

# Pregnancy Outcome after Transventricular Mitral Commissurotomy

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## Summary:

The course and outcome of pregnancy after transventricular mitral commissurotomy was studied. Group I included 33 patients who had undergone TVMC before they became pregnant and all of them belonged to NYHA class III & IV before TVMC and improved to NYHA class I & II afterwards. The mean interval between TVMC and present pregnancy was 4 years and 18.2% developed critical mitral restenosis and 30% moderate restenosis. Deterioration in functional status during pregnancy occurred in 71%, mild deterioration in 48%, and 15% went into CCF.

The overall foetal survival improved. Group II included 19 patients who underwent TVMC during 2<sup>nd</sup> trimester pregnancy and Group III comprised of patients in whom TVMC was done along with LSCS at the same sitting.

All patients in group II & III had deteriorated to NYHA class III & IV with the occurrence of CCF in 48.5% and pulmonary redema in 39%, however, 84% improved to class I & II after TVMC. The overall foetal survival following TVMC was 86.6%.

## Introduction

Heart disease is one of the important medical problems complicating pregnancy. Organic heart disease complicates 1-2% of all pregnancies, rheumatic heart disease being responsible for 90-95%. It contributes to a significant proportion of indirect causes of maternal mortality.

The most dangerous complication of mitral stenosis due to rheumatic heart disease is pulmonary oedema. Mitral commissurotomy has been proved to be valuable in the treatment of mitral stenosis in pregnancy as it prevents pulmonary oedema, thereby significantly reducing morbidity and mortality.

As there are very few such studies done so far, this study was undertaken to evaluate the influence of mitral commissurotomy on the course of pregnancy, delivery and foetal outcome.

## Material & Methods

This study was carried out in the Department of Obstetrics & Gynaecology and Cardio Thoracic Surgery Department, Jawahar Lal Nehru Institute of Postgraduate Medical Education & Research, during a 2 year period between August 1995 and July 1997. In addition, retrospective analysis of cases who had undergone transventricular mitral commissurotomy in pregnant or nonpregnant state in the last 5 years (1990-1995) was also done.

Patients included in the study were divided into three groups:-

Group I: Patients who had undergone TVMC before pregnancy

Group II: Women who had undergone TVMC during pregnancy

Group III: Those who had TVMC at term with caesarean section

Detailed history included the duration and status of cardiac disease, interval between TVMC and present pregnancy, past history of cardiac failure etc. Thorough general physical and systemic examination were done during each visit to find out the functional status of heart and foetal growth.

The operative approach was done by a standard left anterolateral thoracotomy through the fifth intercostal space. The valve orifice diameter was measured by a finger inserted through the left atrium. Splitting of the valve was carried out with Lubb's dilator. Intraoperative and post operative cardiac monitoring was done. Post operative tocolytics were used only when indicated. APGAR score and birth wt. were noted immediately after delivery. The patients were discharged from the hospital on 7<sup>th</sup> to 10<sup>th</sup> day and were assessed in the post natal and cardiac clinics for evaluation of cardiac status. The results were analysed. All patients were subjected to routine laboratory investigations and cardiac status was evaluated by ECG & 2-D echo-color doppler imaging. Chest x-ray with abdominal shield was taken only in specific instances where there were respiratory problems.

**Results**

Total number of patients was 61; 33 in Group I, 19 in Group II and 9 in Group III. Average age of the patients was 25 years. As regards the cardiac status before TVMC (Table I), 79% of women were in NYHA class III & 21% in Class IV in group I, while in group II & III, the number of women who were in class IV NYHA was 43% & 44% respectively. Critical mitral stenosis was observed in all the patients of Group III (100%), 57.8% of Group II & 18.2% of Group I patients.

Table I : Cardiac Status before TVMC

NYHA	Group I (n=33)		Group II (n=19)		Group III (n=9)	
	No.	%	No.	%	No.	%
III	26	79	11	57	5	55.6
IV	7	21	8	43	4	44.4

Table II : Mitral Valve Orifice Area

MVO area	Group I (n=33)		Group II (n=19)		Group III (n=9)	
	No.	%	No.	%	No.	%
< 1 cm	6	18.2	11	57.8	9	100
1.2 cm	10	30.3	4	21.05	-	-
2 cm	4	12.1	-	-	-	-
Not known	13	39.4	4	21.05	-	-

In Group I, there was deterioration of the functional status during pregnancy in 72.7% patients as compared to that before pregnancy (Table III). Congestive cardiac failure occurred in 10 patients (30.3%) before

TVMC during pregnancy. Five patients (15.2%) developed CCF after TVMC was done during pregnancy: 3 during pregnancy and one each during labour and puerperium. The average interval between commissurotomy and present pregnancy was 4 years and 2 months.

In Group II, 7 patients (36.8%) had CCF during pregnancy, of whom 2 developed CCF even after undergoing TVMC. Eight out of 9 (89%) patients developed CCF during pregnancy in Group III.

As regards pregnancy outcome in Group I before and after TVMC (Table IV), 33 women had a total of 71 pregnancies of which 18 occurred before TVMC & 53 after it. All preterm babies survived & 3 neonatal deaths were not related to maternal cardiac disease and were due to meningitis, septicaemia and intrapartum foetal asphyxia. Four out of 5 abortions after TVMC were in the same patient and the cause was cervical incompetence.

Table III : Cardiac Status Before and during Pregnancy (Group I)

Prepregnancy NYHA	Worst NYHA class during pregnancy	No.	%
I	II	16	48.4
I	III	7	21.2
I	IV	2	6.1
II	III	7	21.2
II	IV	1	3
Total		33	100

Pregnancy outcome in group II before and after TVMC is shown in Table IV. There were no still births and Neonatal deaths after TVMC. Neonatal outcome is shown in Table V.

Table IV : Pregnancy Outcome before and after TVMC (Group I)

Outcome	Before TVMC		After TVMC	
	No.	%	No.	%
Live Births	12	66.7	48	90.5
Term	12	66.7	41	77.5
Preterm	-	-	7	13.2
Still Births	3	16.7	-	-
Term	1	5.6	-	-
Preterm	2	11.1	-	-
Neonatal deaths	0	0	3	5.7
Spontaneous abortions	3	16.7	5	9.4
Total Pregnancies	18	(25.4)	53	(74.6)

\* All three neonatal deaths were not related to maternal cardiac disease but were due to meningitis, septicaemia & intrapartum foetal asphyxia.

\*\* 4 of 5 abortions that had occurred after TVMC were in the same patient and were due to cervical incompetence.

Table V : Pregnancy Outcome before and after TVMC (Group II)

Outcome	Before TVMC		After TVMC	
	No.	%	No.	%
Live Births	25	80.6	17	81
Term	24	77.4	14	71.4
Preterm	1	3.2	2	9.5
Still Births	1	3.2	-	-
Term	-	-	-	-
Preterm	1	3.2	-	-
Neonatal deaths	2	6.5	-	-
Abortions	3	9.6	4	19
Spontaneous	3	9.6	3*	14.2
Induced	-	-	1	4.8
Total Pregnancies	31		21 =52	
	(59.6)		(40.4)	

All 9 neonates in Group III had moderate to severe birth asphyxia due to morphine and general anaesthetics as the baby was extracted out, once the valvotomy was accomplished. All 3 neonatal deaths in Group I were unrelated to maternal cardiac disease.

There were 2 maternal deaths, the causes were embolic stroke with septicaemia and low output failure with suspected pulmonary embolism.

## Discussion

Rheumatic heart disease is declining in the developed countries, but is still a common problem in developing countries like ours. There are conflicting views regarding the safety of mitral valvotomy during pregnancy and its influence over the prognosis of future pregnancies.

Pregnancy in patients with mitral stenosis, further taxes an already overloaded circulatory system leading to pulmonary oedema and congestive cardiac failure. Szekely & Snaith (1963) have reported a 60% and Schenker & Polishuk (1968) a 29.5% incidence of congestive cardiac failure prior to valvotomy. This is comparable to the recent study (30%), however, only 6% developed CCF during pregnancies before valvotomy in spite of the fact that most of our patients belonged to poor socioeconomic status.

The improvement in cardiac status following valvotomy is due to improved cardiac output and reduction in left atrial pressure which arrests the progression of pulmonary arterial hypertension and prevents pulmonary oedema. Boyle et al (1964) and later El Maraghy et al (1983) have reported an improvement in cardiac status to Class I & II in 98% & 92% of cases

respectively. In the present study also, all the patients had improved cardiac status to class I & II from class III & IV after the valvotomy & before the present pregnancy.

Many authors feel that mitral valvotomy is a palliative, rather than a corrective procedure and progression of the cardiac condition at a rate peculiar to each patient continues. Accordingly, deterioration of cardiac status can occur during pregnancy in spite of commissurotomy due to continuing pathologic process in the valve resulting in refusion of the valve. Schenker & Polishuk (1968) reported deterioration of cardiac status in 72.7% following first pregnancy and in 81% after second pregnancy of their patients. Similarly, in the present study we observed deterioration in functional status in 73% of our patients.

Good clinical results following mitral valvotomy do not promise uncomplicated pregnancy and delivery. Schenker & Polishuk (1968) reported that 42% of their patients had CCF during pregnancy after undergoing valvotomy. On the other hand, Szekely & Snaith (1963) have reported a comparatively lower rate of CCF (25%) which is comparable to our results (15%). Deterioration after valvotomy is influenced by many factors, time factor being of utmost importance. The optimal time for pregnancy as stated by Schenker & Polishuk (1968) is 2-3 years after valvotomy when circulatory haemodynamics have settled down. In their study, 56% developed CCF who conceived within a few months as compared to only 25% who became pregnant after 2 years. In our study, only 15% conceived within a year but none of them developed CCF. This may be due to improvement in the technological development in intraoperative and postoperative care over the years.

Pregnancy outcome is determined by the age and postoperative functional status of the patient. The foetal outcome in a well compensated postvalvotomy patient is almost similar to that in a pregnant non cardiac disease patient.

Table VI : Neonatal Outcome

Outcome	Group I n=33	Group II n=10	Group III n=9
Birth asphyxia			
Moderate	1		1
Severe	1		
Resuscitation	3		
Nursery admission > 24 hrs.	6		
Birth weight			
AGA	2	1	1
SGA	3	1	
Mortality	3		

Different studies have shown encouraging successful pregnancy outcomes ranging from 87% to

100% and are comparable to our results (Table-VI)

Table VII : Pregnancy Outcome Following Closed Mitral Valvotomy During Pregnancy

	Overall Fetal Survival	Spontaneous Abortion	Preterm Labour	Fetal Mortality
D. J. Jett et al (1960)	92%	8%	-	8%
Boyle et al (1964)	83%	-	15%	17%
Schenker & Polishuk (1968)	84.4%	10%	3.3%	16.6%
El-Maraghy et al (1983)	98%	2.4%	Nil	2%
Goon et al (1987)	100%	Nil	8%	Nil
Vosloo & Reichart (1987)	88%	5%	7%	12%
Abid et al (1990)	100%	Nil	-	Nil
Present study (1979)	86.6%	10%	10%	10.5%

Knapp and Adriti et al (1968) and Abid et al (1990), have shown maternal mortality between 0-2%. However, there were 2 maternal deaths (7%) in the present study due to embolic stroke and atrial fibrillation in the immediate postoperative period. Both these patients had critical mitral stenosis with acute pulmonary oedema and severe pulmonary hypertension respectively.

### Conclusion

Most of the patients with TVMC done in the nonpregnant state tolerate the gestational haemodynamic burden well and have an uneventful pregnancy and delivery. However mitral valvotomy is a palliative procedure with benefits of limited duration and hence pregnancy should not be unduly delayed following valvotomy.

The overall foetal survival is good and perinatal mortality is reduced in postvalvotomy pregnancies. Closed mitral valvotomy during pregnancy is safe and is best done in second trimester, but can be done at any stage of pregnancy with careful cardiac monitoring and foetal surveillance.

### References:

1. Abid A, Abid F, Zargouini N. *Int J Cardiol*; 26: 319-321, 1990.
2. Boyle DM, O'Donnel MJ and Pantridge JF. *Brit Heart J*; 26: 337-342, 1964.
3. Dogliotti AM, Dellepiane G, Actis Dato A., Gentilli R., Siliquiri PN. *J Thoracic and Cardiovasc Surg*; 39: 663-671., 1960.
4. El-Maraghy M, Senna IA and El-Teheewy Y Bassiouni M, Ayoub A, ElSayed H. Mitral valvotomy in pregnancy. *Am J Obst Gyn* 154: 708-710, 1983.
5. Goon MS, Raman S and Sinnathuray LA. *Aust NZ J Obst Gyn*; 27: 173-177, 1987.
6. Knapp RC and Adriti LJ *Clin Obst Gyn*; 11: 978-991 1968.
7. Schenker JG and Polishuk WZ. *Obst Gyn*; 32: 214-220, 1968.
8. Schenker JG and Polishuk WZ. *Surg Gyn and Obstet* Sept: 75: 593, 1968.
9. Szekely P and Snaith C. *J Obst Gyn Brit Comm*; 70: 69, 1963.
10. Vosloo MB and Reichart B. *J Thorac Cardiovasc Surg*; 93: 675-679, 1987.