

# Outcome of Pregnancy After Cardiac Surgery - A Comparative Analysis

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**OBJECTIVE** - To assess the effectiveness of cardiac surgery in improving prognosis of antenatal mothers with cardiac diseases. **METHODS** - Pregnant women with cardiac disease attending antenatal clinic were studied over one year to assess their profiles and compare the outcome of those who had undergone cardiac intervention with those who had not. **RESULTS** - The women were mostly between 21 and 30 years old and primigravidas. The commonest heart disease was rheumatic mitral valve lesion and the interventions were mostly on these valves. There were statistically significant differences in the period of gestation attained, mode of delivery and post-delivery hospital stay but differences in weight of the babies and Apgar scores were not significant. Mortality was more in the non-operated group. Ours being a referral hospital the incidence of antenatal cardiac women is more than average. **CONCLUSION** - The prognosis improved after surgery.

**Key words** : cardiac surgery, pregnancy with cardiac disease

## Introduction

Heart disease is still one of the leading causes of maternal death in our country. This is due to a lack of awareness, education, and low socio-economic condition of most of the women, which leads to a delay in seeking medical attention. With the advances made in cardiac surgery, pregnancy associated with cardiac disease is better tolerated and has a better prognosis for both the mother and the child. The aim of this study was to study the incidence of cardiac disease in women attending the antenatal clinic of our hospital, which is a referral center for cardiac patients, along with their age, parity, education, economic profile and the outcome of the pregnancy with special reference to those women who had undergone cardiac surgery.

## Material and Methods

A comparative analysis was carried out among the antenatal women with cardiac complaints who attended our Obstetrics department between the period of September 2001 and August 2002.

The age of the women, parity, education, socio-economic status, past history of any cardiac surgery and presence of any other associated complicating factors were noted.

Thereafter, the outcome of the pregnancy with regards to period of gestation at delivery, mode of delivery, duration of post-delivery stay, weight of the baby, Apgar score at birth and any associated morbidity of the mother were elicited. Any differences in outcome between mothers who had undergone cardiac surgery and those who had not were studied.

## Results

The total number of deliveries in our institution during this time period of one year was 1780 and 67 of them had cardiac disease (3.764%). Of these 67 women 23(34.32%), had undergone some form of cardiac intervention, 19 before and four during the current pregnancy. Fifty-eight (86.5%) were booked antenatally.

The age of the women varied from 17 to 42 years with most belonging to the age group of 21 to 30 years (62.6%) (Table I)

Most of the women were primigravidas (70.14%), while of the multigravid women eight had history of abortions and two had no living child (Table I).

A majority of the women and their spouses had received at least secondary education (59.7 males and 64.1 females) and a majority came from average income families (73.1%).

There were certain associated complications with the pregnancy in 10 women (Table III).

Of the types of cardiac diseases, rheumatic heart disease with mitral stenosis and mitral regurgitation were most common (74%), followed by congenital

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Paper received on 01/08/2003; accepted on 12/10/04

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Table I. Age Distribution

Age (years)	Operated	Non-Operated	Total
< 20	8	7	15
21-30	11	31	42
31-40	3	6	9
>40	1	0	1
	23	44	67

Table II. Parity Distribution

Gravidity	Operated	Non-Operated	Total
1	14	33	47
2	6	5	11
>2	3	6	9
	23	44	67

Table III. Associated Complications

Fibroid	1
Rh negative blood group	2
Breech presentation	2
Previous cesarean delivery	2
Postdatism	1
Loss of previous child	2

Table IV. Cardiac Lesions

Lesions	Operated	Non operated	Total
Mitral stenosis	12	16	28
Mitral regurgitation	7	15	22
Aortic stenosis	1	3	4
Aortic regurgitation	1	13	14
Pulmonary arterial hypertension	3	14	17
Paroxysmal supraventricular tachycardia	3	2	5
Right bundle branch block	1	1	2
Tricuspid regurgitation	0	2	2
Congenital cyanotic	1	2	3
Congenital acyanotic	3	3	6
Others (aortoarterities, interrupted IVC, coarctation, cardiomyopathy, infundibular stenosis, congenital heart block dextrocardia, bicuspid aortic valve)	3		

Many Patients had a Combination of Conditions

Table V. Functional Grades

Functional Grade	Operated Group	Non-operated Group
NYHA I	9 (13.4%)	18 (26.8%)
NYHA II	6 (8.9%)	9 (13.4%)
NYHA III	5 (7.4%)	10 (14.9%)
NYHA IV	3 (4.4%)	7 (10.4%)
Total	23	4

Table VI. Mode of Delivery

Mode of Delivery	Operated 23	Non-operated 44
Normal	1 (4.3%)	6 (13.3%) (1 had intrauterine death)
Forceps	2 (8.69%)	8 (18%)
Breech	0	2 (5%)
LSCS	19 (82.6%)	25 (57%)
Postmortem cesaream	1 (4.3%)	3 (13%)

Table VII. Perinatal Outcome

Perinatal outcome	Operated	Non-Operated
Number	23	44
Mean birth weight	2720 gm	2530 gm
Percent with low birth weight	23.80%(5)	45%(18)
Mean Apgar score	8.81	8.45
Perinatal deaths (All Stillbirths)	1 (4.76%) <sup>a</sup>	4 (10%) <sup>b</sup>

<sup>a</sup> Postmortm cesarean section<sup>b</sup> 1 had intrauterine death and 3 had postmortem cesarean section

Table VIII. Maternal Mortality

	Cardiac disease	Period of gestation	History of Operation	Hospital stay	Cause of death
MD Unbooked	Aortic stenosis and regurgitation	26 (weeks)	NO	19 days	Pulmonary edema and CCF
KG Unbooked	Mitral stenosis and regugitation	32	Closed mitral commissurotomy	1 days	Pulmonary edema and CCF
RM Unbooked	Severe mital stenosis	29	NO	1 day	Pulmonary edema and CCF
SM Unbooked	Cardio myopathy	33	NO	3 days	Pulmonary edema and CCF

lesions (20.8%) and other miscellaneous lesions (19.4%) (Table IV). Many of the women had a combination of lesions. Fifty-eight (86.5%) women had their cardiac disease detected prior to this pregnancy. Of these the maximum number belonged to NYHA I grade while minimum number belonged to NYHA IV grade (Table V). The majority in every grade, were not operated.

The operations included closed mitral commissurotomy, balloon mitral valvuloplasty, atrial septal defect correction, repair of coarctation of aorta and Fallots tetralogy, pacing and ablation of anomalous tracts, and valve replacement.

Four women were admitted in 2<sup>nd</sup> trimester, 56 in 3<sup>rd</sup> trimester and four during labor.

The mean period of gestation attained at delivery in the operated group was  $37.9 \pm 1.96$  weeks while in the nonoperated group it was only  $36.3 \pm 4.59$  weeks and this difference was found to be just significant with  $p=0.05$  (unpaired student t test).

The mode of delivery in the operated group was lower segment cesarean section (LSCS) in 82% (19/23), while in the nonoperated group it was only 57% (25/44) (Table VI). This difference was statistically significant with a double sided p value of 0.021 (Fischer test). Incidentally at our institution the cesarean section rate is as high as 65%.

The operated group was on an average discharged by 11.1 days after delivery with those undergoing LSCS after 12.1 days and those having vaginal delivery after five days. The non-operated group was discharged on an average by 7.6 days after delivery, with those having LSCS after 7.76 days and those having vaginal delivery after 7.4 days. The difference in the average post-delivery stay of the two groups (operated and non operated) was also found to be statistically significant ( $p=0.007$ ; student t test).

The mean birth weight of the babies of operated mothers was  $2.72 \pm 0.33$  kg while that of the non-operated mothers was  $2.53 \pm 0.44$  kg. This was not statistically significant ( $p=0.086$ ) (Table V). The Apgar at birth in both the groups was similar with means of 8.81 (operated) and 8.45 (non-operated) (Table VII).

The complications that developed after admission included congestive cardiac failure in nine (14%) and cerebrovascular accident in one.

There were a total of four deaths with one in the operated group (1/23 or 4.34%) and three in the non-

operated group (3/44 or 6.81%) (Table VIII). This difference was not statistically significant. The number of stillbirths was 5 (7.46%) of which four were due to death of the mother and one was an intrauterine death.

## Discussion

Normal gestation is associated with adaptive cardiovascular changes<sup>1</sup>. Today, there is a heterogeneous population of young women with cardiovascular diseases (many of which are rare conditions) contemplating pregnancy<sup>2</sup>. Any specific congenital or acquired cardiovascular anomaly and its physiology must be understood. The nature of prior surgical procedures and the residua and sequelae following therapy are essential considerations in the management of a pregnant women with cardiovascular disease<sup>2</sup>. The availability of echocardiography provides information about etiology and anatomic abnormality of the heart and great vessels, gives accurate and non-invasive assessment of severity and serves as a means of monitoring progression<sup>3</sup>.

Cardiac disease during pregnancy has an overall incidence of 1%<sup>4</sup> but in our institute, which is a tertiary referral center, the incidence is found to be almost 4%. Most of them (86%) were under the care of cardiologist prior to conception and hence adequate antenatal care could be administered from the beginning with 90% requiring admission in the 3<sup>rd</sup> trimester mainly due to the associated cardiac condition, distance of residence from the hospital and lack of adequate modes of transport. Although rheumatic heart disease (RHD) remains the commonest cause of heart disease during pregnancy<sup>5,6</sup> our 60% incidence of RHD is less than 88% noted in northern India<sup>7</sup> and 73% in southern India<sup>8</sup>.

It is seen that cardiac interventional surgery enabled the women to attain a longer period of gestation (mean 38 weeks) and achieve higher newborn birth weight (mean 2.72kg).

Although vaginal delivery is the method of choice in most women, as seen worldwide, and cesarean section is seldom done for cardiac indications<sup>2</sup>, it was noted here that delivery by LSCS was the preferred mode especially in the operated group (19/23 i.e. 82%), and also in the non-operated group (25/44 or 57%). This was statistically significant with a double-sided p value of 0.0211 (Fischer test). Six of these women had associated obstetric indications like breech presentation, previous cesarean delivery, post-datism and previous bad obstetric performance. In the other cases, elective LSCS was preferred due to the presence of expert

anesthetic care, adequate postoperative set up and the ability to monitor delivery in a controlled manner. Of note is the fact, that there was no maternal or fetal mortality after abdominal delivery.

The difference in the duration of hospital stay following LSCS in the operated (mean 12.1 days) and nonoperated groups (mean 8.08 days) was statistically significant ( $p=0.0001$ ; student t test), and this may be explained by the fact that women with more severe diseases were the ones requiring cardiac surgery and so they were observed for a longer period following delivery. In contrast the difference in the duration of hospital stay following vaginal delivery in the operated (mean 5 days) and nonoperated (mean 7.44 days) groups was not statistically significant.

All the five stillbirths occurred in unbooked women one of whom came with intrauterine fetal death. Of the four maternal deaths one occurred in those who had undergone cardiac surgery (1/23; 4.34%). Suri et al<sup>9</sup> reported 2.9% maternal mortality following only valve replacement surgery. This further goes to emphasize the need for an interdisciplinary approach between the cardiologist, obstetrician and general practitioner for the adequate diagnosis of the disease, proper treatment including operative intervention where required and regular antenatal care in order to lower the maternal mortality and improve the prognosis of mothers with cardiac disease<sup>10</sup>.

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