



Post CMV Mitral Valve Replacement: A Different Approach

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Abstract

Aim: To study the pros and cons of surgery without releasing adhesions in post CMV (Closed Mitral Valvotomy) patients

Materials and Methods: A total of 42 patients underwent Mitral valve replacement between October 2017- January 2019. Of these 20 patients underwent MVR using the novel approach and 22 patients went for conventional MVR. The difference in operative approach involved incomplete pericardiotomy.

Result: Time to initiate cardiopulmonary bypass was significantly longer in case of conventional procedure as compared to the modification. However Cardiopulmonary bypass time and cross clamp times, which point to the technical ease of operation, were similar in both cases. Fall in hematocrit was slightly more in the conventional group which signifies increased incidence of blood loss in conventional procedure. The noted complications were slightly different between the two groups, conventional group showed a high incidence of chamber injury and injury to coronary arteries

Conclusion: This study demonstrates that surgery for mitral valves in post CMV patients can be done equally effectively without releasing the dense adhesions between pericardium and cardiac chamber which is a tedious, difficult and time consuming procedures. Since the total time required for operation was less in the alternative method, this would mean shorter period of General Anesthesia which is beneficial for the patient, the surgeon and the anesthetist concerned.

Mesh Terms: Redo MVR, CMV, Cardiopulmonary bypass.

Introduction

Rheumatic Mitral valve is very common in our country. In India the prevalence of Rheumatic fever or Rheumatic Heart disease is 0.68 per 1000 children (according to a study conducted by Jacob Jose in 2002). The prevalence in adults ranges between 123 and 200 per 100,000 population^{1,2} Worldwide a total of 33 million people are affected by rheumatic heart disease with another 47 million having asymptomatic damaged heart valves³. According to a recent study⁴ in India mitral valve was the most commonly affected valve in rheumatic heart disease seen in 60.2%. If

affection of the aortic valve was included as well the overall involvement of the mitral valve was 84.7%. According to another study based in India among 10,000 patients a total of 1007 out of 2910 in < 18 yr age group had mitral valve affection and 2943 out of 7090 had rheumatic mitral disease predominantly mitral stenosis⁵. Closed Mitral Commissurotomy was first attempted in 1923⁶ and successes were reported from 1940⁷ Closed Mitral Commissurotomy had been accepted as reliable treatment for severe mitral stenosis. According to various studies rate of restenosis varied from 4.2 to 11.4 per 1000 patients per year. Actuarial

survival after CMV was 95%, 93.1%, 89.1%, and 84.2% at 6, 12, 18 and 24 years⁸. After the advent of percutaneous balloon valvotomy the scenario is a little different. At present there are few indications of CMV over BMV⁹. According to a study 5326 patients with rheumatic mitral stenosis were treated with CMV in a single institution (Christian Medical College Vellore) between 1956-1989.¹⁰

The in hospital mortality of isolated Mitral valve Replacement in a recent study¹¹ came out to be 6.1%. Morbidities included stroke (2.4%), vascular complications (1.9%), necessity for dialysis (4.9%), permanent pacemaker implantation (11.7%) and blood transfusion (41.6%). In case of Mitral valve Replacement following closed mitral commissurotomy in a study conducted between 1954-1980 perioperative mortality was 2% for CMV and 13% for MVR after CMV¹².

Materials and Materials

All patients coming to OPD with mitral restenosis who had undergone previous Closed Mitral Commissurotomy were included for follow up. Patients who had undergone balloon dilatation for Mitral stenosis were excluded.

All Patients were subjected to Transthoracic Echocardiography. All symptomatic patients were enrolled for operation. Patients having moderate to severe aortic or tricuspid valve disease were excluded. All patients more than 40 years of age had a coronary angiography. Patients found to have significant coronary artery stenosis were excluded from the study.

All patients of mitral stenosis or mitral regurgitation following closed mitral valvotomy were operated. All patients underwent mitral valve replacement by the same surgical team with St Judes Mechanical Mitral valve. A total of 42 patients underwent Mitral valve replacement between October 2017 -January 2019. Of these 20 patients underwent MVR using the novel approach and 22 patients went for conventional MVR.

The difference in operative approach involved incomplete pericardiotomy. Immediately following sternotomy the pericardium was gently freed from adhesions directly over the aorta and also at the junction of the diaphragm with the pericardium. Pericardium was opened at these two sites; the rest of the pericardium was allowed to stay adhered to the epicardium as a lining layer. Pericardium overlying the superior vena cava was also released cautiously and incision in this area was extended till the right pulmonary hilum in order to visualize the right pulmonary veins.

Results

The patients were analysed with respect to age, sex, time interval between CMV and MVR, time required to initiate cardiopulmonary bypass from initial skin incision, bypass time, cross clamp time, fall in hematocrit between prebypass and post bypass Abg analysis, complications, perioperative arrhythmia, inotrope requirement on Istpost operative day.

Patients who underwent the novel approach were placed in Group I whereas patients operated by conventional approach were placed in Group II. Of these 20 patients underwent MVR using the novel approach and 22 patients went for conventional MVR.

Table I: Age Distribution of patients

Age in Years	Group I	Group II
<25	1	2
25-35	6	5
35-45	3	7
45-55	9	6
>55	1	2

Table II: Sex distribution of Patients

Sex	Group I	Group II
Male	7	5
Female	13	17

Table III: Time interval between CMV and MVR

Time Interval(in years)	Group I	Group II
0-5	2	3
6-10	4	7
11-15	9	6
16-20	3	5
21-25	2	1

Table IV: Time required to initiate cardiopulmonary bypass:

Time Required to initiate Cpb	Group I	Group II
20-40	2	0
40-60	12	5
60-80	5	9
80-100	1	8

Table V: Total time required for Cardiopulmonary bypass:

Cpb Time	Group I	Group II
40-60	0	1
60-80	6	10
80-100	10	9
100-120	4	2

Table VI: Total time that aorta was kept cross clamped:

Cross clamp Time	Group I	Group II
20-40	1	7
40-60	13	10
60-80	6	5

Table VI: Fall in hematocrit noted after completion of Cardiopulmonary bypass

Hematocrit Fall	Group I	Group II
0-2	8	5
2-4	10	9
4-6	1	2
6-8	1	4
8-10	0	2

Table VII: Complications that occurred after cardiopulmonary bypass

Complications	Group I	Group II
Chamber Injury	1	5
Vena caval Injury	0	1
Air Lock	1	2
Inadequate Cross clamping	1	0
Phrenic Nerve injury	2	0
Injury to Coronary arteries	0	2
Heart Block	1	1
Arrhythmia	5	7

Table VII: Post operative Inotrope requirement

Inotrope Requirement (Adrenaline)	Group I	Group II
<2 days	5	5
2-4 days	8	9
4-6 days	5	6
>6 day	2	2

Inotrope Requirement (Dobutamine)	Group I	Group II
<2 days	3	5
2-4 days	9	8
4-6 days	7	6
>6 day	1	3

Inotrope Requirement (Noradrenaline)	Group I	Group II
<2 days	10	9
2-4 days	8	9
4-6 days	2	3
>6 day	0	1

Discussion

Statistical analysis by t test and Fischer variant of t test shows that there was no basic difference between age, sex, time between initial operation and valve replacement. Analysis by chisqu are test shows significantly prolonged time to initiate cardiopulmonary bypass in case of conventional procedure as compared to the modification. However Cardiopulmonary bypass time and cross clamp times, which point to the technical ease of operation, were similar in both cases with no significant difference. Fall in hematocrit was slightly more in the conventional group which signifies increased incidence of blood loss in conventional procedure. The noted complications were slightly different between the two groups, conventional group showed a high incidence of chamber injury (most commonly the right atrium) and injury to coronary arteries whereas phrenic nerve injury was documented in the modified group only among the studied cases. Intraoperative arrhythmia was noted in both groups slightly more in the conventional. Postoperative inotrope requirement was also similar in both groups.

Conclusion

This study thus demonstrates that surgery for mitral valves in post CMV patients can be done equally effectively without releasing the dense adhesions between pericardium and cardiac chambers. Since the total time required for operation was less in the alternative method, this

would mean shorter period of General Anesthesia which is beneficial for the patient.

However since the study population was small , only similar large volume studies which would span decades, can decisively conclude this technique as superior to the conventional one.

References

1. Mathur KS, Wahal PK. Epidemiology of Rheumatic Heart Disease – a study of 29,922 school children. Indian heart journal 1982;34:367-71
2. Suman Bhandari, K Subramanyam, N Trehan. Valvular Heart Disease: Diagnosis and Management
3. Nulu s, Bukhman G, Kwan GF(February 2017) “ Rheumatic Heart Disease : The unfinished global agenda”. Cardiology Clinics.35(1):165-180
4. C.N. Manjunath, P Srinivas, K S Ravindranath, C. Dhanalakshmi: Incidence and patterns of valvular heart disease in a tertiary care high –volume centre cardiac centre: A single centre experience; Indian Heart Journal ,2014 May; 66(3):320-326
5. Chockalingam A, Gnanavelu G, Elangovan S, Chockalingam V: Clinical spectrum of chronic rheumatic heart disease in India; Journal Heart Valve Disease ,2003 Sep;12(5):577-81
6. Cutler EC, Levine SA, Becj CS. Surgical treatment of mitral stenosis: Experimental and clinical studies. ArchSurg 1924;9:689-821
7. Harken DE, Ellis LB, Ware PF, Norman LR. The surgical treatment of mitral stenosis: IV alvuloplasty. N Engl Journal of Medicine 1948;22:801-809
8. S John,V V Bashi ,P S Jairaj, S Muralidharan, E Ravikumar, T Rajarajeshwari, S Krishnaswami, I P Sukumar, and P S Rao: Closed mitral vulvotomy : early results and long term follow upof 3724 consecutive patients; AHA Nov 1983, Circulation 1983;68:891-896
9. Krishnakant Sahu; Closed Mitral Vulvotomy versus Balloon valvoplasty: Aprospective Comparative study of 100 cases; Health Science Journal: January 2016
10. Stanley John, K M Shyam Prasad, Edwin Ravikumar, Colin John, P SJairaj, S krishnaswamy: Closed Commisurotomy for mitral stenosis: Obsolete or Relevant? :Indian Journal of Thoracic and Cardiovascular Surgery: June 1991,volume 7,issue 1,;8-1
11. Chalak Berzingi, Vinay Badhwar, Fahad Alqahtani, Sami Aljohani, Zakeih Chaker, mohamad Alkhouli; Contemporary outcomes of isolated bioprosthetic mitral valve replacement for mitral regurgitation: Open Heart: August 2018;
12. Rutledge R ,Mcintosh CL, Morrow AG, Picken CA, Siwek LG, Zwischenberger JB, Schier JJ ; Mitral valve replacement after closed mitral commisurotomy; Circulation; August 1982;66:1162-66.