CURRENT STATUS OF CLOSED TRASVENTRICULAR COMMISSUROTOMY IN MITRAL STENOSIS ANALYSIS OF 2212 CASES

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Mitral Darlığında Kapalı Komissurotominin Bugünkü Yeri
2212 Vakanın Analizi

1 Ocak 1970 ile 29 Aralık 1979 tarihleri arasındaki on yıllık dönemde kapalı transventriküler komissurotomi uygulanan 2212 vakanın analizi yapıldı.

Ekstrakorporeal dolaşım tekniğinin özellikle son yıllarda kaydettiği büyük gelişmeler, yöntemin sağladığı emniyet ve olanaklara rağmen, saf darlıklı müsait vakalarda kapalı mitral komissurotomi hâlâ uygulanmakta olan bir girişim şeklidir.

Seçilmiş vakalarda ve tecrübeli ellerce dikkatli uygulandığında kapalı mitral komissurotomiden sonra ameliyat sonu devrede komplikasyon hemen hiç görülmez yada yok denecek kadar azdır.

Yıllardan beri uygulanmakta olan kapalı mitral komissurotomi ile ortalama 5 yıl palyasyon, 10-15 yıl hâtta daha uzun süreli klinik düzelme sağlanabilir.

In adults, normal mitral valve opening area ranges from 4 to 6 cm^2. When the mitral valve opening area narrows down to 2 cm^2 because of pathological causes, the left ventricle can only produce the output required by the body in a resting state. In the states associated with further narrowing of the mitral valve opening, the left ventricular output can not increase in keeping with the effort. Even during rest, the left ventricular output falls below normal level and the left atrial pressure increases. Usually, following this stage, me-

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dical therapy is unsuccessful and surgical intervention is necessary. The narrowed valve orifice has to be enlarged or valve replacement would be required.

The surgical treatment for the relief of mitral stenosis can be performed under direct vision by means of extracorporeal circulation and can also be accomplished in suitable cases by the closed commissurotomy technique.

Surgical procedure for enlargement of the narrowed mitral valve initiated many years ago. In 1924, Cutler and his associates (1) attempted to enlarge mitral valve area by cutting the valve leaflets at any point. This technique caused intolerable regurgitation and for this reason it was necessary to abandon it. The first successful transatrial mitral commissurotomy was achieved by Souttar in 1925 (2). The closed mitral commissurotomy technique has become largely applicable since 1948 and 1949 by this studies of Harken and coworkers (3) and Bailey (4), respectively. In this technique, mitral commissurotomy was done by a finger (finger fracture) or by a special knife. Since 1954, with the introduction of the dilator, closed transventricular mitral commissurotomy has become simpler and it is also a far more reliable method (5).

MATERIALS, METHODS

Between January 1, 1970 and December 29, 1979, closed transventricular mitral commissurotomy was performed on a total of 2212 patients at the Yüksek İhtisas Hospital in Ankara, Turkey. Of these, 1373 were female (62.1 %) and 839 were male (37.9 %).

The youngest patient was a ten year old girl and the oldest was a sixtyfive year old woman. The average age was twentyeight years. Of the female patients, 1159 (52.4 %) were under forty, and 115 (5.2 %) were over forty years of age.

According to the classification of the New York Heart Association (NYHA), 504 females (22.8 %) and 221 males (10 %) were in class II,850 females (38,4 %) and 601 males (27.2 %) were in class III,19 females (0.8 %) and 17 males (0.8 %) were in class IV (Table I).

Open mitral commissurotomy was performed on patients who had a history of systemic emboli and symptoms and signs of old thromboembolic phenomenon.

11 female (0.5 %) and 20 male (0.9 %) patients were suffering anginal pain. 7 out of 31 patients with a history of anginal pain were using nitrogycerine. E.C.G. examinations revealed ST and T abnormalities in 10 male and 4 female patients.

In 29 patients, mitral stenosis was associated with systemic hypertension. Of the 10 female patients with systemic hypertension, 3 were below and 7 were over the age of forty years, whereas, of the 19 male patients in the same group, 7 were below and 12 were over the age of forty years, respectively.

The average time between the appearance of the first symptoms of mitral stenosis and the operation was 11 years. The average duration of symptoms of pulmonary hypertension was 9 years.

3 patients have diabetes mellitus and 8 patients have hyperthyroidism. The symptoms and signs accompanying mitral stenosis are listed in table : II.

1426 out of 2212 (64 %) patients who underwent closed trasventricular mitral commissurotomy had history of episodes of acute rheumatic fever.

Calcific mitral valves were found in 361 (16.3 %) patients including 182 (8.2 %) females and 179 (8.1 %) males, during the operation. Of the female patients, 134 (11.6 %) were below forty and 48 (22.4 %) were over forty years of age. Of the female patients, 148 (20.4 %) were below forty and 31 (27 %) males were over the age of forty. Following operation, 17 of 361 patients with mitral valve calcification, developed very mild mitral insufficiency. In these cases, a grade 1/6 of systolic murmur could be heard postoperatively in the mitral valve area and the postoperative period was uneventful.

During operation, thrombosis was found in either the left atrium or the left atrial appendage in 36 out of 375 patients with calcific mitral stenosis. Of these patients, 3 developed slight cerebral complications, 4 required early embolectomy for peripheric embouls and 4 died in the early postoperative period.

Organized thrombus was found in the left atrium of 138 cases. which included 85 females and 53 males without any mitral valve calcification. Of the females 56 (65.9 %), and of the males 16 (30.2 %) patients were older than forty years of age. The average age of these 138 cases was thirtythree. 124 (89.9 %) patients in the same group suffered from atrial fibrillation and none of them gave

history of systemic emboli or showed any signs of this complication. Following closed transventricular mitral commissurotomy, 43 patients (31.2 %) inn this group received anticoagulan therapy for a short period, ranging from 8-30 days. In 44 patients, the left atrial appendage was stured with special care because of the presence of a thrombus entirely occupying the left atrial appendage and possibly extending into the left atrium. These patients were operated on under the conditions of open heart surgery.

Postoperatively, 15 out of 2212 (0.7 %) patients showed neurological signs suggesting cerebral embouls, and 12 of them (80 %) died in the early postoperative period; 1 developed a permanent speech disorder and 2 patients recovered completely.

Peripheral emboli developed immediattely following the operation in 18 (0,8 %) cases and embolectomy was carried out while the patients were still under anesthesia. Peripheral embouls was observed in only 2 cases in the early postoperative period, and on embolectomy was performed immediately under local anesthesia in the intensive care unit.

In 14 (0.6 %) of the patients, preoperative laboratory tests failed to disclose any evidence of rheumatic activity, however hystopathological examinations revealed marked rheumatic activity. Biopsy specimens were taken from the left atrial appendage during the operation.

In addition to mitral stenosis, 81 with aortic incompetence 22 with aortic stenosis and 171 with functional tricuspis incompetence were found in this series; however these valvular lesions required no surgical intervention.

23 out of 1373 female patients were pregnant, 3 of them had functional tricuspid incompetence and 1 had slight aortic incopetence. Only 1 patient in this group died during the early postoperative period.

In 37 cases, aside from the signs of mitral stenosis, a grade 1/6 systolic murmur was also heard at the mitral valve area; however in 21 of these (56.8 %) this murmur decreased or disappeared following commissurotomy. On the other hand, a slight degree of mitral incompetence occured during closed transventricular mitral commissurotomy in 91 cases (4.1 %), including 53 males and 38 females. Of these patients, 41 were males and 23 were females, all of whom over forty and all of whom showed differing degrees of calcification

inn the mitral valve. 17 casesin this group developed progressively increasing mitral insufficiency and 14 required mitral valve replacement, with an interval ranging from 8 months to 3 years.

34 patients who had been placed on medical therapy following operation, were found to be compensated and had shown a marked decrease in their symptoms on examination carried out on the second, sixth months and thereafter once every year. Of these patients, 8 required mitral valve replacement with an interval ranging from 3 to 6 years following commissurotomy.

A complete opening could not be achieved in both commissural sides in 228 cases (10.3 %). Complete posterolateral commissure and anteromedial commissure openings were achieved in 89 and 139 cases, respectively; only slight or partial openings were obtained in the other commissural sides. However, in these cases, the mitral valve orifice was enlarged sufficiently to enable the insertion of two fingers.

14 out of 2212 patients (0.6 %) were readmitted for symtoms of restenosis with an average interval of 64 months ranging from 3 to 8 years, and 10 patients required mitral valve replacement. Subvalvular stenosis due to very shortened and thickened chordaes and papillary muscles fused to leaflets was found in 1 case and commissurotomy was performed by means of an incision dividing chordaes and papillary muscles.

26 out of 2212 patients (1.2 %) who had closed transventricular mitral commissurotomy died in the early postoperative stages. Causes of death in operated patients were showed in table : III. In this group, 15 were females (57.7 %) and 11 were males (42.3 %), of whom 8 females and 5 males were over the age of forty. 23 patients (88.5 %) suffered from atrial fibrillation. Expired patients included 3 in clas II, 18 class III and 5 in class IV according to their funotional capacities. Neurological disorders related to cerebral embouls were seen in 12 (46.2 %) expired cases in the early postoperative period. Cardiac arrhythmias developed in 4 cases in the early postoperative period which could not be controlled by medical therapy and d.c. countershock, and all died. Myocardial failure, pulmonary edema, surgical haemorrhage, preoperative incorrectable ventricular fibrillation and allergy-anaphylaxy were the causes of death in the remaining patients. In one of the 2 patients who had died of haemorrhage, a left atrial rupture occured which was unrepairable under conditions of closed operation and she died until heart-lung machine

Table : I

Distribution of Patients According to Age, Sex and Functional Capacity

	Age		Functional Capacity		
	< 40	> 40	class II	class III	class IV
Number of Patients	1883 (85.1 %)	329 (14.9 %)	504 (22.8 %)	850 (38.4 %)	19 (0.8 %)
F	1159 (52.4 %)	214 (9.7 %)	725 (32.8 %)	1451 (65.6 %)	36 (1.6 %)
Sex M	724 (32.7 %)	115 (5.2 %)	221 (10 %)	601 (27.2 %)	17 (0.8 %)

F: Female M: Male

Table : II

Symptoms and Signs Acompanying to Mitral Stenosis

Symptoms and Signe	No. of Females Age		No. of Males Age		No. of Patients	Persentage of Tot Patients
	<40	>40	< 40	> 40		
Palpitation	974	188	623	87	1872	84.6
Chortness of breath	952	163	501	82	1698	76.8
Cough	795	138	394	76	1403	63.4
PND+	487	102	366	50	1005	54,4
Orthonea	463	127	317	68	975	44.0
Pulmonary edema	244	77	140	41	502	22.7
Hemoptysis	204	90	147	29	470	22.3
Anginal pain	2	9	6	14	31	1.4

+ Paroxysmal Nocturnal Dyspnea

Table : III

Number and Causes of Death in Operated Patients

Cause	No.	%
Cerebral embolus	12	46.2
Uncontroilable arrhythmias (Postoperative)	4	15.4
Myocardial failure	3	11.5
Pulmonary edema	3	11.5
Surgical haemorrhage	2	7.7
Ventricular fibrillation (During the operation)	1	3,8
Anaphylactic shock	1	3,8
Total :	26	

was prepared. In the other, sudden excessive bleeding through the chest tube was observed in the intensive care unit two hours after the operation, and the patient expired during transportation to the operating room for revision. Postmortem examination of this patient showed a perforated pulmonary artery, which could have been dameged by electrocautery during the control of adventitial bleeding during the operation. 1 male patient, aged fiftysix, developed ventricular fibrillation during the operation, prior to commissurotomy, and immediatly enlargement of the mitral orifice was peformed as fast as possible, followed by cardiac massage and d.c. electroshock; but the patient failed to recover. One of the pregnant patient developed an allergic reaction and anaphylactic shock, probably due to penicillin or other medications applied after operation, and she died.

DISCUSSION

Surgical management of pure mitral stenosis could be affected by closed and open mitral commissurotomy techniques. Closed mitral commissurotomy has been performed successfully for many years with an average of five years pallation, and even clinical improvements lasting for a duration of ten to fifteen years or even more have been achieved (6, 7,28, 9, 10, 11, 12, 13, 14).

Closed mitral commissurotomy could be performed in patients under the age of forty, who did not have acute episodes of rheumatic fever, and who had no rheumatic activity during the short period prior to operation, and in patients having clear first heart sound, diastolic ruble, opening snap, without pulmonary hypertension and pulmonary vascular disease.

In our series, postoperatively, 37 cases had a grade 1/6 systolic murmur. Slight mitral incompetence with predominating mitral stenosis was confirmed during the operation by finger feeling. This central jet could not be feld in 21 of 37 patients following commissurotomy, during the operation. Postoperative physical and phonocardiographic examinations revealed decrease of disappearance of the murmur. This could be explained by fusion of the leaflets causing their limited mobilities which is relieved by mitral commissurotomy, providing free mobilities and adequate bulging to the leaflets. But in the remaining 18 cases this slight reflux and clinical insignificant grade 1/6 of systolic murmur persisted. During operation on 2 of these 18 cases, some small calcifis nodueles were found near the

adge of the mitral orifice. These 2 cases and another case with fibrotic thickened valve had progressively increasing mitral insufficiency and required mitralorifice. These 2 cases and another case with fibrotic thickened valve had progressively increasing mitral insufficiency and required mitral valve replacement within intervals varying from 2 to 4 years. No change was noted in the grade 1/6 systolic murmur in the 15 patients, following operation on repeated examinations done on second, siXth months and thereafter once every year up to 6 months to 7 years. Undouptedly, open heart surgery is necessary in cases having mild or more than mild regurgitation.

It is certain that operative results obtained from cases of heavily calcified valves were not as good as those obtained from cases of slightly calcific or noncalcific valves (15, 16, 17). If the first heart sound is not clear and no opening snap is heard in patients below forty years of age -especially in maies-, the possibility of a calcified mitral valve should be considered. In these cases, calcification should be investigated by the aid of x-ray, fluoroscopy, tomography or echocardiographic methods. The risk during operation is high in cases of calcific mitral stenosis due to the possible occurence of traumatic acute mitral incompetence and systemic emboli (15). For these patients, it is preferable and safer to perform the operation under open heart conditions.

It has been shown that there is a close relationship between calcification of mitral valve and the age (9, 15). 16.5 % calcification in the below the thirties age group and 51 % in the above the fifties age group has also been reported(15). Calcification of the mitral valve is more predominant in male than in females, but the cause is unknown (9, 15). In our series, 182 out of 1373 (13.3 %) female and 179 out of 839 (21.3 %) male patients showed calcification. Of the calcified mitral valve patients, 134 out of 1159 (11.6 %) females and 148 out of 724 (20.4 %) males were younger than forty years of age, On the other hand, 48 out of 214 (22.4 %) female and 31 out of 115 (27 %) male patients with calcific mitral valve were older than forty years of age.

During application of the dilator in calcific mitral stenosis, small pieces of calcific noduls localized at the edge of the orifice or at the fused parts of the leaflets may be mobilized and may cause systemic emboli. Although thrombus usually localized in the left atrium causes emboli, it must be kept in mind that small old clots on the legs of dilator as well as the trapped air between the legs of the dilator may also cause cerebral embolus.

Most frequently, thrombus is found in the left atrium in females, but a more calcified mitral valve is found in males older than forty years of age (18). In our series, 56 out of 85 females (65.8 %) who had left atrial thrombus were older than forty. It is known that left atrial thrombus can be the cause of a fatal outcome during closed mitral commissurotomy (18, 19, 20, 21). Inn the open mitral commissurotomy this complications has been reduced very significantly, but not completely (22).

We share the view of Grantham and associates (2) that the handling of the left atrium and the application of transventricular dilator can be the causes of peroperative emboli in patients with left atrial thrombus. Manteuffel-Szoege and assaciates (10), inn their large series of 1700 cases, stated that peroperative systemic embolization was reduced considerably after abandoning the clamping of the left atrial appendage during operation. Wo do not apply the clamp on the atrial appedage principally, because of the possibility of mobilizing a possibly existing fragile thrombus in the appendage. Instead of clamping, we put a purse-string around the appendage and handling it gently by pressing the auricle with gauze and then making the incision with a knife. The frequency of old thrombus in the left atrial appendage is high in patients who have left atrial appendage with puckered surface and a fibrotic thickened wall. In these circumstances, a purse-string suture is placed on the left superior pulmonary vein near the atrium, and the index finger is inserted through an incision made inside the purse-string. The patient should be placed in the Trendelenburg position during the application of the dilator for the prevention of cerebral embouls. In our series, 15 out of 2212 (0.7 %) patients showed neurological deficiency, 12 of whom died in the early postoperative period. One patient had slight neurological deficiency, the other recovered comletely. 18 cases (0.8 %) had peripheric emboli, all of whom fully recovered following embolectomy.

It has been stated that the peroperative embouls rate is 11.9 % - 25 % in mitral stenosis (7, 18, 23) There is no definite relationship between the history of embolic phenomenon and the left atrial thrombus found in the operation (18, 23, 24). We prefer to perform the open mitral commissurotomy if the patient gives a history of embolic phenomenon or show any signs of this complication on physical examination. Ullal and associates (18) found left atrial thrombus in 62 out of 520 (11.9 %) cases, 33 of whom (67 %) gave an history of emboli prior to operation. The patients who had embolic pheno-

menon were on anticoagulant therapy from the time embolic phenomenon occured. We also did not find a definite relation between the history of embouls and the existence of thrombus in the left atrium.

As known, anticoagulants are not effective for the old thrombi. Usually old thrombus adheres firmly to the columnae carneae and the atrial endocardium. The rough surface of the old thrombus is a suitable place for the formation of new thrombi. These new thrombi are usually not fixed firmly and can easily be detached and carried into the systemic circulation. Anticoagulants can only help prevent the formation of new clots.

The presence of an atrial thrombus in mitral stenosis has been reported to be associated with several factors. These are : Age, (18, 25, 26) history of cardiac failure (27), large atrial appendage (19), an calcification nof the mitral valve (9, 19). However, we did not find an exact relationship between thrombus formation and the above mentioned factors.

A thrombus can be formed in the atrial appendage because of slower rate of blood flow in the atrium due to the atrial fibrillation and narrowed mitral orifice. The incidence of atrial thrombus is much higher in patients with atrial fibrillation (9, 18, 21, 25, 26,27 28) but it may also be found in sinus rhythm (9, 18). In our series, 138 cases had thrombus, of whom 125 (90.6 %) had atrial fibrillation, and 13 cases (9.4 %) were sinus rhythm.

Anginal pain have been reported in 8.5 % to 35 % of patients with mitral stenosis in different series (14, 18, 29, 30, 31, 32). In the presented series, 30 patients (1.4 %) were complaining of anginal pain in various degrees of severity. It has been suggested that low cardiac output (32), pulmonary hypertension (31, 33, 34), microemboli in coronary arteries (30) or mitral stenosis combined with coronary heart disease (29) are responsible for the anginal pain.

Old age is not a risk factor for closed mitral commissurotomy (7. 8, 35, 36), exept in cases of a higher incidence of left atrial thrombus, mitral valve calcification, atherosclerotic coronary disease, systemic hypertension and diabetes mellitus which can be seen frequently in the elderlies. It is obvious that aged patients must be observed more closely in the postoperative period and the results can be acceptable for this older age group if they do not have the complicaitng factors already mentioned above.

In the case of pulmonary hypertension and the increased resistance in pulmonary arteriols, there is a close relationship between these findings and the severity of mitral valve disease. If it is preferable to follow up these patients more carefully in the postoperative period. If symptoms of pulmonary congestion have continued preoperatively for six months or more, the risk of early and late mortality have been found to be higher, however the definite cause of this condition is unknown (7, 8, 12, 37). It has been suggested that increased pulmonary resistance gives rise to pulmonary hypertension. In such cases, the mitral valve is frequentiy found to be calcified (7).

The severity of rheumatic disease in an important factor which may effect the outcome of mitral valve surgery (38, 39, 40). Preoperative laboratory tests sometimes show no rheumatic activity whatsoever, but a specimen taken from the heart hystopathologically may confirm that activity is in existance. In our series, 14 (0.6 %) patients' preoperative laboratory tests showed no rheumatic activity but hystopathologic examinations revealed marked rheumatic activity in the specimens taken from the left atrial appendage during the operation. In spite of a properly performed and uncomlicated operation, this occult type of rheumatic activity could quite possibly cause a stormy postoperative period. In these cases, we noticed that during the thoracotomy, much blood was oozing from the wound and more thoracic bleeding through the chest tube than normal during the postoperative period. The reason for this is unknown to us, and we were also unable to find an explanation in the literature, either. In patients with rheumatic activity, there are unexpected complications in the early postoperative period. 2 of our young patients who had sinus rhythm and a good surgically opened valve, and almost normal postoperative laboratory findings, while having well clinical recovery, suddenly went into ventricular fibrillation and died, despite every attempt to save them. These 2 patients' specimens showed rheumatic activity in hystopathologic examination.

Atrial fibrillation is a certainly not a contraindication to surgical treatment on its own, for the relief of mitral stenosis. But atrial fibrillation in mitral stenosis is related to the severity and duration of the rheumatic disease and the degree of stenosis. For this reason, atrial fibrillation is a risk factor which effects the operative results unfavorably. Kitchin and associate (15), Lowther and Turner (9) reported that the mortality rate is 2-2.2 % in sinus rhythm while patients with atrial fibrillation showed 13 % mortality. In our series, 23 out of 26 hospital deaths (88.5) had atrial fibrillation. Hospital mortality in

atrial fibrillation was 1 % while sinus rhythm was 0.1 %. It was know long before the days of surgical treatment that the prognosis for patients with atrial fibrillation was worse than for those with sinus rhythm, so it was only to be expected that the long-term outlook in these patients after operation would not be very good.

Rheumatic disease can cause some changes in the mitral valve as well as in other valves. It has frequently been found that functional incompetence in the tricuspit valve in cases of longstanding mitral stenosis, and tricuspid incompetence may disappear quickly with medical therapy, following mitral commissurotomy. In our series, 169 patients had functional tricuspid incompetence which was reduced to minimal degree or even disappeared completely 6 to 22 days after mitral commissurotomy. On the other and, such cases can generally be accepted as class III - IV and for those reasons the mortality rate in these groups is rather high; 11 deaths in 171 cases (6.4 %).

Closed mitral commissurotomy can be performed on patients with slight aortic valve disease too, because it tends to affect the result slightly (9, 15). 61 patients in our series had slight aortic incompetence and 22 had slight aortic stenosis. In this group, we had only 1 mortality (1.2 %).

During the operation, if the mitral leaflets are not pliable, we commence commissurotomy with a minimally opened dilator (2.5 cm), then gradually increase the dilator up to 3.5 - 4 cm, until the desired opening of the crifice is obtained. In this manner, we can ayold acute traumatic mitral incompetence and at the same time we can control the mitral orifice.

Mitral stenosis is seen mostly (75-90 %) in pregnant patients with rheumatic heart disease (41, 42). During pregnancy the blood volume increases about 20 % - 100 % (43), the cardiac output is also high; up to 30 % - 50 % (44). Prior to pregnancy, mitral stenosis can be tolorated, but during pregnancy, the mitral orifice is not wide enough to let the increased flow pass through and the left atrial pressure rises. This reflects on pulmonary system and pulmonary congestion develops. During normal pregnancy, pulmonary capillary blood volume may not increse, unless mitral stenosis is present (45). If active medical therapy fails to control the pulmonary congession, then mitral commissurotomy shoud be considered. The proper time for mitral commissurotomy in pregnancy is when the patient's complaints increase and the clinical state shows deterioration (46).

Clinical deterioration is related with the time following closed mitral commissurotomy. An average 5 % decrease in the functional capacity occurs in a period of every five years (8,11). In general, it is pòsible to relieve calcific mitral stenosis completely, or frequently to produce acute mitral inmompetence in differing severities during mitral commissurotomy. For this reason, these patients are mostly candidates for future mitral valve replacement. Restenosis can also be the cause of functional deterioration. The time and rate of the appearance of restenosis varies in different study groups. This is because of differing in lengths of follow-up time in different series. In the case of subvalvular stenosis due to shortening and thickening of chordaes, results are not as good as expected and symptoms may reappear within a short time. Restenosis occurrs rarely if subvalvular apparatus is normal, or almost normal. We believe, like many other authors, that restenosis is the result of insufficient opening of the commissures during an operation, rather than postoperative episodes of rheumatic activity. Closed transventricular mitral commissurotomy can be performed a second time for restenosis in the case of suitable mitral valve found during the previous operation and also if the laboratory and clinical findings are suitable. Hospital mortality rate in closed mitral commissurotomy varies from 1.5 % to 13 % in different centers (6, 7, 8, 9, 10, 13, 15, 35). In the present series, the hospital mortality rate is 1.2 %. Of course, selection of the patients influenced the mortality rate. The best results can be obtained in patients below forty years of age, with controlled rheumatic activity, noncalcified pliable mitral leaflets, suitable subvalvular apparatus, without pulmonary hypertension and sinus rhythm. For the patients with atrial fibrillation, hospital mortality can be as high as 13 % (9, 35). In our series, 23 hospital deaths out of 26 had atrial fibrillation. It has been reported, that the mortality rate is tree times higher in patients who had atrial fibrillation, cardiac enlargement, heavily calcified mitral valve and were older than fifty years of age (9). But, it has been reported that in selected patients, hospital mortality is very low or can even be absent (6, 7, 8, 47).

Conclusion

The field of application for closed mitral commissurotomy became scant especially due to great progress made in open heart surgery. Thereby, closed transventricular mitral commissurotomy can be applied under the following conditions :

1 Cases which do not have intermittent rheumatic activity

or prolonged nonactive period prior to operation;

2 — When a clear first heart sound, diastolic rumble and opening snap in the auscultation are present;

3 — In the absence of pulmonary hypertension;

4 — In cases of sinus rhythm or atrial fibrillation but without complicating factors;

5 — Minimal or no calcification on the mitral valve;

6 — Good mobility of leaflets;

7 — No thrombus in the left atrium;

8 — It is preferable because it does not produce any harmful effect to the mother and foetus during pregnancy;

9 — Applicable particularly for the patients under forty years of age, and ensures long-time palliation or even cures with low morbidity and mortality rate.

SUMMARY

2212 cases of closed transventricular mitral commissurotomy performed between dates of January 1, 1970 and December 29, 1979 have been analyzed.

Especially in recent years, despite great progress in extracorporeal circulation techniques, giving advantages and safety, closed mitral commissurotomy is still an applicable method for pure mitral stenosis in suitable cases.

Development of postoperative complications could be minimized or avoidid completely by the meticulous application of closed mitral commissurotomy technique by skilled hands, in well slected patients.

An average of 5 years palliation and even clinical improvements with a duration of 10 to 15 years or more can be achieved by the closed mitral commissurotomy technique which has been applied for many years.

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