

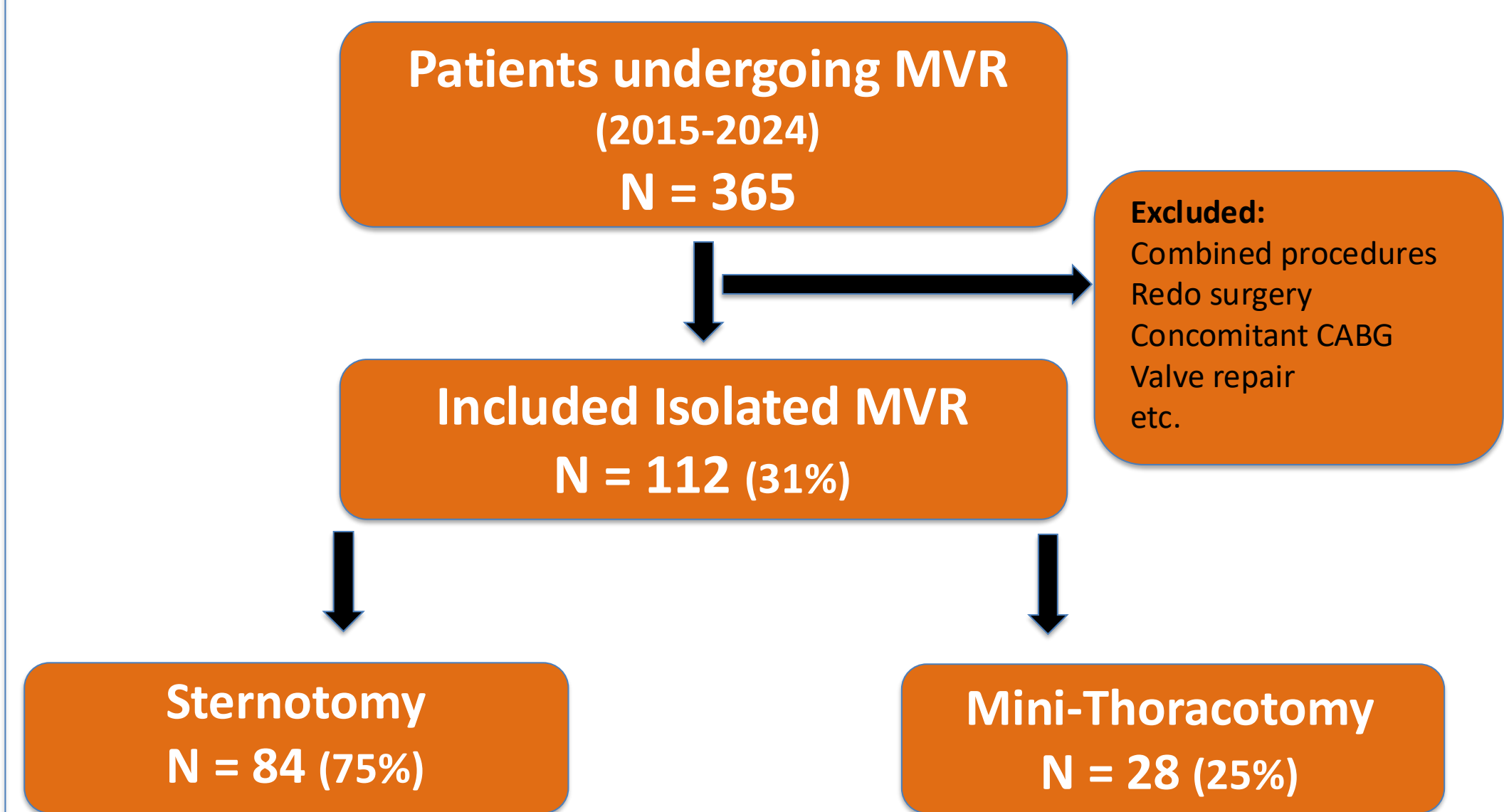
Introduction

Minimally invasive mitral valve surgery using a mini-thoracotomy approach has become increasingly adopted due to advantages such as reduced pain, shorter recovery time, and improved cosmetic outcomes. However, concerns persist regarding resource utilization and cost compared to the traditional sternotomy.

This study compares clinical results and hospital costs between mini-thoracotomy and sternotomy in isolated mitral valve replacement (MVR).

Methods

- Study Design:** Retrospective, single-center study.
- Study Period:** 2015-2024
- Population:** 112 adult patients undergoing isolated MVR.
- Analysis:** Continuous variables are presented as median [interquartile range] or mean (standard deviation) and categorical variables as frequencies (%).



Results

	Sternotomy N=84 (75%)	Mini-Thoracotomy N= 28 (25%)	p-value
Baseline Characteristics			
Age	54.2 ± 15.6	67.5 ± 10.9	<0.001*
Sex, female	57 (67.9%)	20 (71.4%)	0.724
Body Mass Index (BMI), kg/m²	28.9 ± 7.4	25.1 ± 2.9	0.016*
Hypertension	46 (55%)	18 (64%)	0.378
Diabetes	21 (25%)	3 (10.6%)	0.182
Pulmonary Hypertension	17 (20.2%)	4 (14.3%)	0.585
COPD	16 (19%)	7 (25%)	0.500
Dialysis	7 (8.3%)	0 (0%)	0.189
Mitral Annular Calcification	23 (27.4%)	4 (14.3%)	0.206
STS Risk of Mortality, %	4.3 ± 4.6	2.6 ± 1.8	0.119
STS Risk of Morbidity & Mortality, %	26.6 ± 19.6	15 ± 7.1	0.002*
Postoperative			
Renal Failure Requiring Dialysis	4 (4.8%)	0 (%)	0.570
Reoperation for Bleeding	1 (1.2%)	1 (3.6%)	0.439
New Onset Atrial Fibrillation	17 (20.2%)	6 (21.4%)	0.893
Pacemaker	14 (16.7%)	2 (7.1%)	0.350
Pneumonia	6 (7.1%)	0 (0%)	0.334
Prolonged Ventilation, >48hrs	14 (16.7%)	1 (3.6%)	0.110
Need for reintubation	8 (9.5%)	1 (3.6%)	0.446
Tracheostomy	7 (8.3%)	1 (3.6%)	0.677
Disabling Stroke	3 (3.6%)	0 (%)	0.572
In-hospital Mortality	2 (2.4%)	0 (%)	1.0
Duration of Surgery, minutes	228.5 [192.5 – 262.0]	237.5 [219.5 – 281.5]	0.062
Hospital LOS, days	13.0 [8.0 - 20.5]	7.0 [5.0 - 10.6]	<0.001*
ICU LOS, days	6.7 [4.7 - 9.1]	4.2 [2.5 - 6.8]	<0.001*
30-day Readmission	14 (16.7%)	1 (3.6%)	0.110

Baseline Characteristics

- ❖ Mini-thoracotomy patients were older (**67.5 ± 10.9 vs 54.2 ± 15.6 years**, $p < 0.001$) and had lower BMI (**25.1 ± 2.9 vs 28.9 ± 7.4 kg/m²**, $p = 0.016$).
- ❖ The sternotomy group had a higher STS risk of morbidity and mortality (**26.6 ± 19.6 vs 15 ± 7.1**, $p = 0.002$).

Postoperative Outcomes

- ❖ Mini-thoracotomy was associated with significantly shorter hospital length of stay (**7.0 vs 13.0 days**, $p < 0.001$) and ICU stay (**4.2 vs 6.7 days**, $p < 0.001$).
- ❖ No significant differences were observed in mortality, stroke, pneumonia, atrial fibrillation, or readmission.

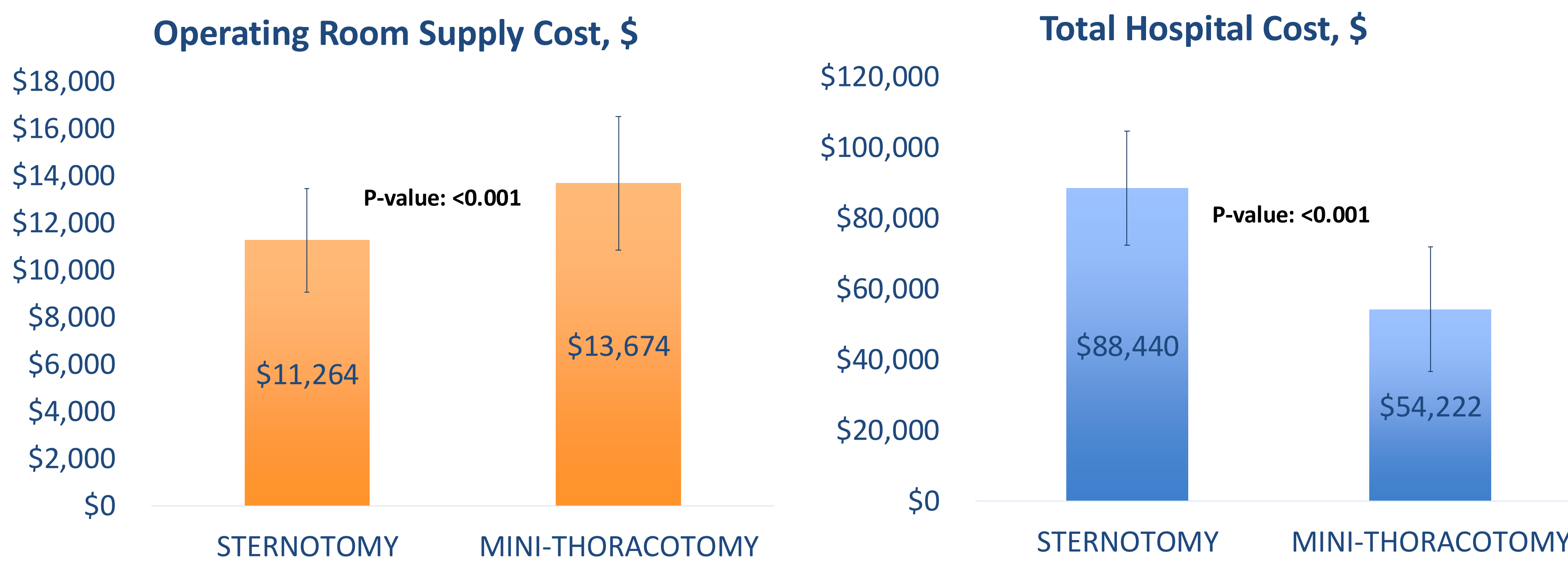


Figure 1. Higher operative costs offset by reduced postoperative resource utilization

Conclusion

In this single-center retrospective study, mini-thoracotomy for isolated MVR was associated with shorter hospital and ICU stays and significantly lower total hospital costs, without compromising early postoperative outcomes. These findings support the use of minimally invasive MVR in appropriately selected patients.

References

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- Atluri P, Stetson RL, Hung G, et al. Minimally invasive mitral valve surgery is associated with equivalent cost and shorter hospital stay when compared with traditional sternotomy. *J Thorac Cardiovasc Surg.* Feb 2016;151(2):385-388.

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