

Long-term Survival after Isolated Tricuspid Valve Replacement



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Background	Isolated replacement of the tricuspid valve is rare, and the decision to operate is difficult. This study reviews the in-hospital mortality and long-term survival after tricuspid valve replacement in the absence of concomitant left sided valve surgery. It identifies predictors of poor outcome.
Methods	All patients who underwent tricuspid valve replacement between January 1995 and December 2011 were retrospectively reviewed. Patients having concomitant mitral or aortic valve surgery were excluded. Logistic regression was used to identify predictors of early and late death.
Results	Twenty-nine cases were identified. There were six in-hospital deaths (20.6%), and eight late deaths. Ascites was associated with in-hospital death (hazard ratio 16.96; $p=0.0052$). Higher dose of Frusemide was associated with late mortality (hazard ratio 1.157 per 20 mg increase; $p=0.0155$). Frusemide dose and ascites were both significantly associated with death overall ($p<0.01$). Survival analysis estimated a 50% probability of surviving to 12.45 years.
Conclusions	Isolated tricuspid valve replacement has a high peri-operative risk. Long-term survival in this study was consistent with other reports. Ascites and higher doses of Frusemide were associated with poor outcomes.
Keywords	Heart valve diseases • Tricuspid valve replacement • Tricuspid valve insufficiency • Tricuspid valve stenosis • Rheumatic heart disease • Heart failure

Introduction

Tricuspid valve replacement (TVR) is an uncommon operation. Most reports contain a small number of patients with a high mortality [1–12]. The decision to operate on the tricuspid valve is difficult when it is the only valve requiring treatment, especially when surgery may lead to replacement rather than repair.

Most studies do not separate patients who have had tricuspid valve replacement alone from those who have also had left sided valve surgery during the same procedure, and often combine repair and replacement patients. Many include data back to the 1960s, with results which may not be applicable to current practice.

The aims of this study were to define the in-hospital and long term mortality of patients at our institution who underwent TVR without concomitant surgery to the left sided valves since 1995, and to identify factors associated with mortality.

Materials and Methods

A retrospective chart review was undertaken of all patients undergoing TVR without concomitant mitral or aortic valve surgery between January 1995 and December 2011 at the Green Lane Cardiothoracic Unit. Patient demographics, pre-operative clinical status, operative details, postoperative

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morbidity and late outcomes were analysed. Late survival was verified from the National Registry of Births Deaths and Marriages.

Statistical analysis

Univariate Cox proportional hazards regression was used to determine predictors of in-hospital death and late death. Statistical analyses were performed with SAS software version 9.3 (SAS Institute, Cary, NC). All p-values resulted from

two sided tests and a p-value of <0.05 was considered statistically significant.

Results

The cardiothoracic surgical database identified 30 patients. Two of these patients had a systemic right ventricle and were excluded. One patient with carcinoid disease underwent two TVRs during the study period so that the total number of replacements was 29 in 28 patients.

Demographics

Patient demographics are presented in Table 1. Mean age was 46 years (range 11-80). Twenty-one cases (72.4%) were female. The original native valve lesion was rheumatic in nine, congenital in 10, endocarditis in five, carcinoid in two patients (one of these was operated on twice during the study period), one following right ventricular infarction, and one idiopathic. This is distinct from the indication for surgery as listed in Table 2. Twenty (61%) had previously undergone open heart surgery. Five (17%) had undergone two or more previous cardiac surgeries. Prior procedures included Tricuspid valve repair or replacement, atrial septal defect closure, Pulmonary valve procedures, Mitral valve replacement, Aortic valve replacement, and coronary artery bypass grafting.

Surgical procedure

A midline sternotomy was performed in all patients. Standard aortic and bicaval cannulation was performed in 25 cases. Femoral cannulation was used in four. Ten cases were done with the heart beating. In the other 19 cases, antegrade

Table 1 Patient demographics and pre-operative variables.

	Number of TVR = 29	Percent (%)
Age (mean)	46	
	(range 11-80)	
Gender (female)	21	72.4
Original lesion		
Rheumatic	9	31.0
Congenital	10	34.5
Endocarditis	5	17.2
Carcinoid	3	10.3
Other	2	6.9
NYHA class		
I/II	16	55.2
III/IV	7	24.1
Unknown	6	20.6
Bilirubin (pre-operative level)		
Raised (>25umol/L)	10	34.5
Normal	14	48.3
Unknown	5	17.2
Ascites (on pre-operative examination)		
Present	2	6.90
Absent	25	86.2
Unknown	2	6.90
Hepatomegaly (on pre-operative examination)		
Present	13	44.8
Absent	11	37.9
Unknown	5	17.2
Right ventricular function (on pre-operative echocardiogram)		
Normal	15	51.72
Mildly impaired	6	20.7
Moderately impaired	2	6.9
Severely impaired	2	6.9
unknown	4	13.8
Number of previous heart surgeries		
0	9	31.0
1	15	51.7
2+	5	17.2
Previous TV repair	5	17.2
Previous TV replacement	7	24.1

NYHA= New York Heart Association; TV=tricuspid valve.

Table 2 Indication for Surgery.

	Number of TVR =29	Percent (%)
Severe TR		
- native valve	7	24.1
- failed repair	5	17.2
- prosthetic degeneration	2	6.9
- native valve +coronary artery disease	1	3.4
- native valve + free PR	2	6.9
Mixed TR/TS		
- native valve	2	6.9
- prosthetic degeneration	4	13.8
- native valve + PS (prior to hepatic surgery)	1	3.4
Infection	4	13.8
Recurrent thrombosis of mechanical TVR	1	3.4

TR=tricuspid regurgitation; PR=pulmonary regurgitation; TS=tricuspid stenosis; PS=pulmonary stenosis.

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