ORIGINAL ARTICLE

A Comparative Study Between Mono Chorionic and Dichorionic Twins to Assess the Perinatal Outcome

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ABSTRACT

Objective: To establish the incidence of twin pregnancy and assess the perinatal outcome in monochorionic and dichorionic twins.
Study design: Prospective study
Place and duration: This study was carried out at Sir Ganga Ram hospital Lahore during a period of one year from 1st June 2000 to 31st May 2001.
Subjects and methods: Total number of deliveries and all cases of twin pregnancies presenting at first and second trimester to Labor room No.2 (obstetrics unit 2 and 3) during one year were included in the study. A special Performa was designed and details of each case including maternal history, clinical exam, ultrasound findings regarding chorionicity, mode of delivery, perinatal outcome and any maternal complications were recorded.
Results: The incidence of twin pregnancy in our study came out to be 9.71 per 1000 live births. 31 (44.29%) patients had monochorionic twins whereas 39 (55.71%) patients had dichorionic twins. Perinatal outcome was slightly better in dichorionic group but parameters like maternal age, parity, mode of delivery of twins, maternal presentation and complications like PIH and preterm labor were similar in two groups.
Conclusions: Twin pregnancy provides the obstetrician with the challenge of increased risk to the mother and increased fetal morbidity and mortality. Monochorionic twins are at more risk to develop various complications. Chorionicity should be determined on ultrasound in all twins preferably in first trimester. Early diagnosis of the twin pregnancy and proper follow up throughout the pregnancy improves the perinatal out come.
Key words: Monochorionic, dichorionic, perinatal outcome, twin pregnancy.

INTRODUCTION

Twins account for about 1 to 4% of all pregnancies[1]. The number of twin births in Western countries has dramatically increased in recent years. The increase in twin births is due to the increasing use of assisted reproductive technology and a trend in delaying pregnancy and childbirth to a later maternal age[2]. About 20% of the assisted reproductive pregnancies are multiple. Twining is common in older mothers presumably due to their rising FSH levels.

Twins are more than five times as likely to be born before 37week's gestation compared to singletons and among preterm births, twins are more than twice as likely to be of low birth weight compared to singletons[3]. Twins also have a relative risk of 6.6 of dying before their first birthday and among survivors a relative risk of 1.4 of handicap compared to singletons. It is reported that fetal growth restriction is a major factor in the neonatal morbidity of twins[4]. Further more it is found that where fetal growth restriction in twins is accompanied by other neonatal complications such as respiratory distress syndrome, sepsis or hyperbilirubinemia, morbidity is increased. Fetal growth restriction is a major factor in the neonatal morbidity of twins[5]. The total loss rate for twin pregnancy including late abortions (After 20 weeks) and perinatal and infant deaths is close to 100 per 1000[6]. The greatest concern is the fetal loss due largely but not exclusively to preterm delivery.

In about two third of twins the fetuses are non identical or dizygotic and in one third they are identical or monozygotic[3]. In all dizygotic pregnancies there are two separate placentas (dichorionic). In two third of monozygotic twins there are vascular communications within the two placental circulations (monochorionic) and in one third of cases there is dichorionic placentation[7]. Monochorionic, compared to dichorionic twins have a much higher risk of abnormalities and death. Chorionicity can be determined by ultrasound and relies on the assessment of fetal gender, number of placentas and characteristics of the membranes between the two-amniotic sacs preferably in the first trimester[3]. Twin

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pregnancy provides the obstetricians with the challenge of increased risks to the mother and of both increased fetal morbidity and mortality. Consequently every attempt should be made to detect fetal abnormality in twin pregnancy and make appropriate interventions if adverse outcomes are to be avoided[2]. In view of these facts, a prospective study was conducted to establish the incidence of twin pregnancy and try to design a protocol for safe perinatal and maternal outcome in cases of twin pregnancy.

PATIENTS AND METHODS

This prospective study was carried out at Labor room No.2 (Obstetrics and Gynecology Unit II and III) Sir Ganga Ram Hospital Lahore, over a period of one year from 1st June 2000 to 31st May 2001. Sir Ganga Ram Hospital is a tertiary care hospital affiliated with Fatima Jinnah Medical College Lahore.

Total number of deliveries and all cases of twin pregnancies presenting preferably at first and second trimester were included in the study. Twin pregnancies presenting during the third trimester (as chorionicity is doubtful during third trimester) and all other cases of multiple pregnancies (more than two) were excluded. A special Performa was designed and details of each case including maternal history, clinical exam, ultrasound finding regarding chorionicity, mode of delivery, perinatal outcome and any maternal complications were recorded, and compared in the two groups monochorionic (MC) and dichorionic (DC) twins. All the sets of parameters were compared with the matched pairs for equality of means. The significant level was fixed at 0.05 P values < 0.05 was considered significant. Significant rate was determined by Z score applying comparison of proportions with YATES continuity.

RESULTS

During the study period of one year total No. 7207 live births were recorded in labor room no. 2 (unit II and III). Total no. of twin deliveries was 70. So the incidence of twin deliveries at Sir Ganga Ram Hospital Lahore came out to be $\frac{1000 \times 70}{7207} = 9.71/1000$ live births. Out of these 70 twin deliveries, 31 (44.29%) were monochorionic (MC) whereas 39 (55.71%) were dichorionic DC. The mean±SD maternal age in MC group was 26.12±3.724 years and in DC group was 25.23±2.805 years. Various parameters including family H/O twins, parity, maternal presentation, mode of delivery of twins and perinatal outcome were recorded and compared in two groups Table I, II, III, IV & V respectively.

The (mean±SD) age of mothers in MC group was 26.12 ± 3.724 years

Age Range: MC group (n=31)

20-25 years	26-30 years	31-35 years
16 (51.6%)	11 (35.48%)	4 (12.90%)

The (mean ± SD) age of mothers in DC group was 25.23 ± 2.805 years

Age Range: DC group (n=39)

20-25 years	26-30 years	31-35 years
19 (48.71%)	15 (38.46%)	5 (12.82%)

Table I: Family history of twins

Monochorionic (MC)	Dichorionic (DC)
26 (83.87%)	32 (82.05%)

Table II: Parity

Monochorionic (MC) n=31	Dichorionic(DC)(n=29)
Primigravida1 07 (22.58%)	13 (33.33%)
Gravida 2 06 (19.35%)	05 (12.82%)
Gravida 3 10 (32.25%)	07 (17.94%)
Gravida 4 04(12.90%)	08 (20.51%)
Gravida 5 00 (00.00%)	02 (05.12%)
Gravida 6 03 (09.67%)	03 (07.69%)
Gravida 7 01 (03.22%)	01 (02.56%)

Table III: Maternal presentations

Monochorionic (MC) n=31	Dichorionic (DC) n = 39
Labor pains 16(51.61%)	20 (51.28%)
P.V leaking 7 (22.58%)	9 (23.07%)
Backache 3 (9.67%)	4 (10.25%)
Sluggish fetal movements 3(9.67%)	3 (7.69%)
Loss of fetal movements 2(6.45%)	3 (7.69%)

Table IV: Mode of delivery of twins

Monochorionic (MC)	Dichorionic (DC)
NVD 17 (54.84%)	22 (56.41%)
Emergency C-section 11 (35.48%)	14 (35.89%)
Elective C-section 3 (9.67%)	3 (7.69%)

Table V: Perinatal outcome

Monochorionic (MC) n=31		Dichorionic (DC) n= 39	
Alive / healthy		**Alive / healthy**	
First twin	**2nd twin**	**First twin:**	**2nd twin**
26(83.87%)	26 (83.87%)	32 (82.05%)	32 (82.05%)
Neonatal deaths		**Neonatal deaths**	
First twin :	**2nd twin**	**First twin:**	**2nd twin**
3 (9.67%)	2 (6.45%)	4(10.25%)	4(4.25%)
IUD		**IUD**	
First twin:	**2nd twin**	**First twin:**	**2nd twin**
2 (6.45%)	3 (9.67%)	3 (7.69%)	3 (7.69%)

Table VI: Weight of twins

Monochorionic (MC)		Dichorionic (DC)
First twin	2.015 ± 0.984 kg	2.125 ± 0.2704 kg
Second twin	2.134 ± 0.446 kg	2.09 ± 0.4747 kg

Table Vll: Apgar score

Monochorionic (MC)		Dichorionic (DC)
First twin	7.24 ± 6.25	7.17 ± 6.76
Second twin	6.76 ± 6.86	6.76 ± 8.41

The results suggested that there was no statistically significant difference in maternal age, parity and maternal presentation in the two groups. Similarly duration of labor and mode of delivery were not much different in monochorionic and dichorionic groups. Perinatal outcome was slightly better in dichorionic group but the weight of twins as well as apgar score of twins in the two groups was statistically insignificant .(table Vl & Vll)

DISCUSSION

The incidence of twin pregnancy varies from country to country. The incidence of twin pregnancy calculated in our study was 9.71 per 1000 live births. The incidence is close to that in North America and Europe (11 per 1000 live births). The frequency of twins births in tertiary centers ranges from 10-40 per 1000 live births, the high rate reflecting the hospital referred population. The highest prevalence of twin pregnancy is in Africa, particularly Nigeria (40 per 1000) deliveries and the lowest one is reported in Japan 6.7 per 1000 deliveries.

Twining rates per 1000 pregnancies in various countries

Country	Twining rates
Nigeria	40
USA	15.8
England & Wales	12.3
Japan	6.7
Pakistan	9.71

The difference in frequency of twining among various populations is due to genes that regulate FSH and LH secretion[8]. Support for this suggestion is provided by the finding of higher blood levels of FSH, LH and oestradiol-17 β in mothers of dizygotic twins[8]. It is a fact that mothers of dizygotic twins are more likely to have twins again than women who have not delivered twins before[9]. The twining rate in the offspring of dizygotic female twins is greatly increased over that observed for the general population[10,11] .The incidence of spontaneous monozygotic twinning is remarkably constant world wide (4 per 1000 births) and does not appear to be influenced by race, heredity, age or parity and is largely attributed to chance[12] . However recently monozygotic twinning has been reported to be increased after the use of agents to induce ovulation. During last 2 decades the twin delivery rate has raised in several countries for example In France between 1972 and1989, the twin delivery rate has risen from 8.8 to 11.2 per 1000 live births. This upward trend was most marked in women between the ages of 30 and 39 years.[13] .In USA between 1972-74 and 1985-89 the rate of twin births increased by 113% among white mothers and by 22% among black mothers[14] .Similar increase in twin births has occurred in other industrialized countries including Japan[15]. These increases have been attributed to the increasing use of assisted reproductive techniques for infertility. In our study the incidence of twin pregnancy in Pakistan is relatively lower (9.71 per 1000 live births). The factors responsible for this low incidence may be the lower maternal age in Pakistan due to a trend of early marriages and presence of fewer facilities for assisted reproductive techniques for infertility. However with more and more development in assisted reproductive technology the incidence of twin pregnancy is expected to rise in Pakistan.

Determination of chorionicity and the comparison between the monochorionic and dichorionic twins was one of our main objectives of the study. Chorionicity was determined by ultrasound preferably in the first and second trimester and inter twins membrane thickness measurements were used to predict chorionicity. In our study out of 70 total twins 31 (44.29%) were monochorionic and 39 (55.71%) were dichorionic. This ratio is different from that given in literature where only 20% of all twins are monochorionic and 80% are dichorionic. In our study the incidence of monochorionic twins is high (44.29%). This difference might be due to the fact that few of the pregnant mothers were assessed during second trimester for the first time and we know that chorionicity is sometimes difficult to be assessed during second trimester due to fusion of placental membranes. Moreover ultrasonographic measurement of membrane thickness has high intra observer and inter observer variability which leads to sub optimal accuracy in determining chorionicity in second and third trimester[16] .

The (mean ± SD) age of mother in MC group was 26.12±3.724 years whereas in DC group it was 25.23±2.805 years. The difference between the ages of the two groups was not statistically significant (P>0.05). It was also observed that maternal age in twin pregnancy was quite low in Pakistan due to cultural and social taboos of early marriage as compared to western and European countries where the maternal age in twin pregnancy ranges from 30-39 years[13].

There was high incidence of family H/O twins in both the groups Table I. The incidence of twins in the family was almost similar in both the groups.

It is known that incidence of twining rises with increasing parity[17]. However in our study, in monochorionic group 10 (23.25%) patients were

gravida3 and number of primigravida patients were 7 (22.58%). n contrasts in Dichorionic group 13 (33.33%) patients were primigravida and 8 (20.51%) patients were gravida4. So the fact that twining increase with parity was not observed in Dichorionic group where maximum numbers of patients were primigravida.

As regards the difference in mode of maternal presentation (Table lll), the two groups had statistically similar parameters.

It is known that twins are more frequently delivered by caesarean section compared with singletons either as an elective procedure or an emergency before or after the delivery of first twin[18]. When the first (leading) twin presents other than vertex, caesarean section appears to be the method of choice for delivery. In our study 17(54.84%) patients in MC group had NVD compared to 22(56.41%) patient in DC group. Emergency C section was done in 11(35.46%) patients in MC group as compared to 14(35.89%) patients in DC group. Elective C section was done in 3 (9.67%) patients in MC group compared to 3(7.69%) patients in DC group. Total no of C sections performed in MC group were 14(45.1%) as compared to 17(43.6%) in DC group. So the rate of C section was more in MC group. Twin pregnancy occurring in woman who had previously a C section is an uncommon complication. In a recent Sheffield study 25 cases of multiple pregnancy occurred in women with lower uterine segment scar during the 11 years period (1975-85). The C section rate in this group of women increased from 20% in the first six years to 70% in the later years for no obvious reason. Analysis of the individual cases and review of the literature suggests that twin pregnancy is not in itself an indication for elective repeat C section[19] . In our study none of the patients in MC or DC group had previous H/O C section which relates well with literature.

As regards maternal complication, Pregnancy induced Hypertension (PIH) was noted in 7 (22.58%) patients in MC group compared to 13 (33.33%) patients in DC group. overall incidence of PIH noted in our study was 28.6%. In an Australian study Long and Oats (1987) found that 25.9% of 642 women with twin pregnancies developed PIH compared with 9.7% of women with singleton pregnancy[20] .Primigravida women with twin pregnancy have a five times greater risk of severe pre eclampsia than with the singleton pregnancy and for multigravid women the risk is 10 times greater[21].

In monochorionic group 10 (30.75%) patients compared to 12 (30.75%) patients is DC group presented with preterm labor. The difference in the two groups was statistically insignificant. Tocolytic therapy was useful in about 50% of patient. Spontaneous preterm labor occurs in 30% of twin pregnancies and is most common in association with monozygotic twins[22] .The administration of tocolytic agents has some benefit in delaying labor long enough to allow the patients to be transferred to a center with neonatal intensive care facilities[23] .

In our study 26 (83.87%) twins in MC group were born alive and healthy whereas 32 (82.09%) twins in DC group were born alive and healthy. The difference in the two groups was not statistically significant. Neonatal death occurred in 3 (9.67%) of the first twin babies and 2 (6.45%) of the second twin babies in the MC group. In the DC group neonatal deaths occurred in 4 (10.25%) of the first twin babies and 4 (10.25%) of the second twins babies. (Table V)

The causes of neonatal death were preterm labor with extremely low birth rate (<1.5 kg) and septicemia. IUD occurred in 2 (6.45%) of first twin and 3 (9.67%) of second twin in MC group. In comparison IUD occurred in 3 (7.69%) of the first twin and 3(7.69%) of the second twin in the DC group. Twins account for approximately 10% of perinatal deaths. In additions infant death rate among twins are estimated to be 4.10 times of singleton births.

CONCLUSIONS

Twin pregnancy provides the Obstetricians with the challenge of increased risks to the mother and both increased fetal morbidity and mortality. MC twins are at more risk to develop various complications. Chorionicity should be determined on ultrasound in all the twins preferably in the first trimester. Determination of chorionicity is important regarding counseling the parents in relation to their risk of prenatal morbidity and morality, invasive testing and management of discordant abnormality, feasibility of multifetal pregnancy reduction, and early detection and management of twin transfusion syndrome. Every attempt should be made to detect any fetal abnormality as early as possible and make appropriate interventions, if adverse outcomes are to be avoided. Early diagnosis of the twin pregnancy and proper follow up through out the pregnancy improves the prenatal outcome. Regular ultrasound for the growth and well being of twins especially in case of monochorionic twins, early detection and management of preterm labor, referral to fetal medicine centers in cases of complication and hospitalization for clinical indications are important steps in improving perinatal outcome and reducing maternal risks in case of twin pregnancy.

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