ORIGINAL ARTICLE

Triple Valve Replacement for Rheumatic Heart Disease

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ABSTRACT

Background: Despite the improvement in Cardiopulmonary Bypass (CPB) and myocardial protection techniques, triple valve replacement surgeries are still challenging with the reported mortality range 2.5- 25%.
Aim: To evaluate the clinical outcomes of the patients both early and late.
Methods: This is a retrospective observational study. We selected 31 patients operated for triple valve replacement surgery between Dec 2005 and Dec 2016 at 3 institutions by single surgeon.
Results: Mean age of the patients was 35±13. 67% of the patients were in NYHA III and 33% of them were NYHA IV preoperatively. In-hospital mortality rate was 13%. Other complications include re-exploration for bleeding 4(13%), renal failure 3(9.6%), CVA 2(6.4%) and respiratory complication 3(9.6%). Actuarial survival rates at the conclusion of five years were 81% and at the conclusion 10 years were 72%.
Conclusion: Results of triple valve replacement are encouraging and shows good short term and long term prognosis.
Keywords: Cardiopulmonary Bypass, rheumatic heart disease, valve replacement

INTRODUCTION

Aortic, mitral and tricuspid valve replacement (triple valve replacement) surgery is an infrequently performed operation even in developing country like Pakistan. Main factors that influence early and late outcome in patients undergoing is preoperative New York Heart Association (NYHA) class. (NYHA) class IV is the main determinant of peri-operative mortality[1,2,3,4]. Other factors include pulmonary hypertension, old age, preoperative renal failure and emergency operation[1,2,3,4,5]. Overall operative mortality for triple valve replacement surgery reported in literature ranges between 2.5%-25%[3-9]. Better results can be obtained by offering early operation before the irreversible myocardial failure[10,11]. The objective of this study is to analyze our experience with mitral, aortic and tricuspid valve replacement (triple valve replacement) using mechanical valves.

MATERIALS AND METHODS

This is a retrospective, observational study. Between Dec 2005 and Dec 2016, 31 patients underwent triple valve replacements at 3 institutions by single surgeon. Prior approval for this study was obtained from local ethical committee and individual consent was not considered. Their ages ranged from 22 to 48 with the mean 35± 13. All valvular lesions were rheumatic in origin with no significant coronary arteries disease present. All patients had aortic, mitral and tricuspid valve replacement.

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Surgical techniques: Surgical approach in all 31 procedures was through median sternotomy. Cardiopulmonary **B**ypass (CPB) was instituted by ascending aortic and bi-caval cannulation. Myocardial protection was done through antegrade blood cardioplegia directly delivered into coronary ostia with moderate hypothermia. Aortic and mitral valves replacements were performed on cardioplegic heart whereas tricuspid valve replacements were done on beating heart.
Postoperative anticoagulation therapy: Post Operative anticoagulation was done by the oral administration of warfarin with the target international normalization ratio between 2.5- 3.5 and followed on monthly basis in INR clinic. Follow up with the primary physician was done on out- patient basis, every six months. Thorough physical examination, ECG, echocardiography, chest x-ray was performed in each visit. Major cerebrovascular accident either from cerebral thrombolism or anticoagulation related major hemorrhage were noted for evaluation. We define prosthetic valve endocarditis and paravalvular leak if they resulted in redo procedure or caused mortality.
Statistical analysis: Descriptive analyses were reported as mean±SD & for continuous variable as frequencies. Time related events were assessed by Kaplan Meir test. A P value of <0.05 was considered statistically significant. Calculations were performed by SPSS 15.

RESULTS

Pre operative data: Patient's demographics are described in table 1. There were 11(35.4%) females and 20 males (64.4%), mean age were 35± 13. All patients had pre operative atrial fibrillation. 67% of the patients were in NYHA III and other 33% were in NYHA IV. All patients had rheumatic valvular heart disease. Mean LVEF was 50± 12.

Operative Data: Operative variable were described in table 2. All patients had mitral, aortic and tricuspid valve replacement done with the use of mechanical prosthesis.

Operative mortality: In hospital mortality was 13%. One patient with severely depressed myocardial function couldn't be weaned off from CPB. Two deaths occurred in ICU because of sepsis and multi organ failure (MOF). One patient was died as a consequence of low cardiac output syndrome. 4(13%) patients were re explored for excessive mediastinal bleeding & 2(6.4%) patients suffered from CVA. All the patients who survived triple valve replacement procedure, duration of their follow up ranged from three months to eleven years. Actuarial survival rates at the conclusion of five years were 81% and 72% at the conclusion 10 years.

Table 1: Roperative data (n=32)

Mean age (years) ± SD	35± 13
Female	11(35.4%)
NYHA Class	
III	21 (67%)
IV	10 (33%)
Hypertension	13 (73%)
Chronic kidney disease	3 (9.6%)
EuroSCORE II	11 ± 7
Diabetes	7 (22.5%)
Previous stroke	3 (9.6)
Preoperative AF	31 (100%)
Pulmonary hypertension	27 (87%)
Endocarditis	2 (6.4%)
Previous valvular surgery	3 (9.6%)
LVEF (%) ± SD	50± 12

Table 2: Operative data

Aortic valve replacement	
Mechanical valves	31
Mitral valve Replacement	
Mechanical valves	31
Tricuspid valve Replacement	
Mechanical valves	31
Myocardial protection	
Blood cardioplegia	31
Cardiopulmonary bypass (min)	173 ± 8
Aortic cross-clamp time (min)	121 ± 7

Table 3: Postoperative complications

Operative mortality	4(13%)
Re-opening for excessive bleeding	4(13%)
Acute renal injury	3(9.6%)
Stroke	2(6.4%)
Atrial fibrillation	31(100%)
Pulmonary complications	3 (9.6%)
Sepsis (MOF)	2(6.4%)
Low cardiac output syndrome	1(3.2%)

DISCUSSION

Patients with triple valve disease are high risk subsets of patients. Surgery for triple valve replacement carries significant operative risk as it prolongs CPB and cross clamp time. This results in higher operative mortality. The operative mortality in this study was 13% whereas the operative mortality reported in the literature ranges from 2.5%- 25%[1-6]. The objective of this study is to determine the predictor of operative and late mortality.

In order to define the predictors for peri-operative mortality, GRESH et al determined that the main factor significantly affecting the operative mortality was preoperative NYHA class IV[1]. Similar results have been demonstrated by Michael et al[12]. Others AKAY et al, identified that various factors i.e., NYHA IV, Left ventricular poor LV function, (LVEF<30 and LVEDD >50), influenced short term and long term survival[7]. In this study during follow up periods major cerebrovascular accidents occurred in 10 patients. The strategy of anticoagulation management was the most important factor that influenced the post-operative thromboembolic events[13]. In developing country like Pakistan patient's lack of awareness and poor socio economic condition were major problems. Patients coming from remote areas are lost to follow up. In such cases we were unable to achieve optimum anticoagulation and resulted in thromboembolic events. In patients with triple valve disease, tricuspid regurgitation usually is functional or as a consequence of poor RV function and pulmonary hypertension. In this study we selected those patients for triple valve replacement who had tricuspid stenosis with regurgitation[14,15,16].

This study has several limitations, i.e., it was retrospective observational and prospectively collective date base. Secondly sample size was small.

CONCLUSION

Results of triple valve replacement are and encouraging and shows good short term and long term prognosis.

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