

Minimally Invasive Changes: Course of Ejection Fraction Changes in Robotic Heart Surgery

Introduction

- Robotically-assisted cardiac surgery is an established approach with outcomes equal to or surpassing traditional thoracotomies.
- However procedure times, including bypass and ischemic times, are typically longer.
- This study aims to determine the changes in LVEF over time among patients undergoing robotically assisted coronary artery bypass (**RACAB**) and mitral valve repair surgery (**RAMVR**) and determine factors influencing this course.

Methods

Retrospective single center review from July 2021- May 2025 was used to identify **341 patients**:

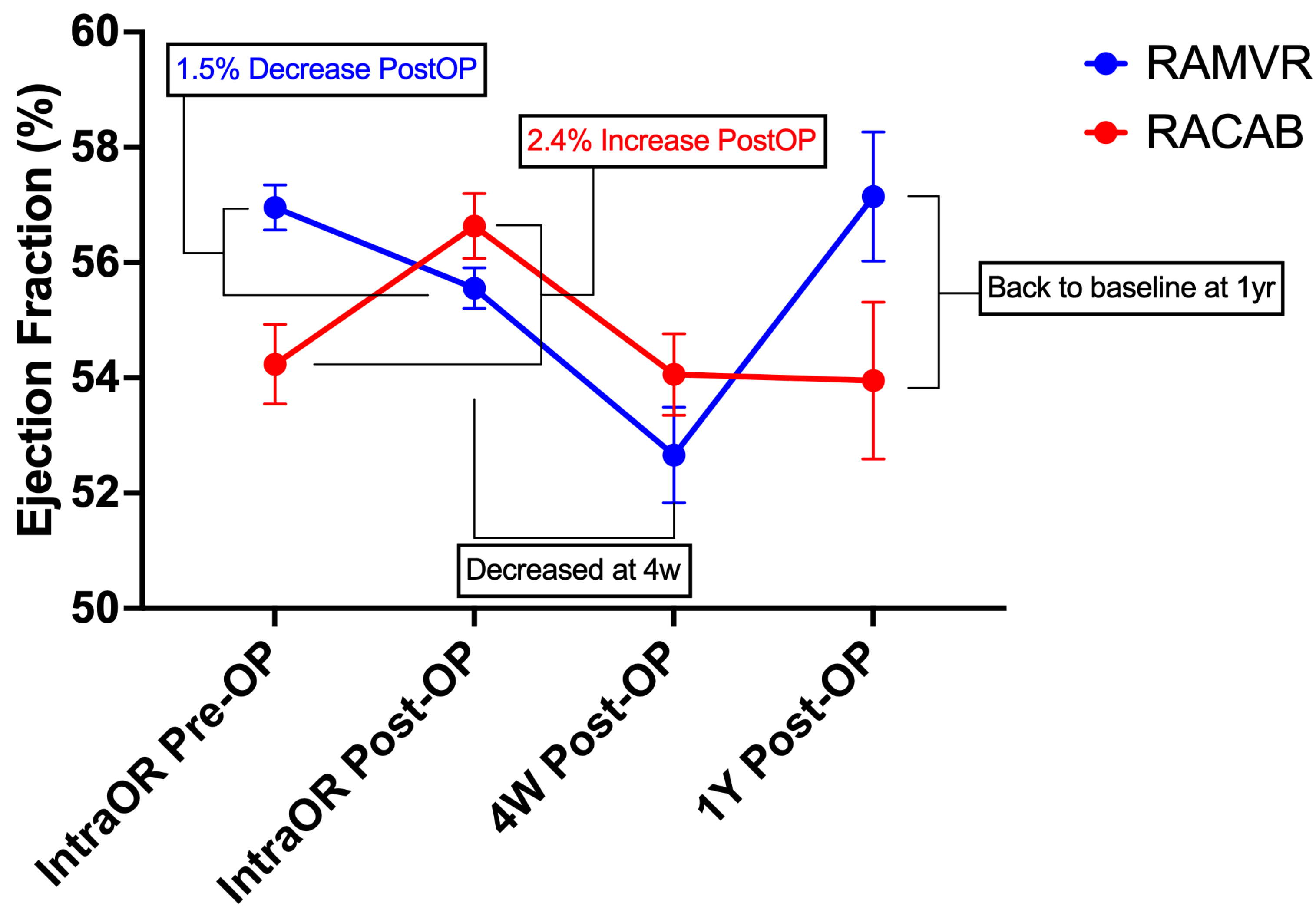
	RACAB (n=161)	RAMVR (n=180)
P = 0.004	Median Age: 66	Median Age: 62
P = 0.002	Median BMI: 27.7	Median BMI: 26.4
P = 0.001	% female: 18.6%	% female: 33.4%
P < 0.001	STS PROM: 0.63%	STS PROM: 0.45%

Repeated-measures ANOVA and linear mixed models were used to asses effects variables had on LVEF course.

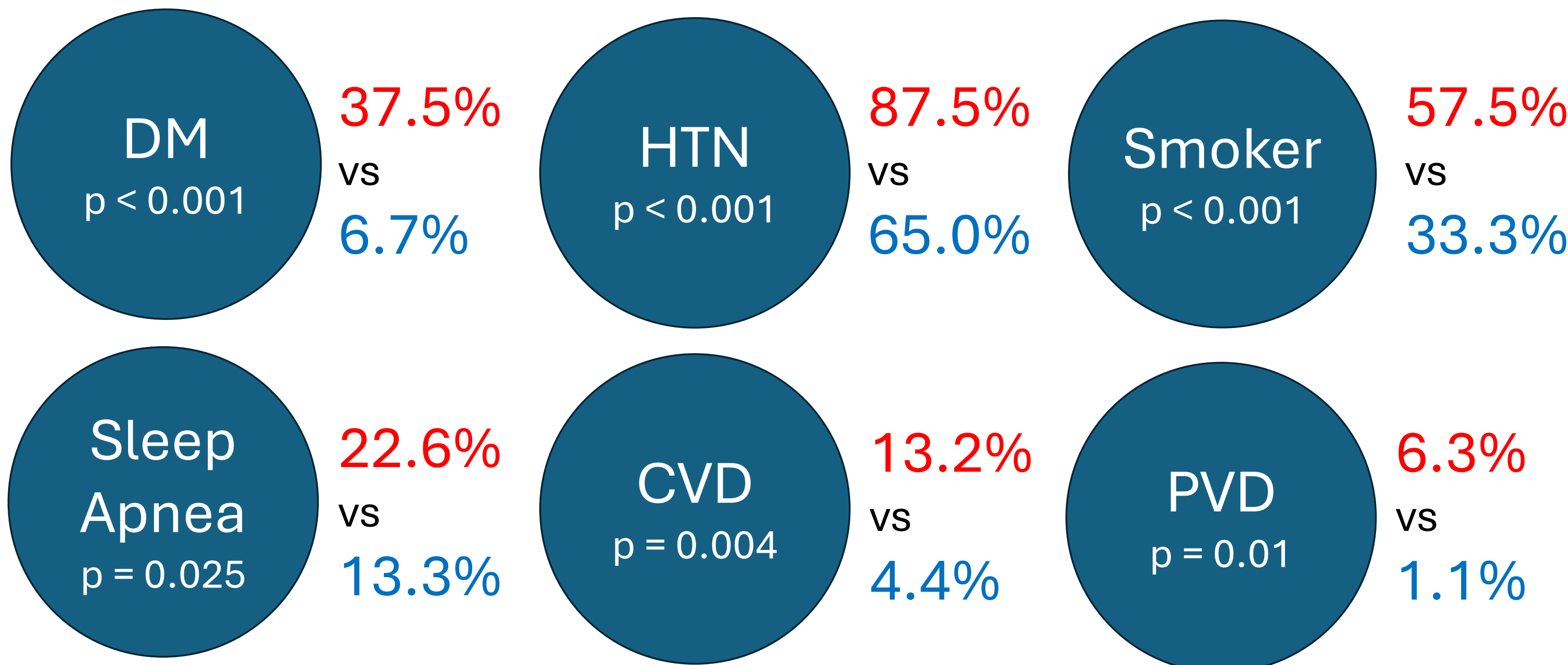
Results

Overall Course of LVEF

Procedure P=0.281, Time P<0.01, Interaction P<0.001



Higher Preoperative Morbidity in RACAB Patients



Higher bypass time in RAMVR vs. Higher APM* in RACAB

	RACAB	RAMVR	P value
Cardiopulmonary Bypass time (min)	84 (44,122)	153.5 (127.3,176.8)	< 0.001
Aortic Cross-Clamp time (min)	55 (0,92)	116 (89.3,133.8)	< 0.001
Console time (min)	200 (153.3,269.5)	114.5 (91.3,135.8)	< 0.001
Instrument active time (min)	129 (99,181.3)	99 (81,113.8)	< 0.001
Instruments used (n)	9 (8,10)	4 (4,4)	< 0.001
Instruments changed (n)	57 (42.5,77.5)	4 (4,4)	< 0.001

No difference in postoperative outcomes

	RACAB	RAMVR	P value
Extubation in OR (n)	77 (48.1%)	99 (55.0%)	0.205
Postop ICU Stay (hours)	47.1 (26.2,68.3)	46.9 (25.3,71.3)	0.874
Postop Hospital Stay (days)	4 (3,6)	4 (3,5)	0.583

* APM = Automated Performance Metrics

Limitations

- Retrospective, single-center design
- Possible confounders affecting LVEF

Conclusion & Future Directions

- Coronary procedures demonstrate early LVEF increases while mitral valve repair patients exhibit an early LVEF decline that normalizes by 1 year.
- The preservation of ventricular function despite longer operative times supports the feasibility of minimal invasive/ robotic approaches as a viable alternative to open procedures while offering minimal trauma to the patient.
- Future long-term follow-up warranted to determine trajectory of LVEF.