

DIRECT COMPARISON OF POST-OPERATIVE PAIN SCORES AFTER ROBOTIC VERSUS CONVENTIONAL MITRAL VALVE REPAIR

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Introduction

- Robotic surgeries are being used as an alternative to conventional mitral valve repairs (MVR).
- Pain outcomes after the first 12 months have been shown to be lower in robotically-assisted MVRs vs those performed with a sternotomy¹.
- Other robotic cardiac surgeries (MIDCAB) have been shown to have higher pain score on POD1 and lower pain scores by POD4 compared to traditional sternotomy².
- Short-term pain outcome differences between the robotically-assisted and traditional MVRs have not been studied.

Methodology

- Database was created of robotic cardiac surgery cases at UPMC Presbyterian and UPMC Passavant Hospitals since July 19, 2021.
 - Matched with patients who underwent mitral valve repair through sternotomy during the same period and from 2015 to June 30, 2024, at UPMC Presbyterian, Passavant, and Shadyside Hospitals in STS cardiac database.
- Excluded: emergent/urgent cases, patients under 18 years, cases performed through partial sternotomy or mini-thoracotomy without the use of a surgical robot and patients with Carpentier’s classification other than class II
- 83 robotic MVRs matched with 83 traditional MVRs and a mixed model of analysis was performed of mean pain scores for POD0-4

Results

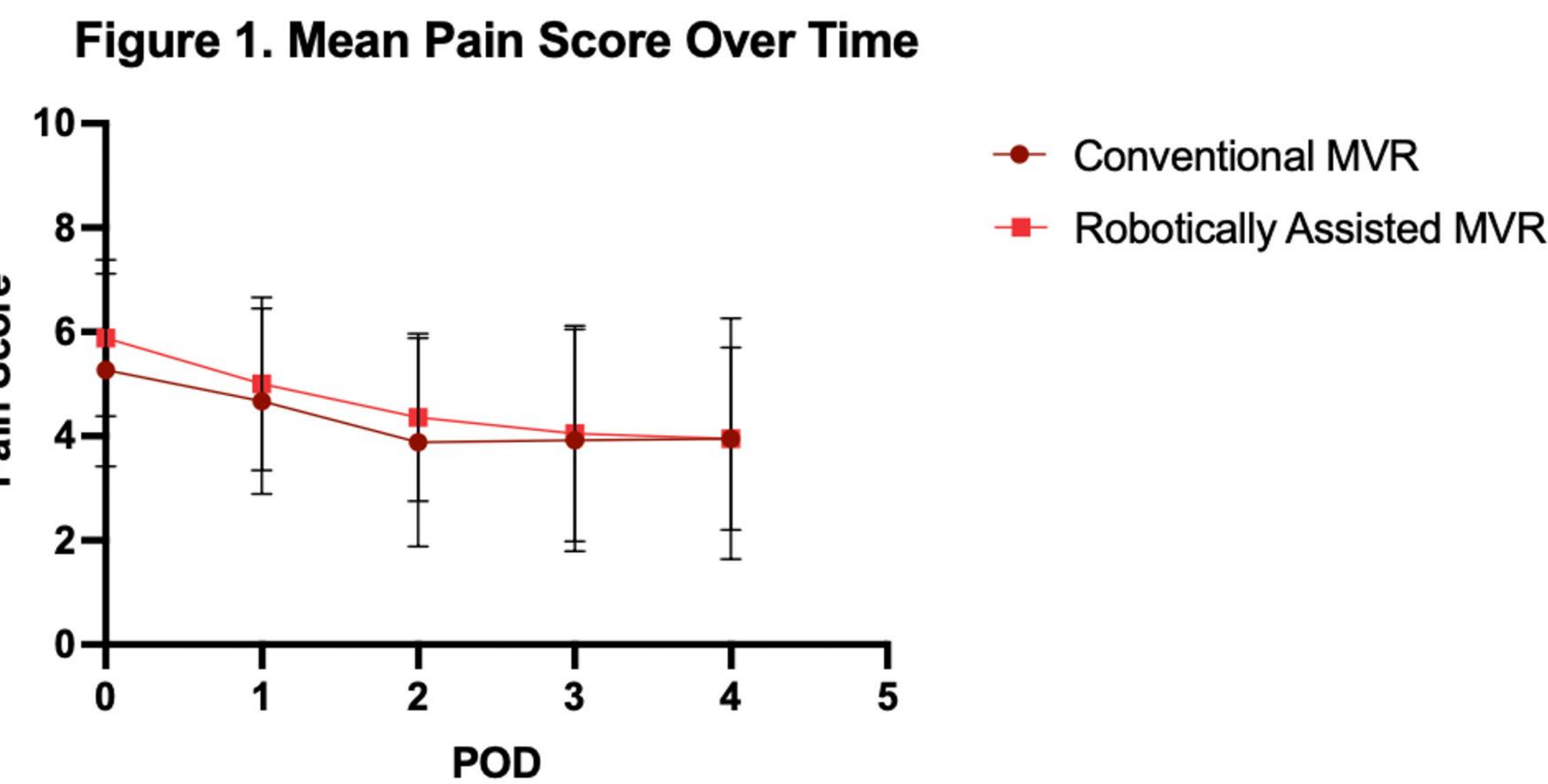


Table 1. Baseline variables for matching

	TOTAL	Conventional MVR	Robotically Assisted MVR	P-Value
Female	67 (31.6%)	35 (31.8%)	32 (31.4%)	0.944
Age (median, q1-q3)	62.0 (54.5-69.0)	64.0 (57.0-71.0)	60.0 (50.0-68.0)	0.005
BMI (median, q1-q3)	26.6 (23.6-30.1)	26.8 (24.2-30.7)	26.4 (22.7-29.4)	0.142
BSA (median, std)	1.96 ± 0.26	1.99 ± 0.27	1.94 ± 0.24	0.142
Left Ventricular Ejection Fraction (median, q1-q3)	61.0 (58.0-63.0)	58.0 (58.0-63.0)	63.0 (58.0-63.0)	0.014
STS Risk Score for Mortality (median, q1-q3)	0.5 (0.3- 0.8)	0.6 (0.3- 0.9)	0.4 (0.2- 0.6)	<.001
Prior Stroke/TIA	6 (2.8%)	5 (4.5%)	1 (1.0%)	0.118
PVD	6 (2.8%)	5 (4.5%)	1 (1.0%)	0.118

Table 2. Operation variables

Variable	TOTAL	Conventional MVR	Robotically Assisted MVR	P-Value
Cardiopulmonary Bypass Time (min)	124 (100- 160)	108 (78.0- 139)	145 (119- 163)	<.001
Cross Clamp Time (min)	94.0 (71.0- 120)	78.5 (50.0- 109)	108 (87.0- 124)	<.001
Length of Stay (days)	5.0 (4.0- 6.0)	5.0 (4.0- 7.0)	4.0 (3.0- 5.0)	<.001
Extubated in OR	78 (36.8%)	14 (12.7%)	64 (62.7%)	<.001
Hours in ICU	49.1 (27.6-79.7)	49.8 (29.1-95.8)	47.7 (24.5-74.2)	0.025
Intraop Blood Product	32 (15.1%)	20 (18.2%)	12 (11.8%)	0.192
Total Intraop RBC Units Transfused (Median, q1-q3)	0.0 (0.0- 1.0)	0.0 (0.0- 1.0)	0.0 (0.0- 1.5)	0.794
Postop Blood Product	35 (16.5%)	21 (19.1%)	14 (13.7%)	0.293
Total Postop RBC Units Transfused (Median, q1-q3)	1.0 (1.0- 2.0)	1.0 (1.0- 2.0)	1.0 (1.0- 2.0)	0.550

Table 3. Postop Outcomes

Variable	TOTAL	Conventional MVR	Robotically Assisted MVR	P-Value
Sepsis	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
Deep Sternal Infection or Mediastinitis	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
Prolonged Ventilation	6 (2.8%)	5 (4.5%)	1 (1.0%)	0.1178
Pneumonia	1 (0.5%)	1 (0.9%)	0 (0.0%)	1.00
Dialysis (Newly Required)	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
Postop Stroke	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
Postop Permanent Pacemaker	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
ReOp	12 (5.7%)	8 (7.3%)	4 (3.9%)	0.2914
ReOp for Bleeding/Tamponade	10 (4.7%)	7 (6.4%)	3 (2.9%)	0.2402
LOS (days)	5.0 (4.0- 6.0)	5.0 (4.0- 7.0)	4.0 (3.0- 5.0)	<.001

Table 4. Long Term Outcome

Outcome	TOTAL	Conventional MVR	Robotically Assisted MVR	P-Value
Total mortality	4 (1.9%)	4 (3.6%)	0 (0.0%)	1
Died in 30d postop	1 (0.5%)	1 (0.9%)	0 (0.0%)	1
Died in 1y postop	1 (0.5%)	1 (0.9%)	0 (0.0%)	1
All-cause Readmission	0 (0.0%)	0 (0.0%)	0 (0.0%)	NA
Follow-up years median, q1-q3	1.7 (0.8- 2.5)	2.2 (1.5- 3.4)	1.1 (0.6- 1.9)	<.001
mean, std	1.76 ± 1.11	2.25 ± 1.16	1.23 ± 0.77	<.001

Conclusion

- Mean pain score was slightly higher in robotically assisted MVRs on a between group test.
- Both groups had decreased pain scores over time.
- Robotically assisted MVRs had longer CPB times and aortic cross clamp times.
- Robotically assisted MVRs had shorter LOS, were extubated in OR more often, required less follow-up and spent fewer hours in the ICU.
- In the future, we can expand number of patients in the database and investigate additional variables. We can also draw comparisons between types of robotic cardiac surgeries in the database

Key References

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2. Ezelsoy M, Oral K, Caynak B, Bayramoglu Z, Akpinar B. Pain and the Quality of Life Following Robotic Assisted Minimally Invasive Surgery. *Heart Surg Forum.* 2016;19(4):E165-E168. Published 2016 Aug 19. doi:10.1532/hsf.1606
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