**0,366**
Hypercholesterolemia	**64/70 (91)**	**26/30 (87)**	**38/40 (95)**	**0,391**
Preoperative AF, n (%)	**4/70 (6)**	**1/30 (3)**	**3/40 (8)**	**0,63**
Chronic Lung Disease, n (%)	**12/70 (17)**	**2/30 (6)**	**10/40 (25)**	**0,044**
Cerebrovascular accident, n	**3/70 (4)**	**0/30 (0)**	**3/40 (8)**	**0,255**
Recent myocardial infarction, n (%)	**14/70 (20)**	**6/30 (20)**	**8/40 (20)**	**1**
Elective surgery, n (%)	**59/70 (84)**	**24/30 (80)**	**35/40 (88)**	**0,511**
NYHA III or IV, n (%)	**16/70 (22)**	**3/30 (10)**	**13/40 (32,5)**	**0,042**
Good LVEF (>50%), n (%)	**56/70 (80)**	**23/30 (77)**	**33/40 (83)**	**0,764**
Reoperation, n (%)	**0/70 (0)**	**0/30 (0)**	**0/40 (0)**	**1**

Table 2: Perioperative and postoperative data

Abbreviation: CABG, Coronary Artery Bypass Graft; AF, Atrial Fibrillation; MACE, Major Adverse Cardiac Event.

	EACAB, entire series (n= 70)	Endo-ACAB, initial experience (n= 30)	Endo-ACAB, late experience (n= 40)	*p* Value
Single vessel CABG, n (%)	**51/70 (73)**	**28/30 (93)**	**23/40 (58)**	**0,002**
Hybrid Revascularization, n (%)	**19/70 (27)**	**10/30 (33)**	**9/40 23)**	**0,417**
Conversion to sternotomy, n (%)	**7/70 (10)**	**3/30 (10)**	**4/40 (10)**	**1**
Surgery duration, median (IQR) (min)	**262,5 (212,5- 345,5)**	**263 (236- 316)**	**254 (199- 359)**	**0,349**
Postoperative length of stay, median (IQR) (days)	**7 (6- 9)**	**7 (6- 9)**	**8 (6- 10)**	**0,841**
Intensive Care Unit length of stay, median (IQR) (hours)	**42 (22- 66)**	**42 (22- 68)**	**24 (22- 65)**	**0,682**
Postoperative intubation time, median (IQR) (hours)	**7 (7- 12)**	**8 (5- 14)**	**6 (4- 10)**	**0,505**
Drain output at 24h, median (IQR) (ml)	**460 (300- 670)**	**345 (200- 533)**	**500 (355- 730)**	**0,014**
Need for transfusion, n (%)	**13/70 (19)**	**7/30 (23)**	**6/40 (15)**	**0,536**
Deep Wound Infection 30 days, n (%)	**2/70 (3)**	**2/30 (7)**	**0/40**	**0,18**
New onset postoperative AF, n (%)	**11/70 (16)**	**8/30 (27)**	**3/40 (8)**	**0,045**
Reoperation for bleeding, n (%)	**2/70 (3)**	**1/30 (4)**	**1/40 (3)**	**1**
Target vessel revascularization at 30 days, n (%)	**1/70 (1)**	**1/30 (4)**	**0/40**	**0,429**
Stroke at 30 days, n	**0/70**	**0/30**	**0/40**	-
Myocardial Infarction at 30 days, n (%)	**2/70 (3)**	**2/30 (7)**	**0/40**	**0,18**
Mortality at 30 days, n	**0/70**	**0/30**	**0/40**	-
MACE at 30 days, n (%)	**3/70 (4)**	**3/30 (10)**	**0/40**	**0,074**