OPTIMIZING CLINICAL APPROACH TO THE FORM OF DELIVERY DURING PREGNANCY IN PATIENTS WITH CARDIAC DISEASE; A REVIEW OF THE EFFECTS OF PRACTICE CHANGE BY CONCURRING TO INTERNATIONAL GUIDELINES

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ABSTRACT

Objective: To assess if adherence to international guidelines for pregnant cardiac patients' mode of delivery is achievable with available local resources.

Study Design: Prospective quasi experimental descriptive study.

Place and Duration of Study: All Pregnant patients with cardiac disease reporting to Armed Forces Institute of Cardiac Disease/National Institute of Heart Disease (AFIC/NIHD) who were admitted for and were delivered from Oct 2009 to Sep 2011 were included in the study.

Methodology: International guidelines and recommendations for mode of delivery for cardiac patients with pregnancy were followed for patients. Caesarean sections were reserved only for obstetrical reasons and absolute cardiac indications. The patients with first trimester miscarriage were not included. Data was collected on a personal computer Microsoft excel sheet. Frequency was calculated from the data entered. The reduction in caesarean section rate and increase in vaginal delivery rate as per guidelines without an increase in maternal mortality, was the main outcome.

Results: Total of 221 patients were delivered in the 2 year period between October 2009 to September 2011 at AFIC/NIHD. The caesarean section rate the year before 2008-2009 had been 48.6%. After the change in practice by concurring to international guidelines, the caesarean section rate for the 2 year period dropped to 26.7%. The hospital maternal deaths were 5. This was slightly better to the year 2008-2009 which had 3 maternal deaths.

Conclusion: It's possible to adhere to international recommendations and protocols for pregnant cardiac patients and achieve internationally comparable outcome in terms of mode of delivery without increasing current institutional maternal mortality rate with local hospital resources.

Keywords: Cardiac pregnancy, Caesarean section, Vaginal delivery.

INTRODUCTION

Cardiac disease complicates pregnancy in 0.2-4% of cases[1]. While developed nations have to combat congenital heart disease and ischemic heart disease during pregnancy as its leading cause of maternal mortality, rheumatic heart disease dominates in developing countries[1,2]. While the women are not healthy and some are very ill, its advised by leading cardiac societies to offer vaginal mode of delivery to these women[2-6]. This is a problematic issue because nations around the globe have a rising caesarean section rate in the healthy pregnant population due to myriad of reasons[8,9] which is needs a collaborative effort on its own to scale down. There is also a lack of robust randomized trials or evidence based care for these patients which also high lights the need for more studies. The developing nations have an added problem of resource-scarcity. This study was carried out to assess if international guidelines for mode of delivery of cardiac patients established in literature by cardiac and obstetrical societies can be adhered to with locally available resources.

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METHODOLOGY

The caesarean section rate of AFIC/NIHD, Rawalpindi hovered around 48-50% and 2-3 maternal deaths in 110 patients (approximate total deliveries annually). Against this background, a

quasi experimental prospective study was carried out. This involved incorporating international accepted guidelines for mode of delivery of pregnant patients with cardiac disease to our clinical practice keeping in mind our institutional resources.

It was agreed that department policy of caesarean delivery for cardiac patients would be for obstetrical reasons only. Vaginal mode of delivery will be offered to all but the cardiac indications considered absolute for caesarean section[12,13].

- Marfan syndrome with aortic root dilation more than 4cm.
- Aortic aneurysm /Aortic dissection.
- Recent MI (within 4 days and labour).
- Labour before 10 days off warfarin in patient with metallic prosthetic valves.
- Endocarditis requiring emergency cardiac surgery at or near term.
- Severe aortic stenosis.

Data was collected on a personal computer Microsoft excel sheet. Frequency was calculated from the data entered. The collected data included age of the patient, records of obstetrical history, current cardiac status and disease severity, acquired/congenital heart lesions, history of previous cardiac surgeries, any complications from previous surgeries with/without residual cardiac defects, operated patients with cardiac disease requiring no further follow up (patent ductus, atrial defects, ventricular defects), medication being taken, cases with pulmonary hypertension and follow up records of these patient population.

It was decided that this information was to be disseminated to the concerned specialists and nursing staff connected to the care of cardiac patients. Midwives and general duty medical officers were also involved. Patient to physician to nursing staff mandatory ratio was set at 1:1:1. This ratio was possible because of low number of patients a day that needed delivery as was evident from previous records. Pain relief was to be provided by the anesthesiologist.

All Pregnant patients with cardiac disease reporting to AFIC/NIHD who were admitted for and were delivered from October 2009 to September 2011 were included in the study. The total number of patients were 221. A standard was set at 60% of the women delivering to do so vaginally because it was rationalized that it will take time to change old practices and hospital behavior.

RESULTS

The results were a lot better than expected for the time period between October 2009 to September 2011 as is shown in table-I.

The maternal outcome in term of mortality was assessed to a comparable disease spectrum vs a vs vaginal and caesarean delivery as is outlined in table-II.

While the disease and circumstances at the time of a particular patient's delivery aren't accurately similar in this study due to its small sample size but they do provide some level of comparison. They appear to show that vaginally delivered patients had better survival rates than the patients delivered via a caesarean section.

Table-I: Management practices in pregnant patients with cardiac disease 2009-2010.

Time Period	Number of patients	C-sections	Percentage	Standard
Oct 2009 - Sept 2011	221	59	26.7%	40%

DISCUSSION

There is a dire need to understand pregnancy in patients with cardiac disease because of considerable morbidity and mortality associated with it[10-13].

The achievements in cardiology and cardiac surgery have permitted a new cohort of women either born with malformed hearts or with acquired heart disease to reach adulthood and consider pregnancy[10,12-14]. When evaluating pregnant women with cardiac disease, a global assessment is made of the risk of adverse maternal cardiac

events, with fetal and neonatal risks considered separately. This should be supplemented with weighing of lesion-specific risks when these are known. A Canadian consortium developed a global risk index for pregnant women with heart disease[21]. Similarly, European Society of Cardiology and a British working group have also created a classification of risk for women with cardiac conditions undergoing pregnancy. This categorizes the risk during pregnancy using global and lesion specific elements[4,6,7].

Table-II: Maternal mortality vs. survival in pregnant patients with comparable underlying cardiac pathology and disease severity-managed along two dissimilar pathways setting-1.

Caesarean Section		Vaginal Delivery	
Patients	**Outcome**	**Patients**	**Outcome**
Primigravida-breech in labour NYHA III/MR Grade III/dilated LA and LV	Emergency C- section Placed on ventilator Could not weaned off Expired 03 weeks later Baby survived	MR Grade III/LA 65mm/ Pulmonary Artery Pressures 65mmHG NYHA III	Patient admitted for 01 month. Spontaneous labour Vaginal delivery Mother and baby survived
Setting 2			
Severe mitral stenosis (MS) Severe pulmonary hypertension	Elective C- section due to poor Bishop score. Postdates and short pregnancy interval (01year) after her C-section. Could not be weaned off ventilator- expired 01 week later.	- Severe MS, pulmonary artery pressures of 100mmHG. Pulmonary oedema. Presented in early labour. -Primary Pulmonary Hypertension PAP of 120 + CVP MMHG	-Delivered Vaginally. Mother and baby survived. -Delivered Vaginally. Mother and baby survived
Setting 3			
Mild MS Bio-prosthetic valve	Elective c- section for poor bishop score Post dates. Previous C-section Expired 2.5 weeks later at home. Suspected arrhythmia/pulmonary embolism	-18 patients of severe MS delivered vaginally.	- All delivered Vaginally. Mother and baby survived.
		-Severe Mitral valve stenosis (MS)	- Delivered vaginally. Remained stable till discharge. Expired at home 2 weeks – suspected pulmonary embolism/arrhythmia (post partum anticoagulation not taken)
Setting 4			
Mitral valve replacement, DCM. EF 20-25%	- Emergency C-section for prolonged rupture of membranes (PROM) Failed induction Previous C-section Expired within 24 hrs Postpartum arrhythmia.	-Previous 2 C- sections. Dilated Cardiomyopathy (DCM). EF 25% Went to labour at 32 weeks of gestation.	Delivered Vaginally. Mother and baby survived.
Mitral valve replacement (MVR) EF 20-25% NYHA III/IV	- Elective C-section due to maternal instability. Re opened for intra-abdominal bleed. Expired 2.5 weeks later due to VF/VT. Baby survived.	- EF 20-25% in Congestive cardiac failure/Dilated cardiomyopathy DCM (CCF)	Delivered Vaginally. Mother and baby survived.

For any woman at increased risk of adverse maternal cardiac or neonatal complications

during pregnancy, there should be timely multidisciplinary assessment, and a plan should be developed for management, which provides recommendations for various contingencies[5,11,14].

Whilst on one hand, the caesarean section is steadily rising in Pakistan, often at the expense of fetal and maternal health and outcome, it is an over exploited modality when it comes to pregnancy in patients with cardiac disease. This is the situation in other developing countries, also[15-19]. This maybe consequent to apprehensions as well as inadequate knowledge, lack of coordination between the obstetrician and the cardiologists that results in the erroneous practice of a high caesarean section rate for these patients. Nursing staff and medical officers need to be trained and permanently stationed at cardiac centers that specifically deal with obstetrical patients with cardiac diseases.

General principles of management of labour and delivery for women with heart disease of moderate or great complexity include early effective analgesia by regional techniques, and vaginal delivery in almost every case unless obstetric considerations require caesarean delivery. Assisted vaginal delivery is often indicated in order to limit or avoid maternal expulsive efforts. Caesarean section is rarely indicated for cardiac reasons[11-14].

It is common knowledge that vaginal delivery is safer for the mother than a caesarean (C-section). The mother is three times more likely to die following a caesarean than following a normal vaginal delivery due to haemorrhage, infection and thromboembolism as well as attendant anaesthetic risks. The problem becomes more complex when maternal health becomes an issue. It has been argued as to which is the best form of delivery for a cardiac patient[5,6]. The areas of trepidations usually cited by the obstetricians is the degree of pain experienced by the patient and the possibility of hypotension and feto-maternal distress caused by epidural, the prolonged delivery process in vaginal birth as well as prolonged fluid and drug monitoring required during the process and bearing down during second stage of labour. Medicines like anticoagulants require prolonged strict monitoring. Such concerns are most acutely felt for women with NYHA III/IV cardiac disease, where cardiac instability of patient leads to a decision to shorten delivery time or terminate a pregnancy via the shortest route due to maternal circumstance.

The current clinical guidelines still advise caesarean delivery only for obstetrical reasons because increased chances of haemorrhage, the hemodynamic fluctuations during surgery (acute bleeding/fluid administration) and later the odds of sepsis and pulmonary embolism increases the perils of these already very sick women. Hence when the decision is taken to reduce the caesarean section rate by incorporating international guidelines for cardiac disease and pregnancy, feto-maternal outcome is also assessed in the results.

So it was felt that the if our institute adhered to the internationally accepted methods of care for our cardiac patient pregnancies then we can find the optimal coordination between our medical and technical personnel as well as incorporate the limited resources to best use.

Review of our data suggested that for every maternal death following a C-section, there was a maternal survival after a vaginal delivery. So the policy of performing C-section only for obstetric reasons was continued.The results were almost immediate. The first year 2009-2010 saw a fall in caesarean section from 48 to 30.9%. The C- section rate next year stood at 22.2%. In the year 2009-2011, there were 5 maternal deaths and 4 neonatal deaths. A sixth patient who delivered vaginally, died 02 weeks later at home reason attributed to possible pulmonary embolism/arrhythmia. Causes for neonatal deaths were related to mostly due to prematurity, 01 was a fetal distress and its attendant complications. There were no intrapartum deaths. This was very comparable to the previous year 2008-2009, during which there were 3 maternal deaths and 2 neonatal deaths (01 fetal distress).

As the data shows, for every patient delivered via caesarean section who died, similarly diseased women delivered vaginally, survived. The study is limited by its small size. However, what we were able to assess was ability to deliver such sick women vaginally using our limited resources so that they don't undergo the higher risked cesarean section.

We also concluded that despite bringing the C-section rate to 22.2%, there was no increase in feto-maternal compromise and delivering via the vaginal route promised a superior outcome. This is possible in a low resourced country and internationally accepted guidelines should be adhered to when catering for the cardiac pregnant patient.

CONCLUSION

Cardiac disease in pregnant patients is a challenge. It is generally associated with significant maternal and neonatal complications despite state of the art obstetric and cardiac care. However, it is possible to incorporate international guidelines with local resources to have an optimal outcome for the mother with cardiac disease and the fetus. So, local guidelines with meticulous multi disciplinary approach for patients with cardiac disease need to be developed, disseminated and enforced both at tertiary level and at sub tertiary peripheral hospitals to improve our current practices.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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