



CHO RAY HOSPITAL
Cardiovascular surgery department



**Results of Minimally Invasive Coronary Artery Bypass Grafts
at Cho Ray Hospital**

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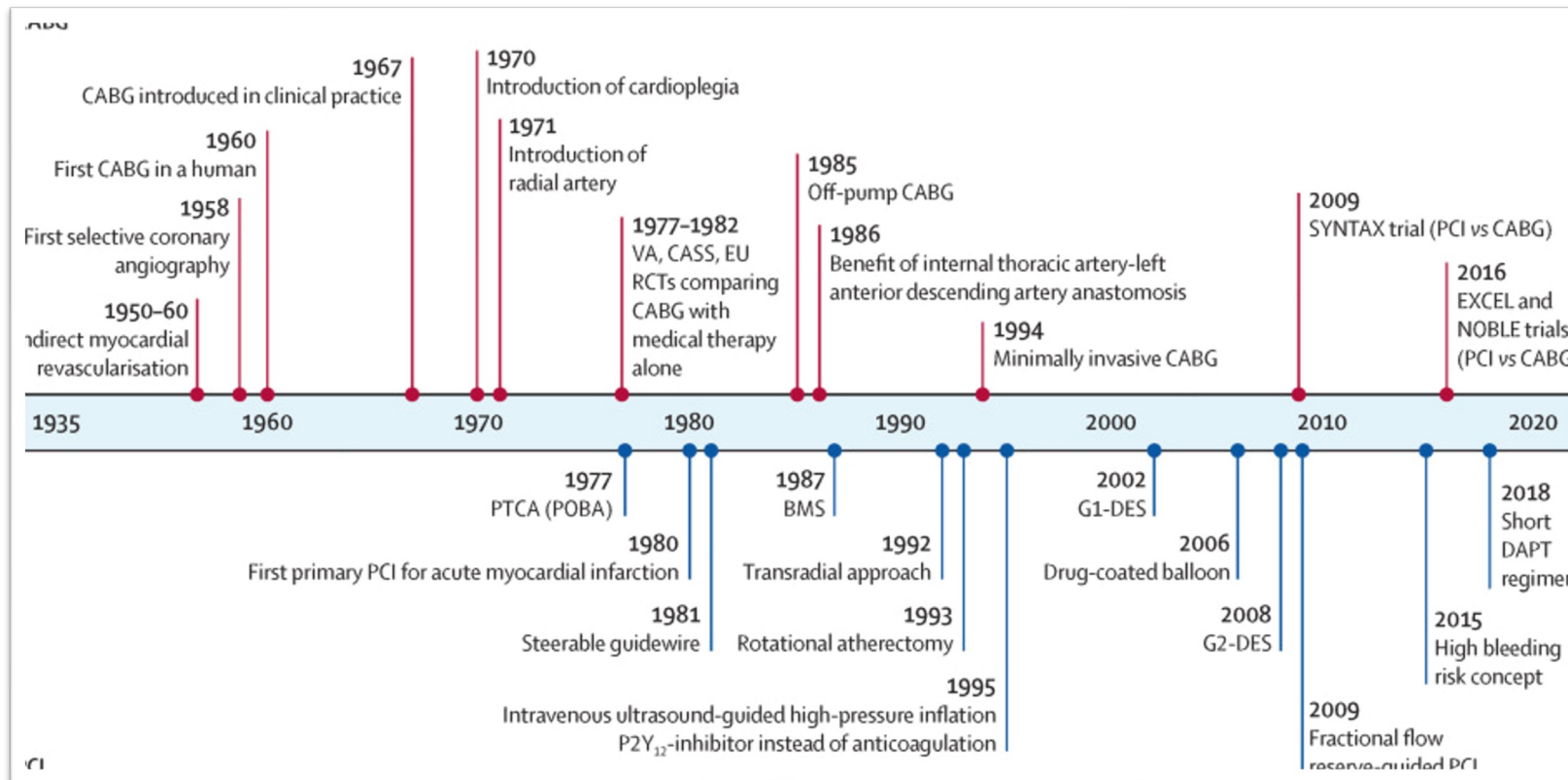


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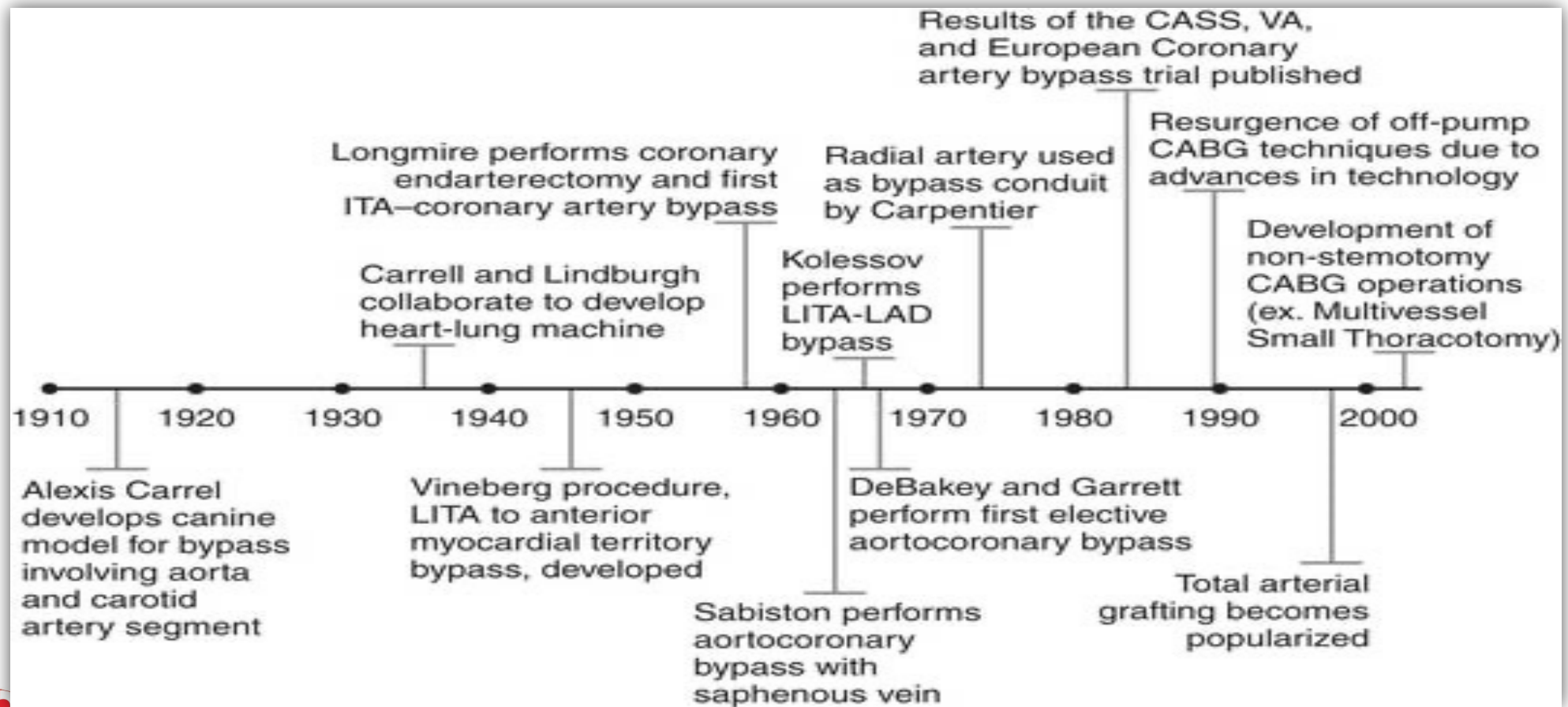
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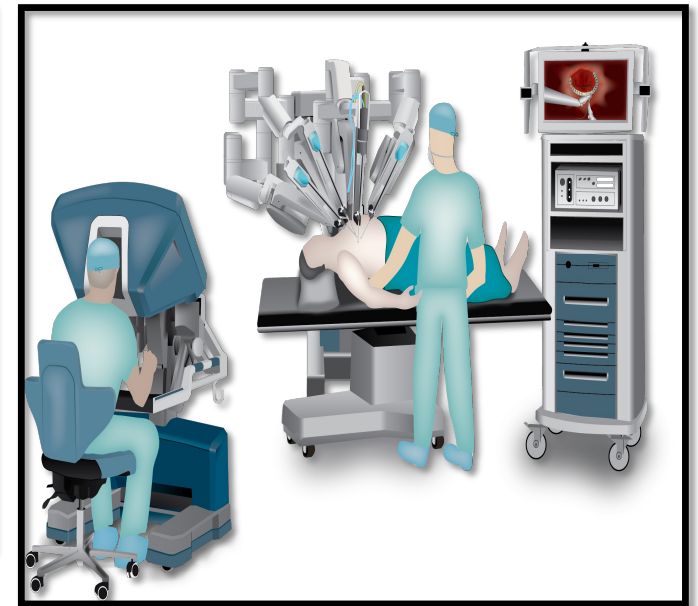
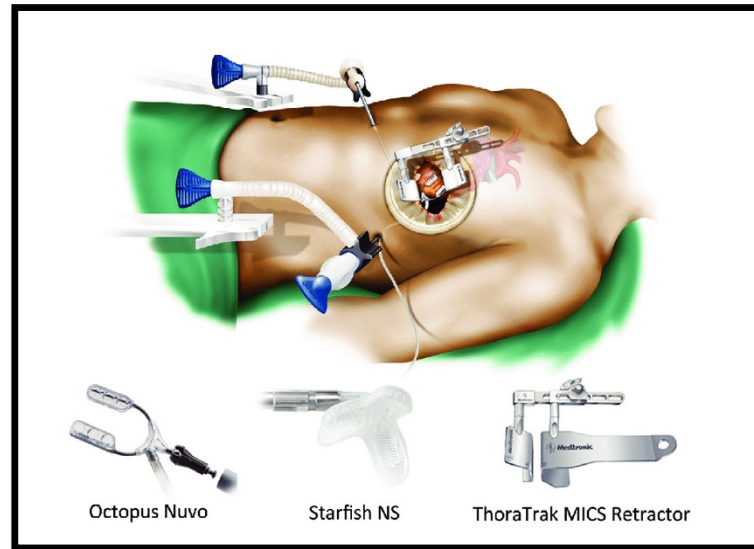
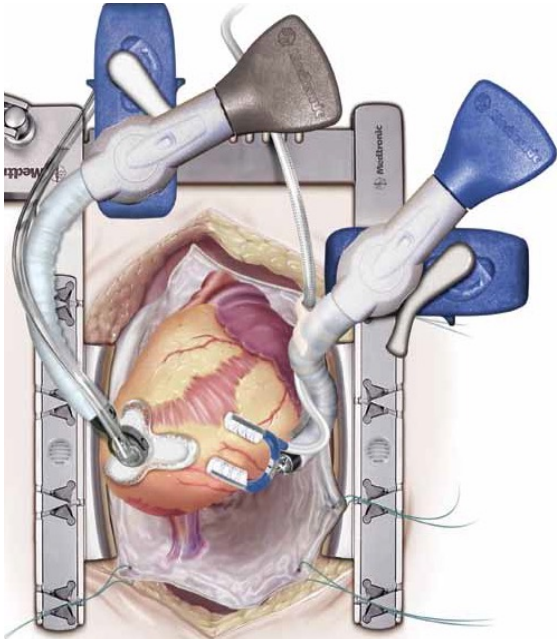
History



History



Present



Present

Background. Limited multi-institutional data evaluating minimally invasive cardiac surgery (MICS) coronary artery bypass surgery (CABG) outcomes have raised concern for increased resource utilization compared with standard sternotomy. The purpose of this study was to assess short-term outcomes and resource utilization with MICS CABG in a propensity-matched regional cohort.

Methods. Isolated CABG patients (2012-2019) were extracted from a regional Society of Thoracic Surgeons database. Patients were stratified by MICS CABG vs open CABG via sternotomy, propensity-score matched 1:2 to balance baseline differences, and compared by univariate analysis.

Results. Of 26,255 isolated coronary artery bypass graft patients, 139 MICS CABG and 278 open CABG patients were well balanced after matching. There was no difference in the operative mortality rate (2.2% open vs 0.7%

MICS CABG, $P = .383$) or major morbidity (7.9% open vs 7.2% MICS CABG, $P = .795$). However, open CABG patients received more blood products (22.2% vs 12.2%, $P = .013$), and had longer intensive care unit (45 vs 30 hours, $P = .049$) as well as hospital lengths of stay (7 vs 6 days, $P = .005$). Finally, median hospital cost was significantly higher in the open CABG group (\$35,011 vs \$27,906, $P < .001$) compared with MICS CABG.

Conclusions. Open CABG via sternotomy and MICS CABG approaches are associated with similar, excellent perioperative outcomes. However, MICS CABG was associated with fewer transfusions, shorter length of stay, and ~\$7000 lower hospital cost, a superior resource utilization profile that improves patient care and lowers cost.

(Ann Thorac Surg 2021;111:1478-85)

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Teman, Nicholas R et al. "Minimally Invasive vs Open Coronary Surgery: A Multi-Institutional Analysis of Cost and Outcomes." The Annals of thoracic surgery vol. 111,5 (2021): 1478-1484. doi:10.1016/j.athoracsur.2020.06.136



Present

[Ann Card Anaesth.](#) 2017 Jan-Mar; 20(1): 57–60.

doi: [10.4103/0971-9784.197837](#)

PMCID: PMC5290697

PMID: [28074797](#)

Minimally Invasive Compared to Conventional Approach for Coronary Artery bypass Grafting Improves Outcome

[Jitumoni Baishya](#), [Antony George](#), [Jayaprakash Krishnamoorthy](#), [Geetha Muniraju](#), and [Murali Chakravarthy](#).



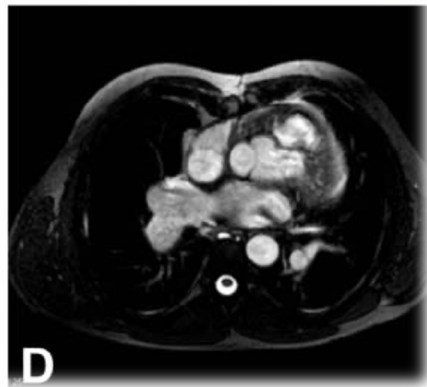
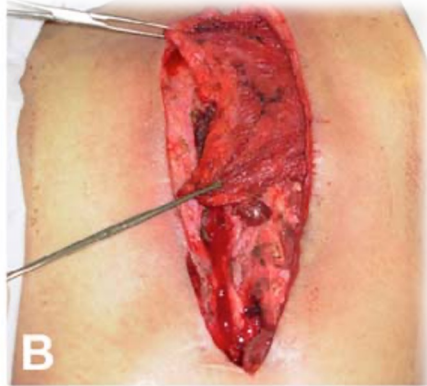
Baishya J, George A, Krishnamoorthy J, Muniraju G, Chakravarthy M. Minimally invasive compared to conventional approach for coronary artery bypass grafting improves outcome. *Ann Card Anaesth.* 2017 Jan-Mar;20(1):57-60. doi: 10.4103/0971-9784.197837. PMID: 28074797; PMCID:

Present

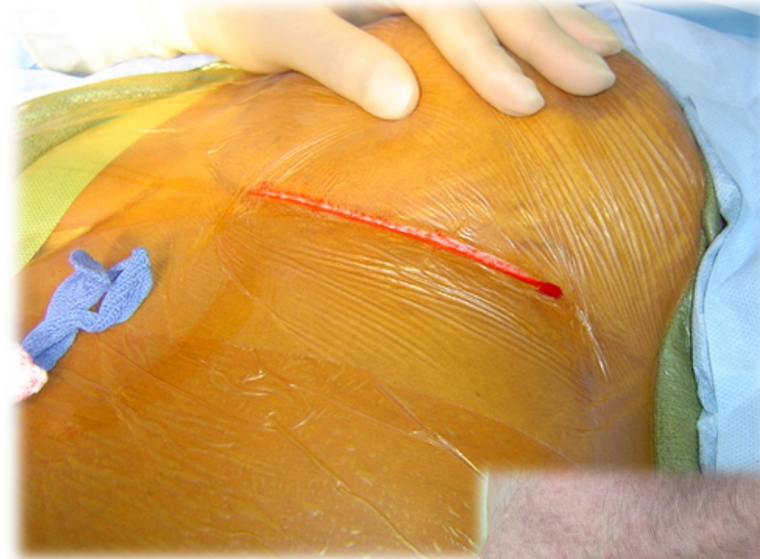
Minimally invasive compared to conventional approach for coronary artery bypass grafting improves outcome.

Introduction: Minimally invasive (MI) cardiac surgery is a rapidly gaining popularity, globally as well as in India. We aimed to compare the outcome of MI to the conventional approach for coronary artery bypass graft (CABG) surgery. **Methods:** This prospective, comparative study was conducted at a tertiary care cardiac surgical center. All patients who underwent CABG surgery via MI approach (MI group) from July 2015 to December 2015 were enrolled and were compared against same number of EuroSCORE II matched patients undergoing CABG through conventional mid-sternotomy approach (CON group). Demographic, intra- and post-operative variables were collected. **Results:** In MI group, duration of the surgery was significantly longer ($P = 0.029$). Intraoperative blood loss lesser ($P = 0.002$), shorter duration of ventilation ($P = 0.002$), shorter Intensive Care Unit stay ($P = 0.004$), shorter hospital stay ($P = 0.003$), lesser postoperative analgesic requirements ($P = 0.027$), and lower visual analog scale scores on day of surgery ($P = 0.032$) and 1st postoperative day ($P = 0.025$). No significant difference in postoperative blood loss, blood transfusion, or duration of inotrope requirement observed. There was no conversion to mid-sternotomy in any patients, 8% of patients had desaturation intraoperatively. There was no operative mortality. **Conclusion:** MI surgery is associated with lesser intraoperative blood loss, better analgesia, and faster recovery.

Traditional CABG

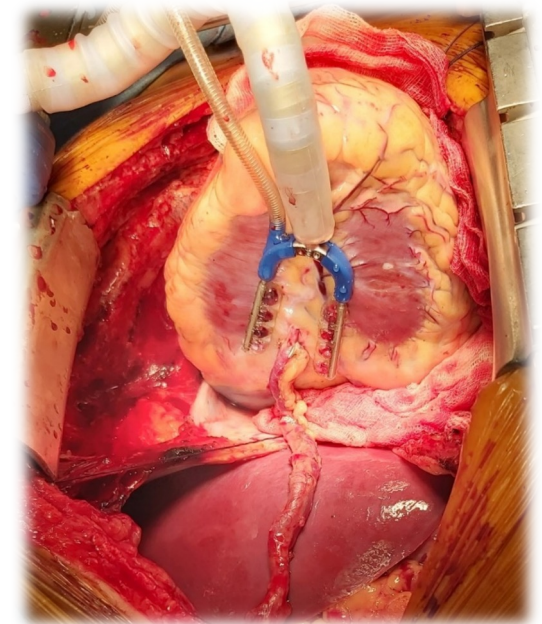
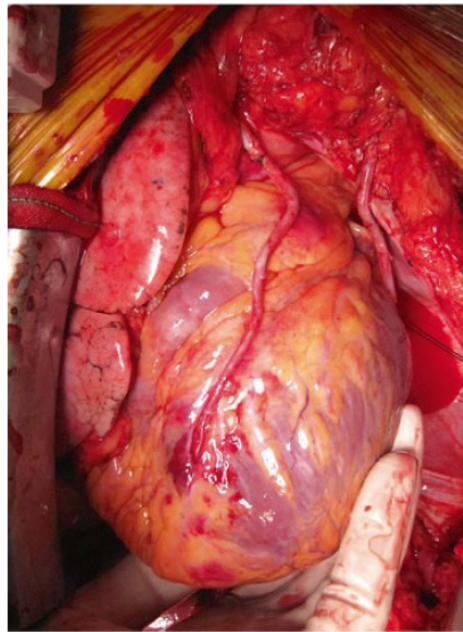


Mics CABG



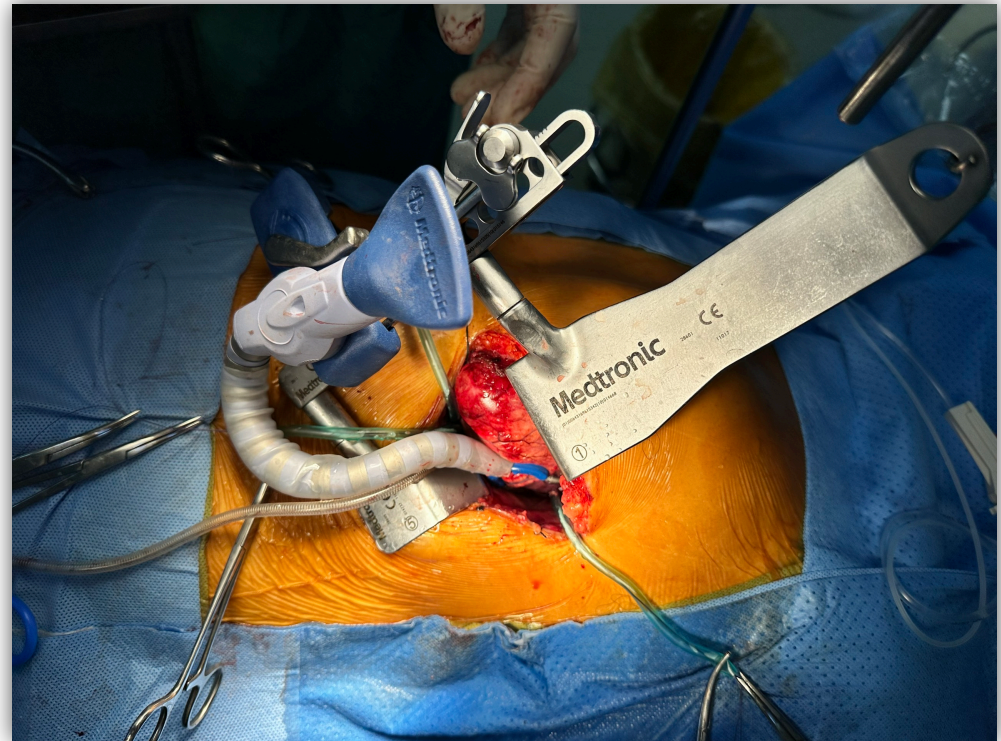
Coronary artery bypass graft surgery at Cho Ray Hospital

- Off-pump CABG surgery has been implemented since 2010.
- On average, >200 cases each year
- Mortality rate of less than 2%



Coronary artery bypass graft surgery at Cho Ray Hospital

- MIDCAB has been implemented since 2020
- MICS CABG has been implemented since 2021
- ROBOTIC?



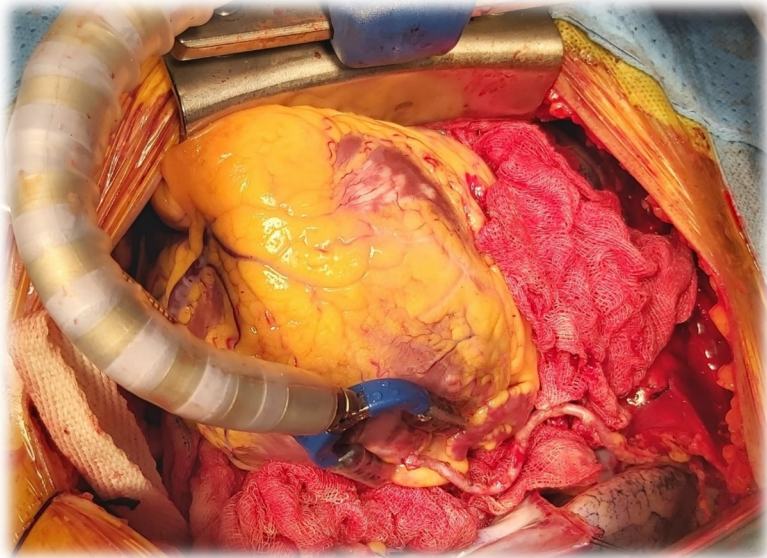
Coronary artery bypass graft surgery at Cho Ray Hospital

As of November 2023, there have been 32 cases performed:

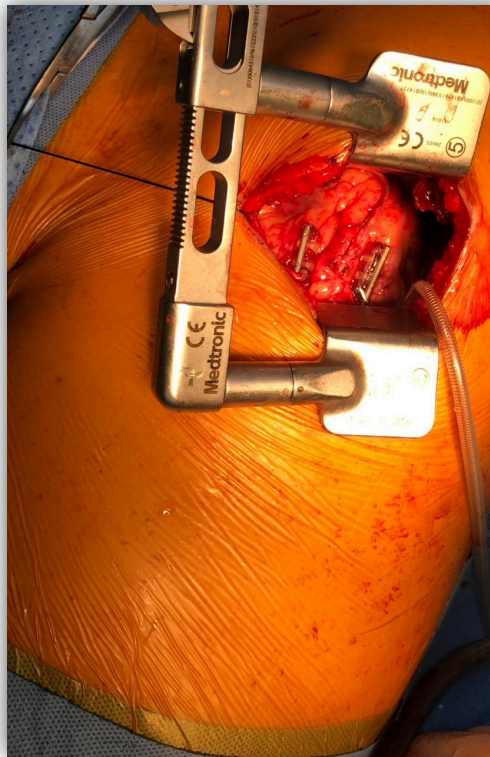
- MIDCAB: 18 cases
- MICS CABG: 14 cases
 - 02 cases with 3 grafts
 - 12 cases with 2 grafts



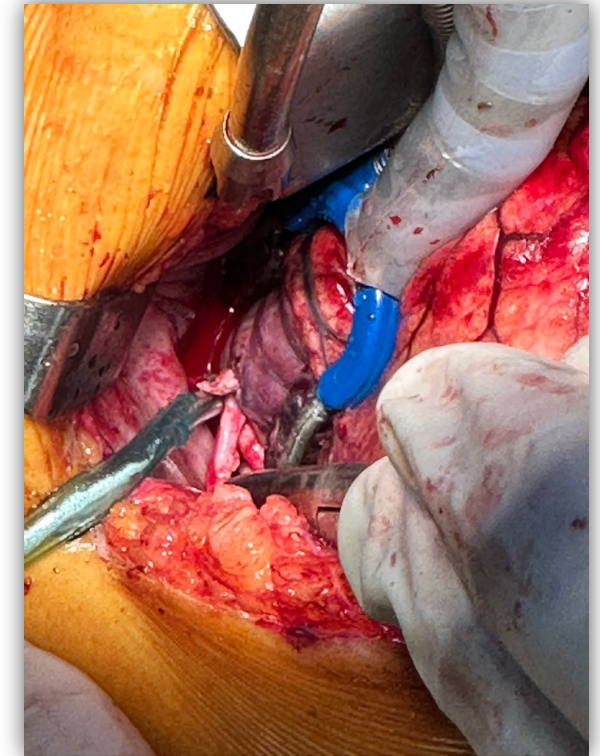
Coronary artery bypass graft surgery at Cho Ray Hospital



Open surgery

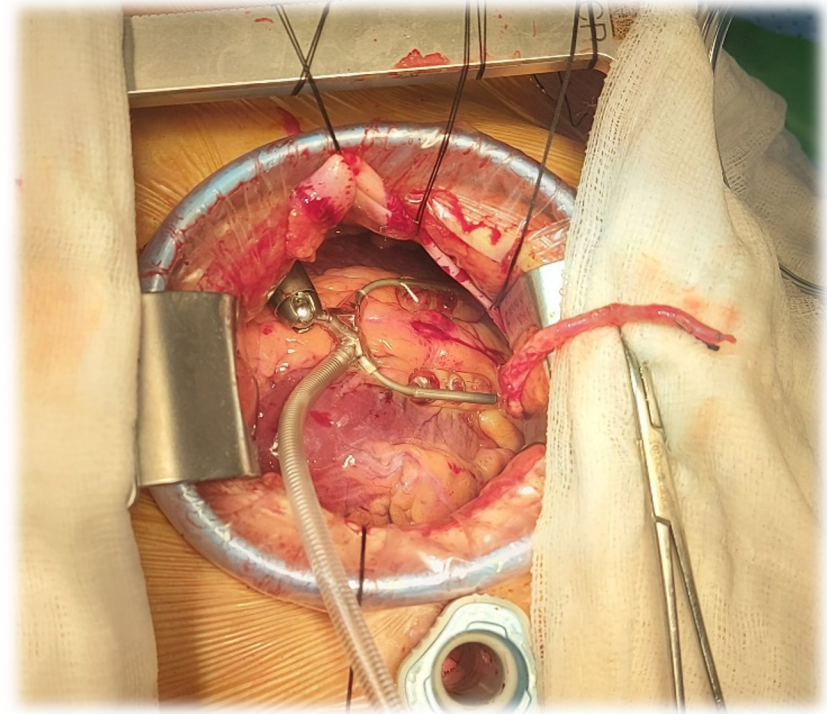
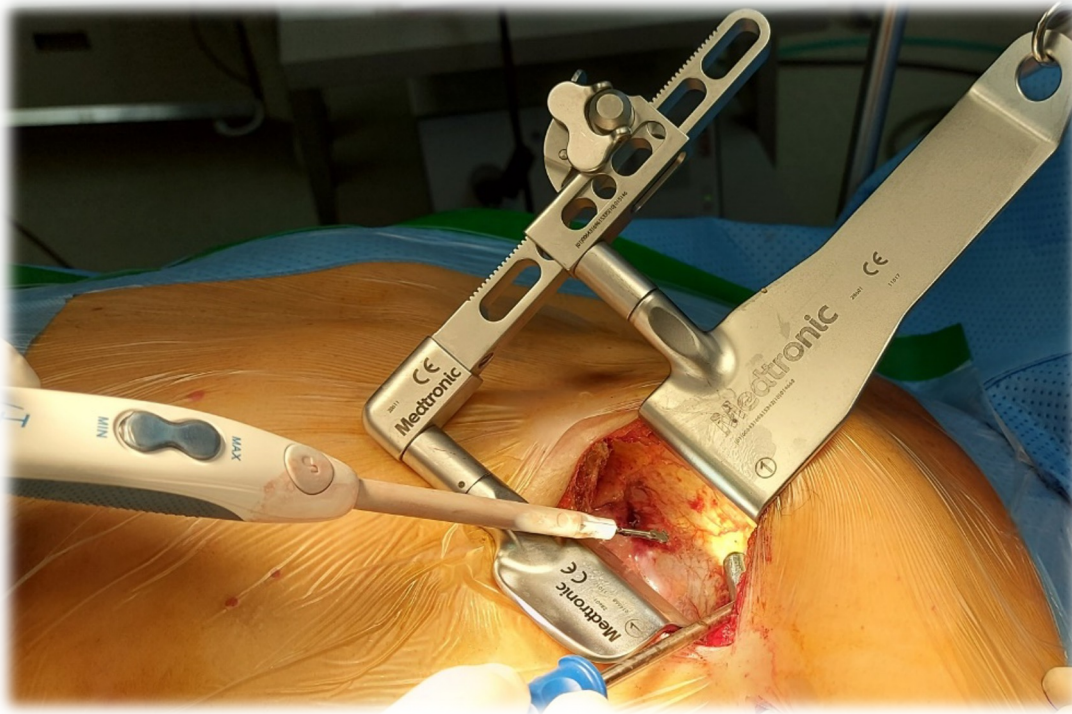


MIDCAB

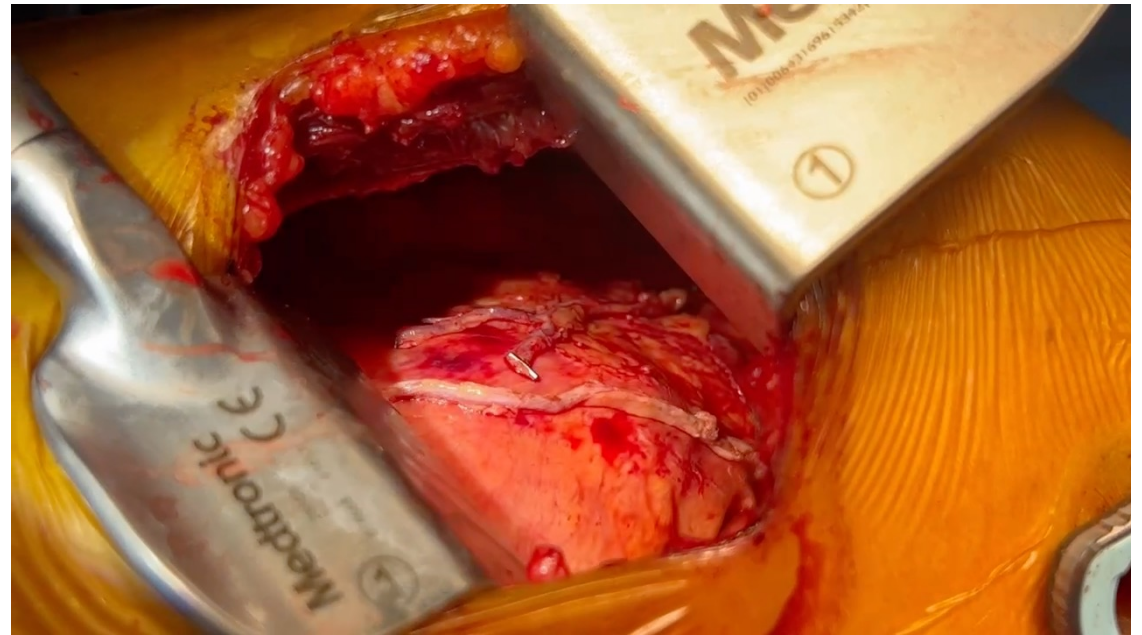
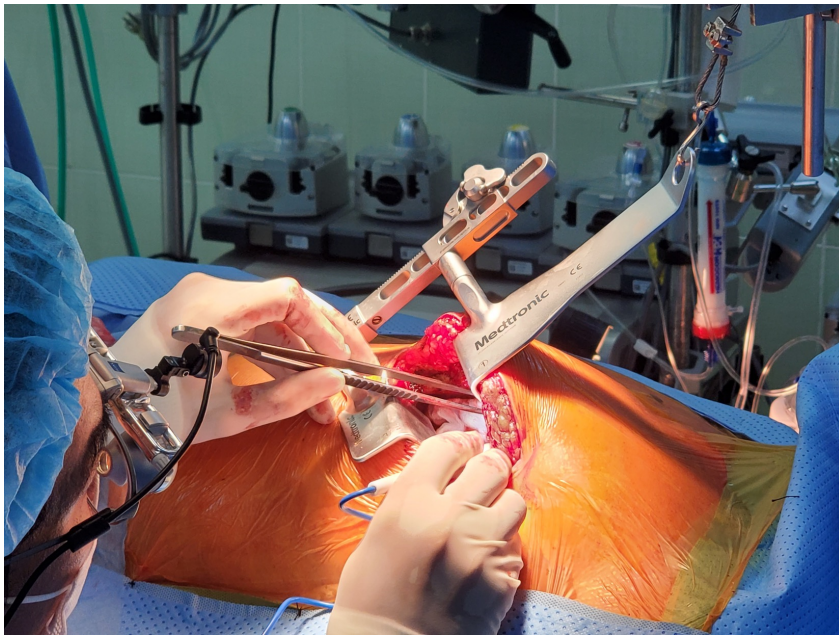


MICS CABG

Coronary artery bypass graft surgery without extracorporeal circulation: LIMA – LAD II



MICS CABG without extracorporeal circulation: RIMA – LAD II, LIMA – LCx III





Result



RESULT 32 CASES

PATIENTS' CHARACTERISTICS

Age, mean (\pmSD)	63.6 (\pm10)
Female (%)	5 (15,62%)
Euroscore %, mean (\pmSD)	3.2% (2.1%)
Diagnosis at admission	
STEMI	1 (3.12%)
NSTEMI	5 (15.62%)
Unstable angina	25 (78.12%)
Stable angina	1 (3.12%)

RESULT

PATIENTS' CHARACTERISTICS

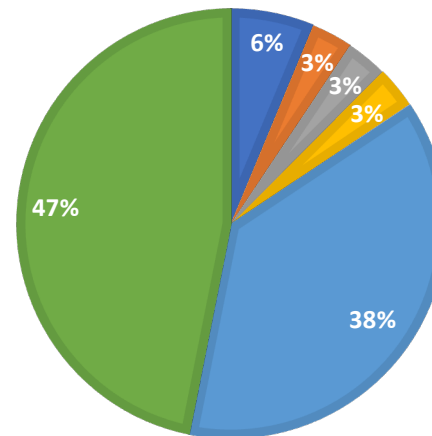
Hypertension	31 (96.88%)
Type II diabetes	1 (4,55%)
Dyslipidaemias	16 (50.0%)
Smoking	22 (68.75%)
Chronic Obstructive Pulmonary Disease	10 (31.25%)
Chronic Kidney Disease	4 (12.5%)
eGFR, mean (\pmSD)	79.7 (\pm19.4)
Chronic peripheral vascular disease	6 (18.75%)
Previous PCI	5 (15.62%)
Previous stroke	7 (21.88%)

RESULT

EF, mean (\pm SD)	60.78 (\pm 10.75)
LVEDd, mean (\pm SD)	50.18 (\pm 6.77)
Preoperative arrhythmia	4 (12.5%)

VESSELS INVOLVED

■ > 50% LM ■ LM + 3 ■ LM + 2 ■ 3 ■ 2 ■ LAD



Preoperative IABP	0
Preoperative vasopressor	
1 vasopressor	3 (9.38%)
2 vasopressors	2 (6.25%)

POPULATION CHARACTERISTICS





RESULT

SURGICAL PROCEDURES

Emergency	1 (3.12%)
Elective	31 (96.88%)

Number of coronary artery grafts, mean (\pmSD)	1.5 (\pm0.6)
1 graft	18 (56.25%)
2 grafts	12 (37.5%)
3 grafts	2 (6.25%)





RESULT

- **18 cases 1 graft: 100% LIMA → LAD**
- **12 cases 2 grafts:**
 - **3 cases using SVG and aortic clamp**
 - **4 cases RIMA (Y graft) → LIMA**
- **2 cases 3 grafts:**
 - **1 case: RIMA (Y graft) → LIMA; SVG → RIMA**
 - **LIMA → LAD**
 - **RIMA → OM2**
 - **SVG → PDA**
 - **1 case: RIMA (Y graft) → LIMA**
 - **LIMA → LAD**
 - **RIMA → OM3**
 - **GEA → PDA**

SURGICAL PROCEDURES





RESULT

SURGICAL PROCEDURES

Postoperative death	0
Postoperative stroke	0
Postoperative renal failure requires RRT	0
Postoperative arrhythmia	9 (28.125%)
Postoperative pacemaker placement	0



RESULT



COMPLICATIONS

Postoperative pneumonia	10 (31.25%)
Postoperative pleural effusion	20 (62.5%)
Reoperation for bleeding	0
Postoperative pericardial effusion	3 (9.38%)



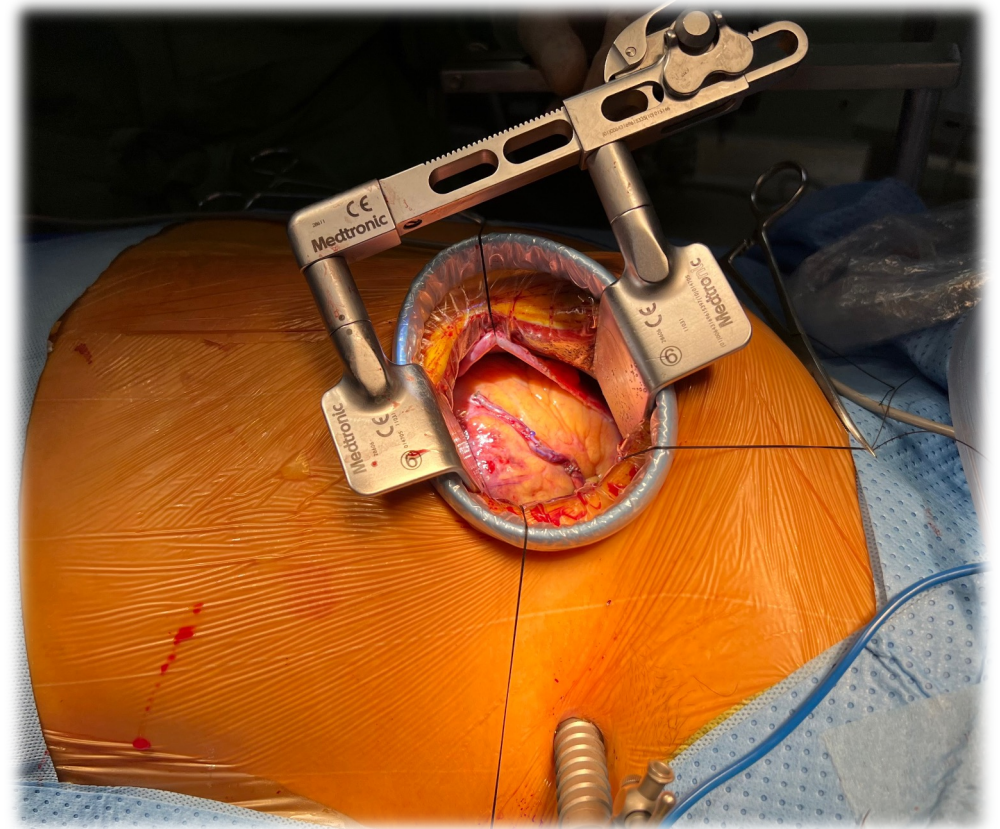
RESULT

LENGTH OF STAY

Length of stay in CCU, hours	48 (± 11)
Length of stay in the hospital, days	6 (± 5)

CONCLUSION

- In line with global trends, the Cardiac Surgery Department at Cho Ray Hospital has successfully implemented Minimally Invasive Cardiac Surgery Coronary Artery Bypass Grafting, making it a routine surgical procedure.
- The patient experiences reduced pain, avoids sternal wound infection, achieves early recovery, and has improved aesthetics.



THANK YOU FOR YOUR ATTENTION.

