INTERMEDIATE TERM FOLLOW UP OF CLOSED MITRAL VALVOTOMIES (CMV)

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SUMMARY

59 cases operated for Mitral stenosis (MS) from November 1987 till December 1989 were followed up to a mean of 29.6 months ± 6.97. 14 patients were lost to follow. Of the remaining 45 patients all turned up at one year follow up, 44 (97.7%) at 2 years and 21 (46.6%) at 3 years follow-up. Mean preoperative mitral valve area (MVA) was 0.85± 0.22 cm², the early post operative MVA 2.01 ± 0.48 (P<0.0001) and MVA at mean follow up of 30.8 ± 9.8 months was 1.23 ± 0.18 cm² (P<0.0001). Preoperatively 57.6% were in NYHA class II and 42.3% in class III. Post operatively at 1 year, 84.4% were in class II and 15.5% in class III (P<0.0001). At 2 years; 68.2% were in class II and 25% in class III, (P<0.01). At 3 years out of 21 patients, 57% were in class II and 42.8% in class III. 4.4% patients were receiving diuretics at 1 year, whereas, 9.1% and 28.6% were on diuretics at 2 and 3 years follow-up respectively. This study shows that CMV is an effective palliative treatment of MS with effective MVA and satisfactory functional class at 2 years, there after restenosis increases.

INTRODUCTION

In 1902 Sir Lauder Brunton, published a preliminary note about the possibility of treating Mitral Valve surgically. Later on among others, Cutler in the United States did experimental work on surgery for Mitral stenosis.\(^1\) In 1923 Cutler and Lavine cut open a stenosed Mitral Valve by introducing a specially designed curved knife through left ventricular apex.\(^2\) In 1925 Soutter did digital dilatation of Mitral stenosis through left atrial appendage.\(^3\) Harkin and Bailey\(^4,5\) in the United States and Brock\(^6\) in London reported Mitral Commissurotomy through left atrial appendage. In 1960 Austen\(^7\) used Tubb’s trans-ventricular dilator with digital control through left atrial appendage. Starr and Edwards\(^8\) did first successful Mitral Valve replacement in 1961.

Since closed Mitral commissurotomy has been so successful with encouraging results, even after introduction of Cardio-Pulmonary bypass, open commissurotomy took several years to replace closed Mitral commissurotomy. By 1970 in most western centres open rather than closed commissurotomy was practiced. In developing countries closed rather than open mitral commissurotomy is practiced, because firstly it is much more economical as compared to open procedure and secondly the pattern of mitral valve disease is different from that seen in the western countries. The mitral valve disease which presents in developing countries is in younger age group with non calcific and pliable leaflets, which does very well after closed commissurotomy.

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MATERIALS AND METHODS

Fifty nine closed Mitral Valvotomies were carried out from November 1987 to December 1989, in the unit of Cardio-Vascular surgery, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar. There were 25 male and 34 females, in the age ranged of 10 to 60 years, with most patients in the first 3 decades of life Table-1.

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Inclusion criteria were pure Mitral stenosis and Mitral stenosis with mild (+1) Mitral Regurgitation (MR). Cases having left atrial appendage (LAA) clot, left atrial clot, calcified Mitral stenosis and MR moderate to severe (MR+2+3) were excluded.

Mitral stenosis clinically diagnosed were confirmed by echocardiography and Mitral valve Area (MVA) were measured. There were 33 patients with MVA of less than 1 cm². Initially cardiac catheterization was also carried out on these cases, where mitral valve gradient (MVG) was measured. Later, with the availability of Doppler studies, cardiac catheterization was performed only when serious doubts existed.

Closed mitral valvotomies were carried out through left anterolateral 5th space thoracotomy. With a finger through the LAA the mitral valve tightness, fibrosis and any calcification assessment was carried out. Mitral valvotomy with Tubbs's dilator through left ventricular apical ventriculotomy, upto 3.5 cm² was carried out. Post operatively after removal of stitches either just before discharge or at the first follow-up, echocardiography was carried out, measuring the post operative MVA.

Patients suspected clinically of restenosis were subjected to echocardiography for MR, MVA and MVG. Post operative follow-ups at one, two, three and four years were analysed for functional class, rhythm, antifailure treatment and if restenosed, MVA and comparing this with preoperative and early post operative MVA and its significance was determined.

RESULTS

Follow-up period was upto 4 years, ranging from 12 months to 48 months with a mean follow-up of 29.6 ± 6.97 and with a total of 1332 months.

Out of 59 patients 14 were lost to follow-up. Of the remaining 45 patients all turned up at 1 year follow-up. At 2 years follow up 44 (97.7%) patients turned up, at 3 years 21 patients (46%) came for follow up and 4 years only one patient (2.2%) came for follow up.

At one, two, three and four years follow up patients were assessed for New York Heart Association (NYHA) functional class, symptoms, rhythm, antifailure treatment and compared these with preoperative figures. Patient suspected of restenosis were subjected to echocardiography for MVA. Pre-operative MVA was compared to early post operative M.V.A and late post operative (suspected restenosed) MVA and their significance determined.
NYHA Functional class

Preoperatively out of 59 patients there were 34 patients (57.6%) in NYHA functional class II and 25 patients (42.3%) in NYHA class III.

Post operatively at one year follow-up, out of 45 patients there were 38 patients (84.4%) in NYHA class II and 7 patients (15%) in NYHA class III (p<0.0001), a highly statistically significant improvement in functional class.

At 2 years follow up out of 44 patients, 30 patients (68.2%) were in NYHA class II and 14 patients (25%) in NYHA class III (p<0.01), still significantly improved functional class.

At 3 years follow up out of 21 patients there were 12 (57%) patients in NYHA class II and 9(42.8%) in NYHA class III, reaching to almost the preoperative proportion.

Atrial Fibrillation

Preoperatively, out of 59 patients 28 (47.45%) were in atrial fibrillation (AF). At one year follow up out of 45 patients there were 13 (28.88%) patients in AF, at two years out of 44 patients there were 12 (27.27%) patients in AF and at 3 years follow up out of 21 patients there were 10 (47.61%) in AF reaching the same as pre operative proportion.

Antifailure Treatment

Preoperatively, out of 59 patients there were 26 (44%) patients on diuretics for congestive cardiac failure. At 1 year follow up out of 45 patients, 9 (20%) patients were on diuretics. At 2 year follow-up, out of 44 patients, 8 (18%) patients were on diuretics and at 3 years follow-up, out of 21 patients 8 (38%) were on diuretics, again approaching the pre-operative proportion.

At one year follow-up, out of 45 patients there were 2(4.4%), at 2 years follow up out of 44 patients there were 4 (9%) and at 3 years follow up out of 21 patients 6 (28.5%) patients who were not on diuretics, preoperatively, were started on diuretics.

Rate of Restenosis

At one year follow-up, there were no restenosed patient. At 2 years follow up out of 44 patients, 4(9%) had restenosed. At 3 years out of 21 patients 10(47%) had restenosed and at 4 years follow-up the only patient that came for follow-up had restenosed, making a total of 15 patients.

Echocardiography done on these restenosed patients at a mean 30.8 ± 9.8 months showed MVA range from 0.9 cm² -1.2 cm² with a mean MVA of 1.23 cm² ± 0.18.

Preoperatively out of 59 patients 33 patients had a MVA of less than 1.0 cm² and 26 patients had a MVA of more than 1.0 cm² with a mean MVA of 0.85 cm² ± 0.22.

Echocardiography done in early post operative days either just before discharge, or at the first early post operative follow up clinic showed MVA range of 1.1 cm² - 2.8 cm² with a mean MVA of 2.01 cm² ± 0.28.

Comparing it with the pre-operative mean MVA of 0.85 cm² ± 0.22, as expected, there was highly significant improvement in the mean MVA (F=<0.0001).

Comparing the mean MVA of 1.23 cm² ± 0.18 of the restenosed patients with the mean MVA of 0.85 cm² ± 0.22
of the pre-operative patients, there was still significantly greater MVA in the restenosed patients (P=<0.0001).

DISCUSSION

The disease process in rheumatic fever and its pattern varies considerably in different parts of the world and in different races. In the West rheumatic fever occurs in childhood and early adulthood. The average age is around twelve years. Mitral stenosis develops slowly after the initial involvement of mitral valve by rheumatic process. The clinical signs of mitral stenosis occurs at an average age of 20 years, and symptoms occur at an average age of 31 years. After the onset of symptoms, it is estimated that it takes 7-10 years for total disability.

In the sub continent the evolution of rheumatic disease is much shorter, so that relatively younger patients present with mitral stenosis and the disease pattern is also different. The leaflets are relatively pliable and dense fibrosis has not set in and commissures are non calcified.

The improvement in functional class at intermediate term follow up in our series correlates favourably with other reported series. In spite of early and intermediate good results of closed mitral commissurotomy, long term results are limited. The damage of rheumatic process progresses specially in the younger subjects, where the rheumatic process has not completely burnt out. The scarring progresses in time resulting in restenosis or newly developed mitral incompetence.

Atrial fibrillation preoperatively is a strong risk factor for a poor late result. Elevated pulmonary vascular resistance as seen in patients in congestive cardiac failure on diuretics is also a risk factor for poor late results.

The increase in MVA after closed mitral valvotomy is very variable. Those valve which have pliable leaflets are more amenable to wider opening as compared to thickly fixed leaflets and dense sub valvular obstruction from fibrosis and fused chordae. Closed mitral valvotomy on average increases MVA from 1.3-2.6 cm² immediately after surgery but then there is retraction so that the MVA is reduced later on. This retraction is more so where there is dense sub valvular fibrosis.

In younger patients where the disease has not burnt out as yet and is still active and where there is dense sub valvular obstruction due to chordae fusion and fibrosis, restenosis occurs earlier than in those patients where there is minimal subvalvular obstruction and fibrosis.

The patients in our series were in the first three decades of life but due to living in backward areas have not had any anti rheumatic treatment and prophylaxis, so marked sub valvular fibrosis and active rheumatic disease process at the time of surgery, thus contributing to rather high incidence of restenosis rate at intermediate term follow up.

This intermediate term follow up of closed mitral valvotomy shows that C.M.V is an effective palliative treatment of MS, with effective MVA and satisfactory functional class at two years, there after restenosis increases.

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REFERENCES


