Abstract

Objective: This study is aimed at evaluation fetal and maternal outcome in pregnant women with heart disease candidate for open heart surgery.
Materials and Methods: In this study we evaluated adverse complications in 14 pregnant women underwent open heart surgery during three years period.
Variable parameters were: age, parity, gestational age, history of cardiac surgery and medications, cardiac complications during pregnancy , surgical indications of cardiac disease, fetal and maternal mortality and related complications.
Results: Mean age and gestational age were 38.4 years and 17.28 weeks respectively. Most of the patients were multiparous (71.42%) and in functional NYHA class III or IV (85.70%). During pregnancy 71.43 percent of patients showed signs and symptoms of CHF and 64.28 percent of them had atrial fibrillation. All patients underwent emergent open heart surgery. Maternal and fetal mortality following surgery were 35.71 and 78/57 percent respectively.
Conclusion: Cardiac Surgery during pregnancy were accompanied with high fetal and maternal mortality. Such pregnancies need to be managed by a team including obstetrician, cardiologist, anesthetist and cardiac surgeon.
For best result, it is better to postpone surgery whenever possible and surgery is performed only when it was indicated. The present study demonstrates that emergency surgery, poor NYHA class, Atrial Fibrilation, unstable heart disease, poor economical _ cultural conditions will result in adverse outcome in mother and fetus following cardiac surgery.

Key Words: Open heart surgery, pregnancy, maternal outcome, fetal outcome.

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reproductive age range(14). The ideal gestational age for operation is addressed by severals authors who established the period between the 13th and 28th weeks as ideal (4,5). There is a high trend towards fetal malformation in the first trimester, and to preterm delivery, maternal hemodynamic alterations, and mortality in the third. Because of socio-economical factors poor functional class, inadequate fetal monitoring and maternal age, unfortunately we couldnot follow these guidelines in all patients.

Fetal monitoring, as reported by Lamb and associates in 1981, allowed analysis of fetal condition during extracorporeal circulation (6). Fetal bradycardia was observed at the beginning of extracorporeal circulation by using a cardiotachometer (5). To counter this phenomenon, Arroni and associates in 1986 used hypertonic glucose in the perfusate to increase the energy supply to the fetus .In addition to monitoring the fetus, uterine contraction must be controlled. Intra operative fetal echocardiography shows the fetal cardiac reactions more accurately and is recommended (6). Extracorporeal circulation is an important technique that causes significant alterations in the mother and fetus. Cardiopulmonary bypass causes alterations in coagulation, the release of vasoactive substances, activation of the complement system, air and particulate emboli , non pulsatile flow, hypotension,and hypothermia (1,13). Hypothermia may lead to uterine contractions and reduction of placental flow(7). To reduce these risks, extracorporeal circulation with high flow, high pressures (mean blood pressure of 60 mmHg), and normothermia should be used (5,8). Hyperoxygenation should be maintained and hematocrit should be kept higher than 25%. Some authors report that myocardial protection using intemittent clamping allows, during normothermia, short perfusion times with pulsatile flow, which favors the fetus (6). .Maternal mortality rate varies in the literature from 1% to 5% (1,7,8,9). The higher incidence of fatal cases in our study compared with those reported in previous studies is result of the poor preoperative conditions of the patients and other above mentioned causes.

The fetal mortality rate of about 78.57% in our study is much higher than other studies (ranging from 16-33%) (10). Fetal mortality is described as higher than 50-66.7% in patients in a functional class over IV.

We found almost similar mortality rates in these patients (71.42% of our patients were in functional class IV and 14.28% in class III).

Heart surgery during pregnancy is associated with acceptable maternal and fetal mortality rates. These rates may be even lower if the factors mentioned above are maintained under control.

We suggest a few measures to reduce maternal and fetal mortality. These include maternal education, preconceptional counseling, organizing a multiprofessional team consisting of cardiologist, gynecologist, anesthetist and cardiac surgeon. These will resulted in avoiding functional deterioration during pregnancy and perhaps prescribing earlier surgery to prevent these patients from requiring an emergency procedures, performing surgery as fast as possible, with minimal extracorporeal circulation time, providing adequate fetal monitoring (cardiotachometer and intraoperative fetal echocardiography), and performing surgery in second trimester of pregnancy preferebly(11,12).

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perfusate to avoid fetal bradycardia. Other facilities which used to avoid fetal injury included: Normothermia, crystalloid cardioplegia, high pump flow, low pump time with intermittent aortic cross clamp (anoxia). All patients were followed until delivery. To provide a better understanding , we showed our results using mean values and standard deviation.

Results:

A total of 14 patients with cardiac pathology who were oprated and followed in our hospital during three years enrolled in this study. Table 1 shows the characteristics of the women.
Ten pateints (71.42%) were in the IV New York Heart Association Class (Table1). Three patients had a history of previous mitral surgery.
Congestive cardiac failure was seen in ten cases (71.42%). Cardiac arrhytmias were also seen in all patients including atrial fibrillation (64.28%), sinus tachycardia (21.43%) and sinus tacty cardiac plus ventricular premature beats (14.28%) (Table2).
In regard to medication, five patients took warfarin (35.71%), six patients digoxin (42.85%), seven patients diuretic (50%) and one patient antihypertensive drugs.
There were only two patients under close observation of cardiologist.
The various cardiac operations are shown in table 3. There was a prevalence of mitral valve pathology (78.57%).
21.43% of them required reoperation for thrombosed mitral valve replacement (three patients), two cases for myxoma and one case for endocarditis underwent surgery. One patient had a previous cerebral event (Table 1,3).

Table2: Maternal cardiac events during pregnancy in Ghaem and Imam Reza Hospitals 2000-2003

Type	Frequncy	percentage
Heart Failure	10	71.42%
Atrial fibrillation	9	64.28%
Sinus tachycardia	3	21.43%
Sinustach.+vent.arrhytmia	2	14.28%

Table3: Surgical indications in mothers with heart disease in Ghaem and Imam Reza Hospitals 2000-2003

Type of operation	Frequency	Percentage
Mitral stenosis	4	28.58%
Mitral regurgitation	2	14.28%
Combined MS&MR	2	14.28%
Mitral prosthesis dysfunction	3	21.43%
Atrial myxoma	2	14.28%
Endocarditis	1	7.14%

Postoperative maternal and fetal complications are shown in table 4.
Maternal mortality rate was 35.71% (5 mothers). The deaths were as follow: One patient had endocarditis preoperatively. She underwent surgery in unfavorable conditions. Four patients were in functional class IV and surgery was done in very poor conditions (severe cardiomyopathy). These patients died in the operation room due to unsuccessful weaning from cardiopulmory bypass machine; and two patients died in intensive care unit with the signs of heart failure. Two patients developed new cerebral events postoperatively. Fetal mortality occurred in eleven cases (78.57%). Of three newborns, two cases had been delivered vaginally and a case by cesarean section. One newborn showed severe cardiac anomaly.
The mean perfusion time was 47.78 minutes. The lowest value was related to myxoma surgery (28 minutes); and the most value for mitral valve replacement due to redo operation (45 minutes).

Discussion:

Surgery during pregnancy permits treatment of many diseases, including patients with valve disease, aneurysms, coronary disease and myxomas as described in many literatures(5).
Valve disease, especially mitral valve, is the most common because in our environment rheumatic heart disease is predominant and affects women in

Introduction:

The incidence of heart disease in pregnancy has been gradually falling during the last three decades.Although in our country the rate of that has decreased,it is still prevalent due to socio-economical factors.Maternal cardiac disease, especially rheumatic heart disease remains an important cause of fetal and maternal mortality in our country and other underdeveloped countries.The incidence of heart disease during pregnancy ranges from 1% to 5% and rheumatic mitral disease is responsible for about 50% of cases (1,2). Mitral valve pathology, especially mitral stenosis, is the most common lesion and it accounts for 10% of maternal mortality. Maternal mortality increases to 50% in classes III and IV of the NewYork Heart Association classification. It is further increased to 14-17% in the case of atrial fibrillation(3). Perinatal outcome is good in classes I and II but is poor in classes III and IV ,with a mortality of 12-31%(1). First cardiac surgery during pregnancy was done by Leyse and associates using cardiopulmonary bypass in 1958 (4). Other cardiac pathologies which must be operated include atrial septal defect(ASD),patent ductus arteriosus (PDA),ventricural septal defect (VSD). Because of widespread use of intravenous drugs and dessiminated infection during pregnancy, incidence of infective endocarditis also has been increased (5). The goal of this study was to evaluate maternal and fetal outcomes in pregnant women which underwent cardiac surgery in emergency and poor conditions in the hospitals of Mashhad University of Medical Sciences.

Patients and Methods:

We studied 14 women submitted to cardiac surgery at the Ghaem and Imam Reza hospitals, Mashad, IRAN between April/2000 and September/2003. These hospitals are referral centers for complicated patients with heart disease in Khorasan province. Characteristics of all women were noted, including maternal age, gestational age, parity, still birth, abortion, functional cardiac class(NYHA), medication, past obstetric and cardiac history, type of operation,mitral valve area, pump time, mortality and morbidity of mother and fetus (Table 1,4).

Table1: Characteristics of the patients in Ghaem and Imam Reza Hospitals 2000-2003

	Range/N	Mean+-SD/Percentage
Age (years)	19-35	38/21+-10
Parity (N)	0-4	1.57+-0.53
Gestational age (w)	8-35	17.28+-8.57
Mitral valve area (cm2)	0.8-6	2.65+-1.76
Parity:Multiparous	10	71.42%
Primiparous	4	28.58%
Previous abortion	4	28.58%
Previous stillbirth	2	14.28%
NYHA class IV	10	71.42%
NYHA class III	2	14.28%
NYHA class II	2	14.28%
Previous heart surgery	3	21.43%
History of stroke	1	7.14%

Table4: Post operative outcome of mother and fetus in Ghaem and Imam Reza Hospitals 2000-2003

	Frequency	Percentage
Maternal mortality	5	35.71%
Fetal mortality	11	78.57%
Vaginal delivery	2	14.28%
Cesarean section	1	7.14%
Fetal cardiac anomaly	1	7.14%
New maternal stroke	2	14.28%

Mode of delivery and fetal outcomes were noted in all cases. Surgery was performed under general anesthesia with midazolam, pancronium, fentanyl and halothane. Dobutamine, nitroglycerine and isoprenalin were used for hemodynamic control during surgery. Alpha adrenergic drugs such as adrenalin and noradrenalin were avoided to prevent excessive vasoconstriction, which may decrease umblical flow and stimulate uterine contraction. Maternal monitoring followed with invasive arterial pressure, electrocardiogram, urinary catheter,central venous pressure, pulse oximetry and temperature. Hypertonic glucose was added to extracorporeal

Maternal and Fetal outcomes following open heart surgery during pregnancy

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بررسی عوارض مادر و جنین بدنبال جراحی قلب باز

خلاصه

هدف: منظور از این مطالعه ، بررسی بیماران حامله بدنبال جراحی قلب باز بوده و هم چنین به بررسی عواقب آن برای مادر و جنین می پردازد.

روش : در این مطالعه ، عوارض ناخواسته را در ١٤ بیمار حامله که در یک دوره سه ساله در بیمارستانهای دانشگاهی مشهد تحت عمل جراحی قلب باز قرار گرفتند بررسی کردیم . متغیرها شامل موارد ذیل بود :

سن ، تعداد زایمان ، سن حاملگی ، سابقه جراحی قلبی و مصرف داروهای قلبی ، عوارض قلبی طی حاملگی ، اندیکاسیونهای جراحی قلبی ، مرگ و میر و عوارض مادر و جنین بدنبال جراحی قلب باز .

نتایج : متوسط سن و سن حاملگی بترتیب ٣٨/٤ سال و١٧/٢٨ هفته بود . اغلب بیماران (٧١/٤٢ درصد) چند زا و در کلاس NYHA بالای III (٨٥/٧٠ درصد) قرار داشتند . طی حاملگی ٧١/٤٢ درصد بیماران علائمی از نارسایی قلبی را از خود نشان داده و ٦٤/٢٨ درصد آنها فیبریلاسیون دهلیزی داشتند . تمام بیماران بصورت اورژانس تحت عمل قرار گرفتند . مرگ و میر مادر و جنین به دنبال عمل به ترتیب ٣٥/٧١ و ٧٨/٥٧ درصد بود .

نتیجه گیری : جراحی قلب باز طی حاملگی همراه با مرگ و میر بالای مادر و جنین می باشد . چنین حاملگی هایی نیازمند همکاری دقیق بین متخصصین زنان ، قلب ، بیهوشی و جراحی قلب می باشد . به منظور حصول بهترین نتیجه ، در صورت امکان بهتر است جراحی تا زمان زایمان به تعویق و زمانی انجام گیرد که اندیکاسیون قطعی برای آن وجود داشته باشد . مطالعه حاضر نشان می دهد جراحی اورژانس ، کلاس NYHA بالا ، فیبریلاسیون دهلیزی ، بیماری قلبی کنترل نشده و شرایط بد اقتصادی - فرهنگی منجر به عواقب بد مادر و جنین خواهد شد .

کلمات کلیدی : جراحی قلب باز ، حاملگی ، عواقب مادر ، عواقب جنینی.

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