

Robotic Coronary Revascularization: Routine Postoperative Angiography To Optimize Clinical Results?

Joshua B. Schwartz MD¹, Elie Fadel MD¹, Amina Ferroum MD¹, Naïla Benchelabi MD¹, Emmanuel Moss MD¹

¹Division of Cardiac Surgery, McGill University, Montreal, QC, Canada

BACKGROUND

- Robotic minimally invasive direct coronary artery bypass (**MIDCAB**) offers revascularization of:
 - isolated **left anterior descending artery (LAD)** disease.
 - multivessel disease **with stentable non-LAD targets**.¹
- MIDCAB **avoids sternotomy** while obtaining the **same long-term benefits** of a left internal mammary artery (LIMA)-LAD bypass, and benefits patients with elevated sternotomy risk.
- MIDCAB is more **technically challenging** than a conventional coronary artery bypass grafting (CABG), but **enables faster recovery** with less perioperative morbidity.²
- Study aim:** To report the use of routine postoperative angiography as a strategy to improve operative results and reduce the need for future revascularization.

METHODS

- Retrospective study of a **single surgeon experience**, over a 10-year period.
- Population:** 210 consecutive patients scheduled to undergo robotic-assisted MIDCAB.
- Co-primary outcomes:** 1) Anastomotic quality, measured angiographically via a modified Fitzgibbon score; 2) LAD reintervention assessed via questionnaires and chart review.
- Key secondary outcomes:** 1) Conversion to sternotomy; 2) in-hospital reintervention; 3) survival.

RESULTS

- Robotic MIDCAB** was successfully **completed in 202 patients** (96% of the 210 scheduled to undergo the procedure), of which **195 (96.5%)** received **routine early angiography**.
- Routine early angiography was utilized to determine the graft's Fitzgibbon score, obtained by grading the distal anastomosis of the graft (grade A, B, or O) according to its appearance in the worst plane.³
- Patients with **single-vessel CAD** represented 52% (n=109) of the study population.
- Hybrid revascularization** was performed in 56 patients.
- Clinical follow-up was **91.3 % complete** using Clark's C method.

Table 1. Patient Characteristics

Age at Surgery	Female Sex	BMI	Diabetes	Hypertension	Dyslipidemia	Previous PCI		Presenting with a Myocardial Infarction	Total Intubation Time*
years (± SD)	n (%)	kg/m2 (± SD)	n (%)	n (%)	n (%)	n (%)	Previous PCI involving LAD?	n (%)	min (± SD)
65.3 (10.8)	46 (21.9)	28.2 (4.8)	70 (33.3)	145 (69.0)	160 (76.2)	53 (25.2)	27 out of 53	59 (28.1%)	460 (485)

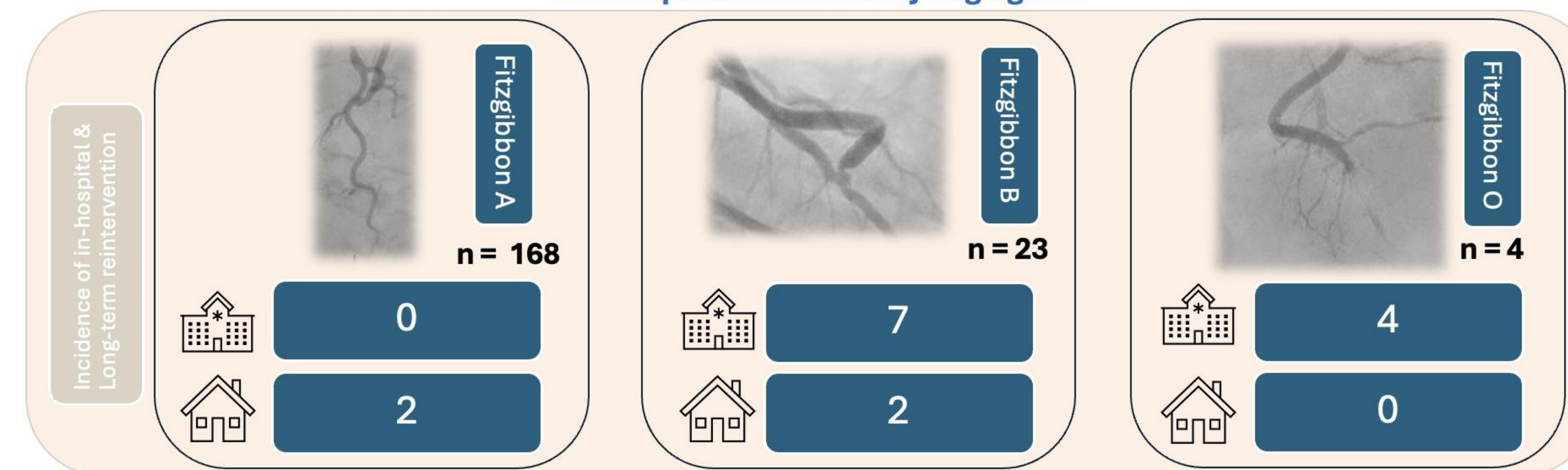
*Time from pre-procedure intubation to extubation

OUTCOMES:

- Modified Fitzgibbon scores:** **A** in 168 patients (86.2%), **B** in 23 patients (11.8%), & **O** in four patients (2.1%).
- Out of **8 conversions to sternotomy**, 7 were non-emergent.
- In-hospital re-intervention** was required for 11 patients (5.2%); 7 via redo mini-thoracotomy & 4 via sternotomy.
- Freedom from LAD revascularization** post-discharge: 96.7%
- Patients requiring a late reintervention:** Fitzgibbon A: n=2, Fitzgibbon B: n=2, & No early angiography: n=2
- Mortality:** in-hospital: n=1 (0.4%). **Survival was 91.4% at mean follow-up of 3.2 ± 2.3 years.** Out of 17 outpatient mortalities, 2 were due to cardiac causes.

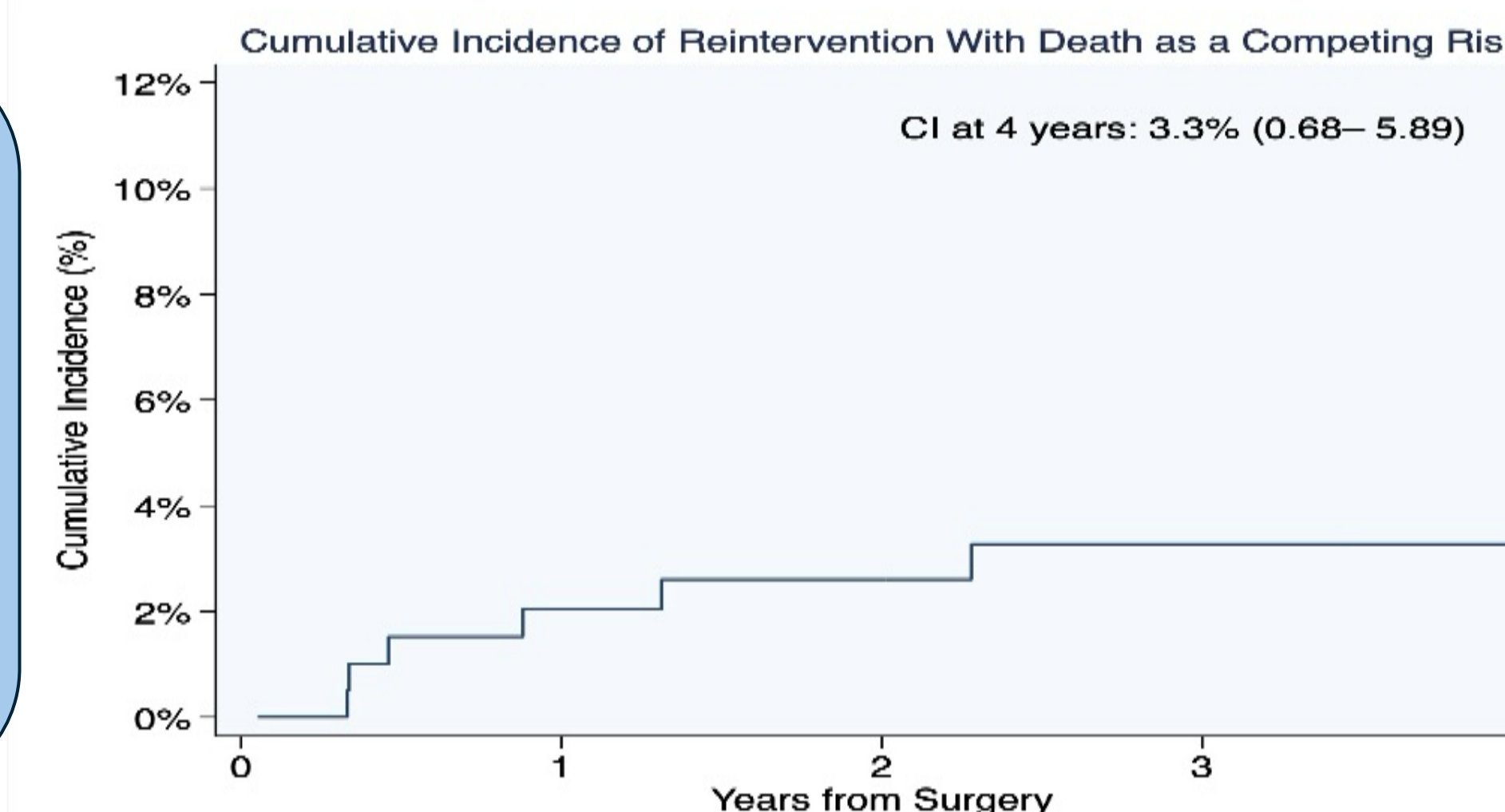
Angiographic and Clinical Outcomes in Patients Undergoing Robotic Coronary Revascularization

195/210 patients with early angiogram



Defining modified Fitzgibbon scores:³

Grade A: Excellent
Grade B: Fair (narrowed to less than 50% of the caliber of the grafted coronary artery AND/OR suboptimal operative results (ie. bypassed proximal to a lesion, dissection within distal mammary, etc.))
Grade O: Occluded



CONCLUSION

- Robotic MIDCAB is a **safe and reproducible procedure** that provides patients with a **durable revascularization**.
- Early identification of suboptimal anastomoses** allows for timely reintervention before adverse clinical events can occur.
- Routine postoperative angiogram** can identify asymptomatic patients with an imperfect result & is an effective method to **improve graft patency rates** and **optimize long-term results**.
- Limitations of this study include its single-center, retrospective design, and absence of a control group.
- Future directions** include evaluating the efficacy of coronary CT compared to angiogram to detect suboptimal coronary anastomoses.

DISCLOSURES

The authors do not have any financial disclosures or conflicts of interest to declare.

REFERENCES

