Abstract

Objective: To evaluate the impact of cardiovascular disease on outcome of pregnancy. Setting: Shaheed Shahrawardi Hospital in Obstetrics and Gynaecology Department. Design: Prospective study (May, 1998 to May, 1999). Total number of patients was forty five, forty cases were primigravida, three were second gravida & two were forth gravida. Mean age of them was 21 yrs with standard deviation 3. Among them forty-two patients (93%) had mitral stenosis (acquired), two (4.4%) atrial septal defects (congenital) and one (2.2%) had heart disease secondary to hyperthyroidism.
• 91% of them were symptomatic.
• 9% asymptomatic.
• 88% of them are surgically corrected followed by medical treatment.
• 12% medically managed.
Outcome measured in terms of morbidity and mortalities of mother and baby before, during and six weeks following delivery.

Results: Out of forty five cases with different types of cardiac disease with varying degrees of severity there was no maternal mortality except few morbidities and there was two (4.40%) intrauterine growth retardation and one (2.2%) perinatal death, remaining babies were healthy in follow-up visit and there was no congenital anomaly. Conclusion: Close antenatal follow up and monitoring by a team and planned hospital delivery can reduce the mortality and morbidity with these high risk.

Introduction

Heart disease in pregnancy is a cause for concern for obstetrician (De swiet, 1984 & 1976). In the developed countries, circulatory disorders in pregnancy have become more important as other causes of morbidity & mortality have declined due to economic prosperity, better nutrition, improved medical care and social conditions. In the third world countries, conditions have not improved to the same extent. While the direct causes of maternal mortality are still more predominant in the developing countries, heart disease is the major indirect cause of maternal mortality. Because of its adverse effects on both the mother and the fetus. Mother may suffer from pulmonary edema; C.C.F, pulmonary embolism, subacute bacterial endo-cardities, peripartum cardiomyopathy, anyone of these complications may cause death of the mother. Baby may also suffer from prematurity, IUGR, and even intrauterine death may occur due to decompensated maternal cardiac status. Fortunately, the incidence of this serious condition is low, about 1% in the range of 0.2-4.1%. Rheumatic heart diseases has been the main cause of heart lesions in pregnancy. The most dominant of the rheumatic heart lesions has been mitral stenosis (up to 80%) followed by aortic stenosis (10 %), mitral regurgitation (6.6%) and aortic regurgitation (2.5%). The improvements in cardiovascular surgery has improved the prognosis of congenital lesions & many women, even with several defects, are now reaching the childbearing age. The other conditions like coronary heart dis-eases and arrhythmias are only rarely seen in pregnancy. The ischemic heart diseases in pregnancy is approximately one per 10,000 deliveries (0.01 %) and acute myocardial infarction is 7.5 per 10,000 deliveries.

Pregnant women with cardiac disease fall into two categories:-
1. Diagnosed heart disease and under treatment before becoming pregnant.
2. Those with previously undiagnosed heart disease.

In both cases, natural history of the underlying cardiovascular disease and the circulatory changes peculiar to pregnancy are important.
Original Article

considerations in the management. The quality of management and the course of the disease in preceding years have important impact on potential risks and actual complications occurring during pregnancy. Chronic rheumatic and congenital heart diseases require continuous medical supervision for life. The pregnancy should be considered as a transient physiological state with hemodynamic implications in the course of chronic illness. It should be managed in such a manner that the actual disease should not worsen at the end of this transient state.

Alterations seen during pregnancy are marked by raised blood volume, rise is progressive and inconsistent, cardiac output increase by 30% to 50% and achieved by increase in stroke volume and heart rate, there is decrease in peripheral resistance, fibrinogen level increase by 50%, platelets adhesiveness increase and fibrinolytic activity depressed.

Anatomic and physiologic changes that occur in normal pregnancy closely simulate those of organic heart. After proper evaluation of the patient functional status should be assessed at first visit, because prognosis depends on the cardiac reserve rather than types of heart disease.

In case of severe type of heart disease patient should be hospitalised at diagnosis and the option for therapeutic abortion could be considered, provided duration of pregnancy less than 12 weeks. Corrective surgery is usually done in the nonpregnant state but if medical treatment fails, recurrent pulmonary edema and hemoptysis develops, patient refuses termination, mitral valvotomy is the option. Open heart surgery is not contraindicated in pregnancy if it is an emergency. Patients having prosthetic valves and cases of cardiomyopathy of pregnancy need anticoagulants.

Relief of pain has its advantage in cardiac patients because it decreases the hemodynamic burden, morphine and its derivatives have been traditionally advocated in cardiac patients. In the majority of cases the anaesthesia of choice is epidural blockade administered by experienced person. Few studies also showed carefully controlled general anaesthesia causes less haemodynamic fluctuation than spinal anaesthesia (Williams et al, 1975).

Adaption of small family should be seriously considered for cardiac patient because many clinician still believe that every pregnancy has so many nails in the coffin of a women with heart disease (Webster, 1913, Chesly 1980). Combined oral contraceptives carry the risk of thromboembolism, hypertension, hyperlipidemia and hypercoagulability, although the risk is less with newer generation low dose pills. Permanent sterilisation is the method of choice with the completion of family, IUCD do not have any adverse effect on cardiovascular system, but carry the risk of infection.

Methodology

This was a prospective study. Forty five patient with different types of cardiac diseases were evaluated. Mean age of them was 21 years with standard deviation 3. Forty patients were primigravida, three patients are 2nd gravida, two patients are 4th gravida. Out of them forty two patients (93%) had mitral stenosis (acquired), two (4.4%) atrial septal defects (congenital) and one (2.2%) had heart disease secondary to hyperthyroidism. Forty patients (88%) were surgically treated, 38 patients had closed mitral valvotomy for mitral stenosis and two patients had correction of atrial septal defect, before pregnancy; five patients (12%) showed clinical symptoms first time during pregnancy. Surgically corrected patients (40) are under regular antenatal care from very early weeks of pregnancy with interval of two to four weeks and as per needs with cardiac consultation in each visit. Undiagnosed cases presented with symptoms during mid trimester, subsequently they visited as per advice. According to the functioning classification used by the New York Association of Heart (NYAH), our patients were of following categories.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
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<tbody>
<tr>
<td>65%</td>
<td>of cases are of GII heart disease</td>
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<tr>
<td>26%</td>
<td>of cases are of GIII and IV.</td>
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<tr>
<td>9%</td>
<td>of cases are of GI</td>
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All relevant investigations were done which includes:
- Blood T.C, D.C, E.S.R, HB%.
- Urine R/E, C/S.
- Blood sugar random.
- ASO Titre-in indicated cases.
- VDRL.
- Blood group and Rh factor.
- ECG.
- USG of abdomen for pregnancy:
  - X-ray chest P/A view.
  - Echo cardogram.
- T3, T4, TSH, antithyroid antibodies-in indicated case.

**Hospitalization**
Patients with Gl disease admitted at 38 weeks, GII at 34 weeks, GIII & GIV at diagnosis.

**Delivery**
- Planned hospital delivery.
- 93.4% patients starts natural labour at term.
- 6.6% patients need elective caesarean section at term (under epidural block) for cephalopelvic disproportion.
- 71% (out of all) patients delivered vaginally under closed supervision.
- 22.4% need emergency caesarean section due to failure to progress of labour (under G/A)

**Management during vaginal delivery**
- Psychotherapy.
- Appropriate analgesia in first stage of labour (I/M inj pethidine).
- Augmentation of labour (with IN oxytocin and ARM). Fluid restriction to avoid overloading of systemic circulation.
- Oxygen in indicated cases (followed up with pulse oxymetry).
- Episiotomy invariably.
- Conventional management of third stage avoiding I/V ergometrine injection if not essential.

**Post-natal management**
- Limited activity but early ambulation to avoid thromboembolic risk.
- Oxytocin infusion following LUCS for 12hrs or more accordingly.
- Continuation of pre-pregnant medication.
- Exclusive breast feeding if there is no contraindication.

**Discharge criteria**
- Convalescence from pregnancy.
- Return of cardiac status to pre-pregnant level.
- Total hospital stay of GI patients-4weeks (before and following delivery).
- GII patients 6 weeks,
- GIII & GIV patients 10 weeks.

**Advice during discharge**
- Rest.
- Continuation of drugs used before pregnancy.
- Oral iron and calcium supplementation.
- Exclusive breast feeding if not contraindicated.
- Barrier contraceptive (where applicable) or sterilisation.

**Follow up visit**
- First visit at 6th weeks following delivery.
- Any emergency immediate consultation.
- Corrective surgery in indicated cases.

**Result**
Those cases diagnosed before pregnancy and treated medically or surgically were booked cases, under regular care done jointly by obstetrician, and cardiologist during antenatal period, and at labour help from anaesthesiologist and neonatal care by neonatologist was taken as per need. Out of 45 cases 31 patients (71%) delivered vaginally and 14 patients (29%) delivered abdominally under general anaesthesia / epidural blocked. Forty patients (88%) discharged, from hospital two weeks following delivery and five (2%) patients were discharged after three weeks following delivery.
Progression of disease, which varies from mild to severe form and asymptomatic patient to symptomatic form and only 9% of patients remained static. Following delivery one patient developed pulmonary oedema which improved with treatment, two patients had post partum haemorrhage needed IN oxytocin infusion and also needed I/M ergometrine and fresh blood transfusion slowly. One patient had cardiac arrhythmia and emergency digitalization was needed. All patients were free from other types of pregnancy induced morbidity except one who suffered from urinary tract infection. Two newborn were of intrauterine growth retardation due to decompensated cardiac status of mother. One baby died in utero at term due to high fever of mother for urinary tract infection. There was no congenital anomaly of baby.

There was no maternal mortality. Although the prognosis is good in patients with rheumatic heart disease in pregnancy in our study group, many clinician still believe that every pregnancy was so many nails in coffin of a women with heart disease (Webster,1913,Chesly1980).

**Discussion**

The cardiovascular dynamics of all women change profoundly in pregnancy and are tolerated remarkably well by women without heart disease and those with minimal or no symptoms. However, women with an altered cardiovascular system have limitations to adapt to these stresses of pregnancy, labour and peripartum placing both the mother and fetus at risk. Sporadic fatalities will be seen in all forms of heart disease in pregnancy, mortality is most likely in those conditions were pulmonary vascular blood flow can not be raised (Jewett, 1979),e.g Eisenmenger's syndrome where mortality varies from 30%-50%. In case of primary pulmonary hypertension maternal mortality is 50%(Morgan Jones & Howitt, 1965, Sinnenbeg, 1980). One fatality has also been recorded in corpulmonale (Rush et al, 1979). In contrast, in Fallot's tetralogy where the pulmonary vascular resistance is normal, the report ed mortality varies between 4%-20% (Moran Jones and Howitt, Jacoby,1964). The maternal mortality is said to be high in Marien's syndrome (Hall 1979) and classic forms of Ehers Danlos syndrome (Pearl & Spicer, 1981) and dissecting aneurysm of coronary arteries Uewett, 1978). Recently pyeritz (1981) suggested that dilatation of the aorta to more than 40mm (as determined Echographically) should be the limit at which pregnancy is contraindicated. The mean survival time in the pregnant group studied by Chesley (1980) was no less than in the nonpregnant group. It means that pregnancy does not affect long term survival of a woman with rheumatic heart disease providing that she survive pregnancy itself.

The fetal outcome in rheumatic group is usually good but in cyanotic congenital heart disease, the babies are usually growth retarded (Baston.1974) and the fetal loss including abortion may be as high as 40% (Gleicher et al, 1979), in the tetralogy of Fallot, the fetal loss rate may be as high as 57% (Copeland et al 1963). In contrast, the feta results in 40 pregnancies following 27 cases of total correction of Fallot's Tetralogy were excellent (Singh et al, 1982). Uncorrected coarctation of aorta has also been associated with a 13% fetal loss rate (Burwell&Metcalfe, 1958) and intrauterine growth retardation (Benney et al, 1980) presumably because of placental insufficiency.

**Conclusion**

Though patients with heart disease is high risk for both mother & fetus, the present study showed that team management by cardiologist and obstetrician, providing appropriate care during pregnancy and labour in a specialised centre can bring excellent outcome. Complications were more in women of age above 30yrs and those who did not avail the appropriate care during prepregnant state and also during pregnancy. So, emphasis must be given to motivate the patient to come for regular antenatal care and to get hospital admission and care according to the need/advice.
Reference