

Pump Assisted Beating Mitral Valve Replacement and Tricuspid Annuloplasty: A Case Report And Review of The Literature

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Abstract:

Beating heart valve replacement is an interesting technique which can be made under sternotomy or thoracotomy. It is an alternative technique in patients with poor left ventricular function, because it avoids the ischemic component of cardioplegia and an arrested heart by keeping the heart beating will go a long way in reducing iatrogenic damage to the heart.

We report the case of a 43-year-old man with no significant past medical history, who was admitted to the cardiology department for invalident dyspnea.

Physical examination showed a diastolic murmur in the cardiac auscultation.

Electrocardiogram revealed atrial fibrillation.

Transthoracic echocardiogram revealed a left ventricle dysfunction with an ejection fraction of 30 %, and a severe mitral stenosis and regurgitation with remanied and calcified mitral leaflets, with a tricuspid insufficiency and the tricuspid annulus measuring 44 mm.

He was operated under a median sternotomy, normothermic cardiopulmonary bypass, and through a left atriotomy, mitral valve observation revealed calcified leaflets and subvalvular apparatus.

The mitral valve was resected and a mechanical prosthesis was implanted with simple sutures. A tricuspid annuloplasty was performed with the technique of De Vega.

Then, the left and right atrium were closed and the patient was weaned from cardiopulmonary bypass. Intraoperative transesophageal echocardiography showed moderate regurgitation.

Weaning from cardiopulmonary bypass was not complicated, and the hemodynamic status was stable under low doses of catecholamins.

The postoperative course was uneventful.

Predischarge echocardiographic evaluation revealed a left ventricular ejection fraction of 35 % and mild tricuspid regurgitation, and mitral prosthesis without paraprosthetic regurgitation.

At his 3-month follow-up, the patient was in good clinical condition without chest pain or dyspnea.

Key-words: Mitral valve replacement; left ventricular dysfunction ; beating heart

Introduction :

Beating heart valve replacement is an interesting technique which can be made under sternotomy or thoracotomy, and can preserve the left ventricular function in the patients with cardiac dysfunction, and patients with multiple-time redo mitral valve surgery [1].

We report the case of a 43-year-old male patient who underwent successfully mitral replacement and tricuspid annuloplasty with beating heart and cardiopulmonary assistance.

Case report :

An 43-year-old man with no significant past medical history was admitted to the cardiology department for invalident dyspnea.

Physical examination showed a diastolic murmur in the cardiac auscultation.

Electrocardiogram revealed atrial fibrillation.



Transthoracic echocardiogram revealed a left ventricle dysfunction with an ejection fraction of 30 %, and a severe mitral stenosis and regurgitation with remanied and calcified mitral leaflets, with a tricuspid insufficiency and the tricuspid annulus measuring 44 mm.

Because of the low ejection fraction of the left ventricle, and the high operative risk of the cardioplegia and cardiac arrest, we decided to perform mitral replacement and tricuspid annuloplasty with beating heart and cardiopulmonary assistance.

After a median sternotomy, normothermic cardiopulmonary bypass was initiated.

Through a left atriotomy, mitral valve observation revealed calcified leaflets and subvalvular apparatus.

The mitral valve was resected and a mechanical prosthesis was implanted with simple sutures. A tricuspid annuloplasty was performed with the technique of De Vega.

Then, the left and right atrium were closed and the patient was weaned from cardiopulmonary bypass. Intraoperative transesophageal echocardiography showed moderate regurgitation (figure 1).



Figure 1 : Intra-operative trans-esophageal echocardiography.

Clamp time and cardiopulmonary bypass time were 33 and 100 minutes, respectively. Weaning from cardiopulmonary bypass was not complicated, and the hemodynamic status was stable under low doses of catecholamins.

The postoperative course was uneventful.

Predischarge echocardiographic evaluation revealed a left ventricular ejection fraction of 35 % and mild tricuspid regurgitation, and mitral prosthesis without paraprosthetic regurgitation (figure 2).

The patient was discharged asymptomatic on postoperative fifth day.

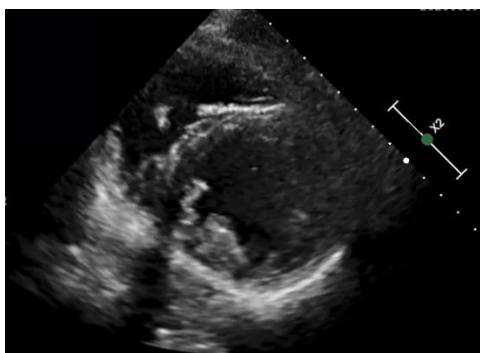


Figure 2 : Post-operative echocardiography.

At his 3-month follow-up, the patient was in good clinical

condition without chest pain or dyspnea.

Discussion :

Any technique that avoids the ischemic component of cardioplegia and an arrested heart by keeping the heart beating will go a long way in reducing iatrogenic damage to the heart [2]. In addition to its myocardial protecting benefit, on-pump beating heart valvular operations may have other advantages and utilities [2, 3]. It eliminates the ischemic component by keeping the heart beating throughout the operation [3].

Mahmoud A et al [4] carried a study to evaluate the results of mitral valve replacement on beating heart in patients with chronic severe mitral regurgitation and left ventricular dysfunction, by comparing two comparable groups of patients : a group who underwent mitral replacement with beating heart technique, and a group who underwent surgery with cardiac arrest and cardioplegia.

They concluded to a better left ventricular function early postoperatively than mitral valve replacement using warm bloody cardioplegic arrest. Also, in this study, the mean intensive care unit stay was significantly longer in control group I (3.60 ± 1.19) in comparison to beating group II (2.40 ± 0.68) [4].

Gersak and colleagues [5] reported that the values for creatinine kinase and LDH for beating group were lower than the values for arrested heart group.

In the study of Katircioglu and colleagues [3], there was no operative mortality nor major complications such as cerebrovascular stroke or perioperative myocardial infarction in either group.

Ricci et al [6] reported a series of 59 patients who underwent multiple valve surgery with beating heart technique.

This technique can also be indicated in redo patients under sternotomy or thoracotomy.

Magilligan and colleagues [7] reported that 28 rheumatic patients underwent second-time redo mitral valve surgery through median sternotomy, and 26 patients (93%) were NYHA CHF class 3 or 4. There were 4 (14%) hospital mortalities. They concluded that deaths were related to poor ventricular function and not to the number of previous operations.

However, this technique has technical difficulties which are mainly due to flooding the field with blood and inability to suture safely with the contracting annulus, and the difficulty of avoiding air embolism [8].

Conclusion :

Beating heart mitral valve surgery looks to be associated with better left ventricular function early postoperatively than in MVR using cardiologic arrest.

Further studies are needed to fully evaluate the potential benefits of this method to preserve ventricular function in multiple valvular surgery.



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