SURGICAL CLOSE MITRAL COMMISSUROTOMY. A PROCEDURE THAT STILL HOLDS ITS PLACE.

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ABSTRACT

To assess the role of Close Mitral Commissurotomy in patient with symptomatic mitral stenosis. Between January 1997 to December 1997, 200 cases of close surgical mitral commissurotomy were performed at the National Institute of Cardiovascular Diseases, Karachi. Male to female ratio was 1:1.5, mean age was 20 years. All of the patients had symptoms refractory to medical treatment. 97% of the cases were in New York Heart Association (NYHA) Functional Class III. Mean mitral valve area was 0.7 cm^2 and mean diastolic gradient across mitral valve was 20 mmHg. All the patients had severe pulmonary artery hypertension. Mean pulmonary artery systolic pressure was 82 mmHg. 87% of the cases were in sinus rhythm. Moderate tricuspid regurgitation was present in 24% of the cases, while 9% had moderate mitral regurgitation. Mitral valvotomy was performed using Tubbs dilator adjusting its diameter to 3.5 cm^2 in isolated mitral stenosis and to 3.0 cm^2 in cases having associated mitral regurgitation. In 80% of isolated cases mitral valve area increased from 0.7 to 1.8 cm^2 $\pm$ 0.2 cm^2. In 17% of cases moderate increase of mitral valve area i.e., 0.7 to 1.5 cm^2 was achieved. Two patients had failed procedure. Mitral valve gradient dropped to 7 mmHg and mean pulmonary artery systolic pressure was 50 mmHg. Perioperative mortality was 1.0%. One patient had emergency Mitral Valve Replacement (MVR) due to severe mitral regurgitation.

Close surgical mitral commissurotomy is effective, safe and cost effective procedure. In developing countries where the incidence of rheumatic heart disease is high and facilities for balloon valvuloplasty are limited, close mitral commissurotomy serves as the ideal procedure. PJCTS 2000; II: 56-58.

INTRODUCTION

Close mitral commissurotomy is one of the simplest and oldest of all cardiac operations[1]. The first successful close mitral commissurotomy was reported as early as 1923 by Cutler and Levince[2], followed by Souttar[3] in 1925. The efficacy and safety of this procedure has been well documented[4,5]. With the establishment of safety of cardiopulmonary bypass, the open mitral commissurotomy has been considered a more effective procedure having the advantage of doing under direct vision. Although it is a more invasive procedure with the inherent complication of cardiopulmonary bypass. Since the advent of balloon valvuloplasty it has become the first choice for simple mitral stenosis, but due to our limitation with balloon valvuloplasty close mitral commissurotomy offers the best option for treating mitral stenosis.

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PATIENTS AND METHODS

Between January 1997 to December 1997, 200 cases of close mitral commissurotomy were performed at the National Institute of Cardiovascular Diseases, Karachi. Their ages ranged from 9 to 45 years with a mean of 20 years. Male to female ratio was 1:1.5. Nearly 70% of patients had symptoms for less than 5 years. Dyspnoea and palpitations were the main symptoms. 97% were in functional class III. (Table I). 13% of our patients were in atrial fibrillation. None of them had previous embolic episodes. Auscultatory findings of a clear opening snap was evident in 89%, and a loud first heart sound in 96%. All the cases had loud second heart sound. Rumbling mid diastolic murmur over the apex was the hallmark of mitral stenosis. Electrocardiographic evidence of right ventricular hypertrophy was present in 87% of the patients. Biphasic 'p' wave in lead V_1 was present in 50% of the cases. Cardiothoracic ratio ranged from 0.4 to 0.7 pulmonary venous hypertension was evident in 81% of patients. Two dimensional echocardiogram revealed tight

mitral stenosis with mitral valve area ranged from 0.5 to 1.2 cm^2, mean of 0.7 cm^2. Mean left atrial dimension was 50 mm. Mean diastolic gradient across the mitral valve ranged from 16 to 32 mmHg with a mean of 20 mmHg. Moderate tricuspid regurgitation was present in 24% of cases. Mild to moderate mitral regurgitation was present in 9% of patients. Mild annular or commissural calcification was noted in 23% of cases. Table II.

OPERATIVE TECHNIQUE

During surgery patient is monitored noninvasively. Electrocardiogram is monitored. Blood Pressure (BP) cuff is put over patient's right arm and probe of pulse oximeter is attached to the right hand finger. A left anterolateral thoracotomy through the fifth intercostal space had been the standard approach in majority of the cases. Posterolateral incision was used in cases where there was marked right ventricular enlargement, shifting the left ventricular apex posteriorly. This approach avoided excessive lifting of the heart. Mitral valve was assessed with finger through left atrial appendage. Finger fracture of fused commissures attempted with variable success followed by instrumental dilatation with Tubbs dilator introduced through left ventricular apex. Opening span of Tubbs dilator was adjusted at 3.5 cm^2. For cases having associated mitral regurgitation limited commissurotomy was done by reducing the Tubbs dilator opening to 3.0 cm^2.

RESULTS

We lost two patients, (1.0%). One was in functional class 4. His pulmonary artery systolic pressure was 105 mmHg, right ventricle dimension of 40 mm and moderate tricuspid regurgitation. While finger fracture of mitral commissure was being performed, heart fibrillated. The other patient had fibrosed valve which could not be adequately dilated and he died of low cardiac output. One patient developed severe mitral regurgitation, as the Tubbs dilator was opened tangential to the leaflet edge leading to tear of anterior mitral leaflet, emergency mitral valve replacement was performed. In all other cases satisfactory results were achieved. In 80% of the cases mitral valve area increased from 0.7 cm^2 to 1.8 ± 0.2 cm^2. In 17% moderate increase in mitral valve area from 0.7 to 1.5 cm^2 was noted. In two cases we failed to spilt the mitral commissure. The features associated with failed splitting were tough fibrotic valve, calcium deposition and fused subvalvular apparatus. Cases having associated mitral regurgitation had mild or no residual regurgitation after commissurotomy. There was significant drop in pulmonary artery pressure in the immediate post operative course. Mean pulmonary artery systolic pressure was 50 mmHg.

DISCUSSION

Close instrumental mitral commissurotomy is one of the simplest and well established procedure. Though there is increasing number of surgeons who would favour open commissurotomy, as the preferred surgical technique for mitral stenosis[6,7,8], Houseman[9], et al, reported 16% occurrence of restenosis after an open procedure. Brewer[10] results show no advantage of open procedure over close mitral commissurotomy. Over the years we at our institute have produced very promising results with close mitral valve commissurotomy. The present study of 200 cases was conducted to review the results of close mitral valve commissurotomy procedure done at NICVD, Karachi. Majority of our patients were young. Nearly all of them had rheumatic etiology but only a small majority could exactly recall the rheumatic fever history. 80% of the patient population comes from the remote area of the country from low socioeconomic class living in poor hygienic conditions. Clinically 80% of the patients had opening snap indicating the valve pliability. 13% of the cases had atrial fibrillation but none of them were taking anticoagulant therapy. Exertional dyspnoea was the main presenting feature. Despite taking antifailure medications 97% were in NYHA functional class III indicating the severity of mitral stenosis and associated pulmonary venous hypertension. Two dimensional echocardiography and colour doppler study were solely applied for the assessment of mitral valve apparatus and patient selection for close mitral commissurotomy. Patients having grossly thickened valve leaflets, moderate calcification or left atrial clot were refused closed mitral commissurotomy. Preoperatively patients were screened for the status of rheumatic activity by doing their erythrocyte sedimentation rate and serum antistreptolysin 'o' titer. Anterolateral

thoracotomy provide excellent exposure in all the cases. Tubbs dilator diameter was adjusted to 3.5 cm^2 for adult cases. In children it was kept between 2.5 to 3.0 cm^2. In cases having associated mitral regurgitation we limited the Tubbs diameter to 3.0 cm^2. In 80% of cases we achieved satisfactory results. Mitral valve area increased from 0.7 to 1.8 $cm^2 \pm 0.2$ cm^2. Farhat MB[2,11], et al, reported increase in mitral valve area from 0.9 to 1.6 ± 0.4 cm^2. Mitral valve area achieved after balloon valvuloplasty is (from 0.9 to $2.2 \pm 0.4 cm^2$). In 17% of our cases the increase in mitral valve area was moderate (from 0.7 to 1.5 ± 0.2 cm^2). In this subset of cases the leaflets were thickened and fibrotic. In two of the cases we failed to split the valve. The features associated with failed splitting were tough fibrotic valve, calcium deposition and fused subvalvular apparatus. Both these cases were electively scheduled for mitral valve replacement. 90% of our patients were in functional class I after close mitral commissurotomy. The immediate hemodynamic response is similar after close mitral commissurotomy and balloon mitral valvotomy[11,12]. Increase in left ventricular end-diastolic pressure have been reported after close mitral commissurotomy (2.5 ± 3.4 mmHg[12]). This could be due to decreased left ventricular compliance after ventriculotomy. We lost two patients. Both were in functional class IV, had severe pulmonary arterial hypertension (105 mmHg and 95 mmHg) and severe tricuspid regurgitation. One of the patients had cardiac arrest peroperatively while the valve was being splitted. The other patient died of low cardiac output in the high dependency unit. Such sick patient should ideally be done under controlled condition of cardiopulmonary bypass with good myocardial protection and elective controlled mechanical ventilation till the patients hemodynamics are stabilized.

CONCLUSION

This study shows that in terms of safety, efficacy and cost effectiveness close mitral commissurotomy is very useful palliative procedure for mitral stenosis. In developing country like ours where the facilities for balloon commissurotomy are not easily accessible close mitral commissurotomy offers an ideal alternative to relieve rheumatic mitral stenosis.

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