

Safety and Feasibility of Early Chest Tube Removal After Robotic Mitral Valve Repair

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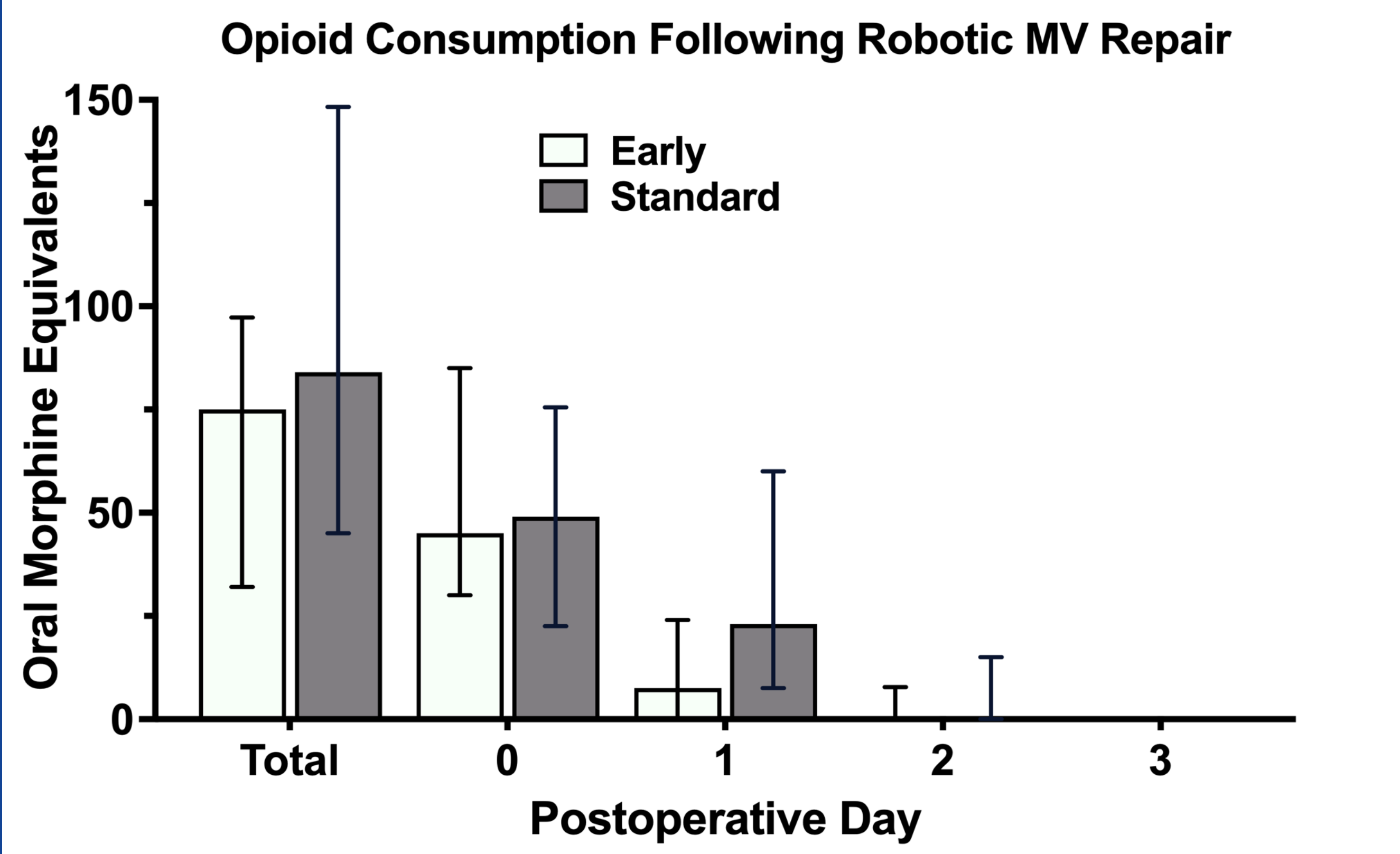
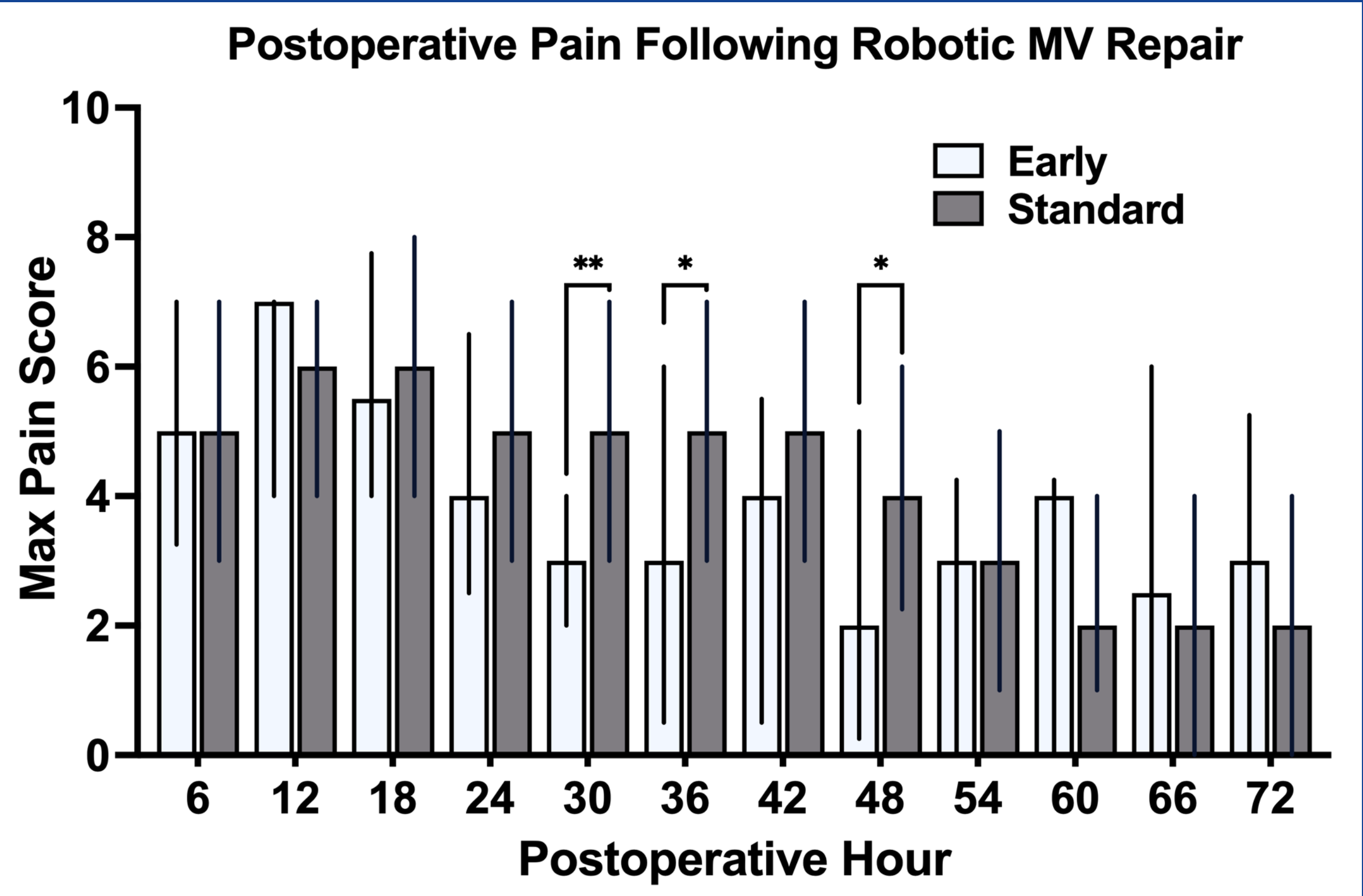
BACKGROUND

- Robotic-assisted mitral valve repair (MVR) is increasingly being performed and is associated with shorter hospital length of stay, faster recovery, decreased pain, and excellent long-term outcomes.
- Although few studies have assessed chest tube removal timing after cardiac surgery, enhanced recovery after surgery (ERAS) protocols recommend removal as early as possible.
- The optimal perioperative management of chest tubes, including the timing of removal following robotic-assisted MVR, is unknown.
- The aim of this study was to determine the safety and clinical outcomes of early chest tube removal after robotic-assisted MVR.

METHODS

- A prospective protocol for early chest tube removal following robotic-assisted MVR was implemented at our institution in Dec 2022:
 - If indications were met (e.g., absence of air leak and <250 mL serous drainage in last 12 hours), chest tubes were removed on postoperative day 1.
 - Our institution standard also places patients on apixaban after chest tube removal.
- All patients undergoing robotic-assisted MVR from January 2022 to December 2023 were identified.
- Postoperative outcomes were compared between the early chest tube removal cohort and the standard chest tube removal cohort.

RESULTS



Variable	Early, n=21	Standard, n=277	P value
Age (years)	58.2 (47.1-68.6)	63.9 (55.3-70.2)	0.097
Female	3 (14.3)	92 (33.2)	0.073
Race			0.252
White	20 (95.2)	261 (94.2)	
Black	1 (4.8)	0 (0.0)	
Asian	0 (0.0)	6 (2.2)	
Body mass index	25.5 (24.1-28.6)	25.6 (23.5-27.9)	0.605
Diabetes	1 (4.8)	6 (2.2)	0.404
Hypertension	11 (52.4)	127 (46.0)	0.653
Preop serum creatinine (mg/dL)	1.10 (1.01-1.25)	1.04 (0.90-1.16)	0.015
STS predicted mortality (%)	0.25 (0.21-0.42)	0.38 (0.26-0.62)	0.019
NHYA class			0.733
I	7 (33.3)	103 (38.4)	
II	10 (47.6)	128 (47.8)	
III	3 (14.3)	29 (10.8)	
IV	1 (4.8)	8 (3.0)	
Left ventricular ejection fraction (%)	63.0 (60.0-65.0)	62.0 (60.0-65.0)	0.817

Variable	Early, n=21	Standard, n=277	P value
Concomitant TV repair	2 (9.5)	42 (15.2)	0.750
CPB duration (min)	78.0 (68.0-93.0)	88.0 (74.0-106.0)	0.041
Cross-clamp duration (min)	59.0 (55.0-69.0)	64.0 (53.0-79.0)	0.367
OR extubation	18 (85.7)	244 (88.1)	0.728
Chest tube duration (hrs)	24.8 (23.1-27.4)	48.0 (45.3-66.9)	<0.001
Postop blood products given	0 (0.0)	15 (5.4)	0.611
Pneumothorax	0 (0.0)	2 (0.7)	1.000
Pleural effusion	0 (0.0)	4 (1.4)	1.000
Pneumonia	0 (0.0)	3 (1.1)	1.000
Atrial fibrillation	4 (19.1)	91 (32.9)	0.231
Permanent pacemaker implantation	0 (0.0)	9 (3.3)	1.000
Reoperation for bleeding	0 (0.0)	2 (0.7)	1.000
ICU length of stay (hrs)	20.8 (16.0-24.3)	22.2 (19.4-27.7)	0.067
Postop length of stay (days)	3.0 (3.0-3.0)	4.0 (3.0-5.0)	<0.001
30-day readmission	0 (0.0)	23 (8.6)	0.391

CONCLUSIONS

- Early chest tube removal after robotic-assisted MVR was associated with **decreased pain and shorter length of hospitalization**, which may improve patient satisfaction and reduce resource utilization.
- It was **not associated** with **increased complications** or **30-day readmission rates**, suggesting it is safe in select patients following robotic-assisted MVR.