Start Of Cardiac Surgery In Peshawar

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SUMMARY

Closed heart surgery has started at the Post Graduate Medical Institute (P.G.M.I.), Lady Reading Hospital (L.R.H.) Peshawar, the Metropolis of the North West Frontier Province of Pakistan. The first ever successful closed mitral valvotomy was carried out on a 15 years old boy, with severe mitral stenosis and Grade IV dyspnoea, from the suburbs of Peshawar city on 28th November, 1987. Following this there was a gap till March 1988. During the period of 1st March 1988 to 28th February 1989 there were 27 more closed mitral valvotomy operations, making a total of 28 cases. There were 10 Males and 18 Females. Majority of patients were in younger age group of under 30 years. Mitral valve area (MVA) ranged from 0.7 to 1.8 cm^2 with over 70% with MVA of 1 cm^2 or less. Gradient across the mitral valve ranged from 10 to 55 mm Hg. Severe pulmonary artery hypertension was recorded in 9 cases. Cases with calcification of mitral valve, significant mitral regurgitation (MR) or aortic regurgitation were not accepted for closed mitral valvotomy. There were no operative, on-table deaths. Post operatively two deaths occurred (7%). Both these cases were in congestive cardiac failure, had atrial fibrillation, had severe mitral stenosis with high gradient across their mitral valves and had severe pulmonary hypertension. The remaining surviving cases had very rewarding symptomatic improvement at short term follow up.

PATIENTS AND METHODS

Cases diagnosed clinically to be suffering from rheumatic fever heart disease (RFHD) resulting in mitral stenosis were confirmed by echo-cardiography and cardiac catheterisation.

All cases of pure mitral stenosis or mitral stenosis with no significant mitral regurgitation or aortic regurgitation were accepted for surgery. Cases with aortic regurgitation or mitral regurgitation of 1+ were accepted for surgery.

Evidence of even minimal calcification of mitral valve was considered as absolute contraindication to surgery.

Extremes of Age were not considered to be contraindication to surgery. Patients with reasonably wide mitral valve area but restricted by symptoms were accepted for surgery.

At echo-cardiography mitral valve area (MVA) was measured and any regurgitation of mitral valve (MR) was noted. Any evidence of calcification or vegetations around the mitral valve or evidence of clot on the mitral valve or left atrium or left atrial appendage were noted.

Cardiac catheterisation was done in all cases in this group and gradient across the mitral valve (MVA) was recorded. Pulmonary artery and wedge pressures were recorded. Also any evidence of mitral and aortic regurgitation was noted and graded.

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Patients with atrial fibrillation, congestive cardiac failure, disrhythmias and pulmonary artery hypertension were treated medically before surgery.

At surgery patients were on continuous ECG monitor with internal defibrillator close at hand. Through left 5th space thoracotomy pericardium was secured by stay sutures. Then through a left atrial appendage atriotomy, digital dilatation of mitral valve was initiated. Then through left ventricular apical ventriculotomy, valvotome was negotiated through the mitral valve and valvotomy completed. Both atriotomy and ventriculotomy incisions were carefully closed.

The first closed mitral valvotomy was done on a 15 years old boy from the suburbs of Peshawar city on 28th November 1987. Following which there was a gap till March 1988. During the period of 1st March 1988 till 28th February 1989, further 27 cases of closed mitral valvotomy were carried out, making a total of 28 cases of closed mitral valvotomy.

There were 10 males and 18 females.

Table 1. Sex distribution

Male	10
Female	18

There were no cases in the first decade of life. Majority of the patients were in younger age group of under 30 years (Table 2).

Table 2. Age distribution

Years	Cases
11—20	14
21—30	06
31—40	07
41—50	01

Degree of mitral stenosis as measured by echocardiography ranged from 0.7cm²—1.8 cm². Over 70% cases were with MVA of 1cm² or less.

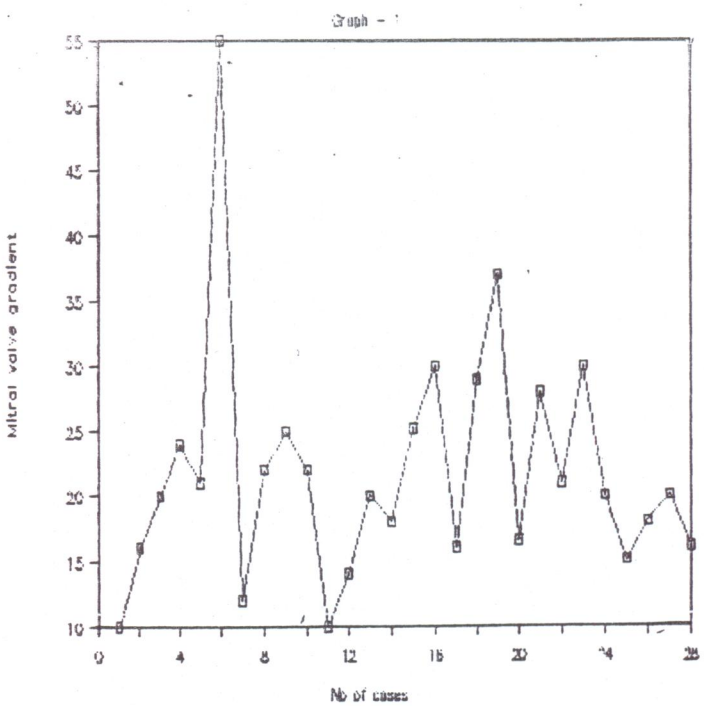
At operation the valve was dilated conservatively at first. The first case was dilated to only 2.5 cm and a girl of 12 years, who was a small 12 years. One case had digital dilatation because after opening the valvotome before being used, will not close. Therefore it was not used. Over 80% cases were dilated upto 3.5 cm².

Table 3. Degree of stenosis

Mitral valve area (cm²)	Cases
0.7	6
0.8	7
0.9	5
1.0	2
1.1	2
1.2	2
1.3	2
1.4	1
1.8	1

Table 4. Degree of operative dilatation
Range = 2.5cm 2- 3.5cm²

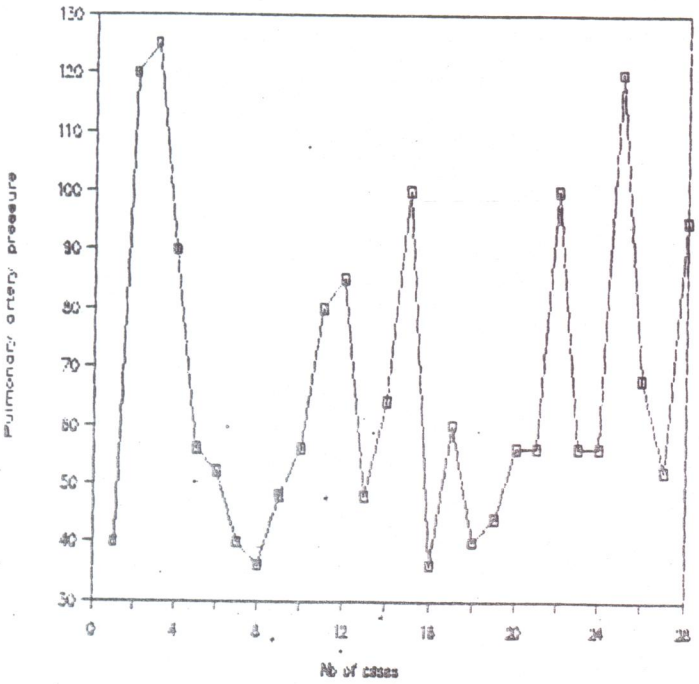
Dilated to	cases
2.5	2
3.5	25
Digital dilatation only	1



Gradient across the mitral valve as measured by doppler and at cardiac catheterisation ranged from 10mm Hg to 55mm Hg with a mean of 21.8 with a standard deviation of ± 8.8. (Graph 1).

Pulmonary artery hypertension (PAH) ranged from 36 to 125mm Hg with mean of 67.10 and a standard deviation of 26.43 (Graph 2).

Graph – 2



Severe PAH with pressures above 80 mm Hg was noted in 9 cases.

RESULTS

There were no on table, operative deaths.

There were two post operative deaths within 3 post operative days.

First death was an obese female 50 years old. She was in congestive cardiac failure with atrial fibrillation preoperatively, with a PAH of 125mm Hg and with a gradient of 55mm Hg across the mitral valve. She had tight mitral stenosis of 0.8cm. Had smooth surgery but post-operatively remained unconscious with right hemiplegia which became more dense gradually. The patient died on 3rd postoperative day without gaining consciousness.

As no postmortem examination was allowed by the relatives, it is presumed that she had thrown an embolus or emboli from undetected clot in the left atrium, this having dislodged at surgery.

The second death was a boy 19 years of age who also had been in atrial fibrillation and in congestive cardiac failure, with PAH of 100mm Hg, with a MVA of 0.7cm and gradient of 37mm Hg across the mitral valve. He also had smooth surgery and good postoperative recovery. Four hours after recovery while talking collasped, went into supraventricular tachycardia leading to ventricular tachycardia. Bedside reopening in ICU was done. There was no cardiac temponade or bleeding. Open cardiac massage and repeated attempts at cardio-version failed to revive him.

The remaining surviving patients on their short term postoperative check up had very rewarding symptomatic improvement.

Post operative mitral valve area measurements were done where possible. Some patients with low pain threshold will not cooperate. Table 5 shows preoperative MVA, dilatation done at surgery and post operative MVA measurement.

Table 5. Postoperative MVA compared to pre-operative MVA

Preoperative MVA (cm^2)	Operative dilatation (cm^2)	Postoperative MVA (cm^2)
1.0	3.5	2.9
0.8	3.5	1.7
0.9	3.5	2.5
*0.8	*2.5	*1.1
1.8	3.5	2.3
1.2	3.5	2.5
1.1	3.5	2.2
0.7	3.5	1.8
0.9	3.5	2.2
1.2	3.5	2.5
1.0	3.5	2.0
0.8	3.5	2.5
0.9	3.5	2.2
1.0	3.5	1.7
+1.0	+2.5	+1.6

* The first case.
\+ The small 12 years old girl.

DISCUSSION

Closed mitral valvotomy was practiced universally in the sixties before open heart surgery came on the scene 1.

At present closed mitral valvotomy is practiced in underdeveloped countries and specially in the Asian countries. This is mainly due to the fact that rheumatic heart disease is still prevalent in Asian countries. Rheumatic valvular disease seen therefore, is in its early stages and in younger age group 1. The valves involved therefore are still pliable, where calcification has not set in as yet. In contrast the valvular disease seen in developed countries is in more advanced stage, subvalvular fibrosis and calcification of the valves is common. Therefore valve replacement rather than valvotomy is the treatment carried out 2,4.

Closed mitral valvotomy should be carried out before the patient develops atrial fibrillation. If the patient has increased pulmonary vascular resistance, significant enough to cause pulmonary artery hypertension, then even in asymptomatic patients, operation is indicated 3. Patients with moderate restrictions from symptoms (NYHA functional class II) but with severe mitral stenosis are good candidates for valvotomy. In young patients who may have only moderate mitral stenosis but with attacks of Paroxysmal nocturnal dyspnoea or pulmonary oedema, mitral valvotomy is indicated 1,3.

Advanced age, preoperative atrial fibrillation, congestive cardiac failure, mitral regurgitation, severe pulmonary hypertension, immobility of mitral valve produced by subvalvular fibrosis and advanced symptomatology are risk factors which adversely affect the survival following surgery 3,5.

The benefit derived from valvotomy depends upon the increase in effective mitral valve area (MVA). As a secondary effect of increase in MVA, a decrease in flow resistance occurs. This causes reduction in left atrial pressure.

The left ventricular end diastolic pressure (LVEDP) usually is moderately higher after valvotomy. Pulmonary vascular resistance falls as does the pulmonary artery pressure. These falls correlate with fall in left atrial pressure. Cardiac output increases after mitral valvotomy. This increase is proportionate to the increase in the MVA.

Mitral valvotomy produces increase in MVA which varies. There are certain factors which affect the effective increase in the MVA. Leaflet pliability is most important, hence more effective increase of MVA occurs in younger patients 4,5 as compared to older patients 2. The extent of subvalvular fibrosis and fused chordae causing obstruction also affect the increase in MVA adversely 4.

It has been found that closed mitral valvotomy increases the MVA on an average by 1.3 —2.6 cm^2. The postoperative MVA range between 0.7—5.8 cm^2. The increase in MVA following mitral valvotomy and the secondary effects that it produces, causes symptomatic improvement following surgery. Symptomatic improvement is dependant on haemodynamic changes brought about 2.

CONCLUSION

Most of the cases in younger age group in this series showed dramatic improvement symptomatically, at short term follow up, following surgery. Analysing the two deaths, in both, the common features were, marked stenosis, high gradient across the mitral valve, atrial fibrillation, congestive heart failure and severe pulmonary artery hypertension. Severe preoperative disability caused by these features adversely affect the results after surgery and survival 3,5. Both death cases were, therefore, in high risk group. As the LVEDP increases after valvotomy, the left ventricle, immediately after opening up of a severely stenosed mitral valve, cannot cope with this sudden increase in blood flow and therefore fails. This seems to explain the sudden collapse and death in the young patient, four hours after recovery.

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