

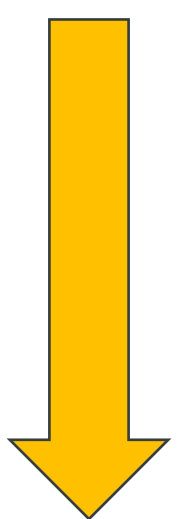
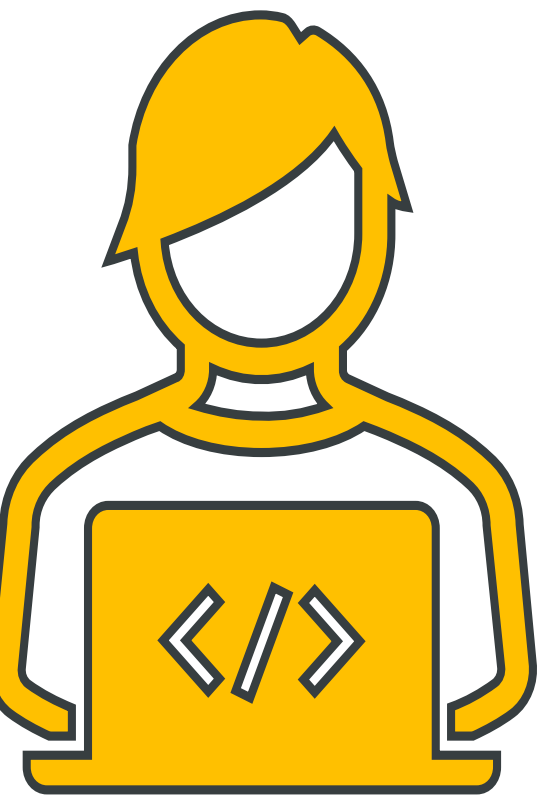
Minimally Invasive and Robotic Approaches to Mitral and Tricuspid Endocarditis are Safe and Effective

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INTRODUCTION

The 2016 AATS consensus guidelines on surgical treatment of endocarditis advocate for a conventional sternotomy approach for valve repair or replacement. We sought to evaluate the repair rate and outcomes in patients undergoing minimally invasive and robotic approaches to mitral valve (MV) and tricuspid valve (TV) endocarditis.

METHODS



Queried our Institutional Society of Thoracic Surgeons Adult Cardiac Database for all patients with MV and/or TV endocarditis undergoing minimally invasive or robotic valve surgery via right thoracic approach between July 1, 2016 and June 30, 2022

- Excluded Concomitant procedures
- Stratified patients by valve location
- Compared Descriptive statistics by valve and approach (repair vs replacement)

Table 1: Demographics							
		Overall (n=48)	MVR (n=6)	MVr (n=24)	TVR (n=11)	TVr (n=7)	p value
Age	Median [Q1-Q3]	46.5 [32-55.5]	59 [50-64]	51 [43.5-59]	37 [26-47]	26 [25-41]	p<0.05
Gender	Male	26	1	17	6	2	p<0.05
Smoker	Former	6	2	3	1	0	p<0.05
	Never	16	3	12	1	0	
	Current	26	1	9	9	7	
	No IVDU	46	6	22	11	7	p=0.52
Preoperative Heart Failure†		20	2	14	2	2	p<0.05
NYHA Class†	I	2	0	1	0	1	p=0.19
	II	10	0	8	2	0	
	III	9	3	6	0	0	
	IV	3	1	1	0	1	
	HTN	20	4	14	2	0	p<0.05
	PAD	4	0	2	2	0	p=0.59
	CVD	9	0	8	1	0	p=0.42
Preoperative Stroke		8	0	8	0	0	p=0.27
	Recent	3	0	3	0	0	
	Remote	5	0	5	0	0	
Preoperative Dialysis		3	0	2	1	0	p=0.90
Diabetes		6	3	3	0	0	p<0.05
Chronic Lung Disease		7	1	3	2	1	p=0.42
	Mild	3	0	0	2	1	
	Moderate	1	1	0	0	0	
	Severe	3	0	3	0	0	
Preoperative EF/%	Median [Q1-Q3]	60 [57.5-63]	59 [58-68]	60 [56.5-61.5]	63 [55-65]	58 [52-65]	p=0.82
Preoperative Creatinine	Median [Q1-Q3]	0.81 [0.68-1.06]	1.14 [0.82-1.4]	0.82 [0.70-1.03]	0.74 [0.6-0.96]	0.67 [0.48-0.84]	p=0.07
Predicted Mortality/%	Median [Q1-Q3]	0.84 [0.52-2.6]	2.66 [1.84-3.67]	0.70 [0.48-1.96]	*	*	
Predicted Major Morbidity	Median [Q1-Q3]	10.8 [7.3-22.5]	28.2 [14.6-38]	9.87 [6.86-16.4]	*	*	
Endocarditis	Active	31	2	13	9	7	p<0.05
	Treated	17	4	11	2	0	
Degress of TR	None	8	2	6	0	0	p<0.05
	Trace	1	0	1	0	0	
	Mild	19	3	13	2	1	
	Moderate	11	1	4	3	3	
	Severe	9	0	0	6	3	
Degree of MR	None	7	0	1	6	0	p<0.05
	Trace	5	0	0	1	4	
	Mild	6	0	1	3	2	
	Moderate	5	1	3	1	0	
	Severe	25	5	19	0	1	

MVR: MV Replacement; MVr: MV Repair; TVR:TV Replacement; TVr:TV repair; HTN: Hypertension; PAD: Peripheral arterial disease; CVD: Cerebrovascular disease; EF: Ejection Fraction; TR:Tricuspid Regurgitation; MR: Mitral Regurgitation
†Missing data for: Preoperative Heart Failure, data was missing from 7 patients; NYHA Class, data missing for 24 patients
*Data unavailable

Table 2: Intraoperative Variables							
		Overall (n=48)	MVR (n=6)	MVr (n=24)	TVR (n=11)	TVr (n=7)	p value
Robotic approach		22	1	21	0	0	p<0.05
Conversion Sternotomy		1	0	0	1	0	p=0.49
Operation Status	Elective	13	3	10	0	0	p<0.05
	Urgent	35	3	14	11	7	
MV Annuloplasty		13	0	13	0	0	p=0.06
MV Patch		5	0	5	0	0	p=0.30
MV Chordal Transfer		4	0	4	0	0	p=0.35
TV annuloplasty		4	0	0	0	4	p<0.05
TV Patch		4	0	0	0	4	p<0.05
Perfusion Time†	Median [Q1-Q3]	135.5 [93-184]	141.5 [121-201]	157.5 [123.5-202.5]	82 [77-120]	96 [84-124]	p<0.05
Cross Clamp Time†	Median [Q1-Q3]	98.5 [93-184]	103 [72-138]	110 [83-152.5]	48 [45-118]	63.5 [59-98]	p<0.05

MVR: MV Replacement; MVr: MV Repair; TVR:TV Replacement; TVr:TV repair;
†Missing data for: Perfusion Time, data was missing for 2 patients; Cross Clamp Time, data missing for 10 patients

Table 3: Postoperative Outcomes							
		Overall (n=48)	MVR (n=6)	MVr (n=24)	TVR (n=11)	TVr (n=7)	p value
Transfusion		28	3	14	6	5	p=0.87
Postoperative Stroke		0	0	0	0	0	p=1
Reoperation (bleeding)		2	0	2	0	0	p=0.55
Renal Failure†		0	0	0	0	0	p=1
Prolonged ventilation (>24hrs)		4	1	2	1	0	p=0.75
STS Major Morbidity		5	1	3	1	0	p=0.75
LOS	Median [Q1-Q3]	18.5 [5-41.5]	12.5 [7-19]	5.5 [4-29.5]	41 [13-42]	42 [13-43]	p<0.05
30 Day Mortality†		0	0	0	0	0	p=1
Readmission		6	3	1	2	0	p<0.05

MVR: MV Replacement; MVr: MV Repair; TVR:TV Replacement; TVr:TV repair;
†Missing data for: Renal Failure, data was missing for 3 patients; 30 Day Mortality, data was missing for 3 patients;

RESULTS

A total of 48 patients underwent minimally invasive or robotic surgery for mitral or tricuspid endocarditis during the study period.

- Preoperatively,**
- 20 patients (37.5%) had HF (MV=16, TV=4)
 - 3 patients (6.3%) were on dialysis (MV=2, TV=1)
 - 3 MV patients had an acute stroke prior to operation
 - Median BMI was 26.4 [19.6-44.8] kg/m²
 - Active endocarditis was present in 65% patients (31/48)
- Intraoperatively,**
- Robotic approach was globally 46% (22/48), all MV with no conversion to sternotomy
 - Repair rate for MV endocarditis was 80% (24/30)
 - Annuloplasty ring utilized in 54% patients (13/24)
 - Autologous pericardial patch in 21% patients (5/24)
 - Ipsilateral chordal transfer in 83% patients (20/24)
 - Repair rate for TV endocarditis was 38.9% (7/18) with 1 conversion to open sternotomy.
 - Annuloplasty ring utilized in 57% patients (4/7)
 - Autologous pericardial patch in 57% patients (4/7)
 - Institutional global repair rate for:
 - MV endocarditis: 49.3%
 - TV endocarditis: 47.3%

- Postoperatively,**
- No operative mortalities, new strokes, new renal failure, or wound infections.
 - 2 reoperations for bleeding (all MV) and 4 patients with prolonged ventilation (3 MV, 1 TV).

CONCLUSIONS

Minimally invasive valve surgery is safe and effective for management of Mitral and Tricuspid endocarditis with a high rate of successful valve repair. Future guidelines and consensus statements should support open or minimally invasive approaches based on surgeon experience and expertise.