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Original Research Article

## Obstetric outcome in twin gestation with reference to chorionicity

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### ABSTRACT

**Background:** Monochorionic twin pregnancies are at greater risk for growth abnormalities and other complications. This study aims to outline the obstetric problems faced by twins in general and also to determine the influence of chorionicity on pregnancy and perinatal outcome in twins. Objective of present study was to compare the obstetric and perinatal outcome between monochorionic and dichorionic twins.

**Methods:** A clinical non-interventional prospective observational study was conducted in a tertiary care hospital over a period of 1 year. 232 cases of twin pregnancies were followed up from first trimester. The antepartum complications, mode of delivery, presentation, pregnancy outcome, condition of babies and perinatal mortality were compared between mono-chorionic and dichorionic twins.

**Results:** Among 232 cases of twins studied, 2/3rd were dichorionic and 1/3rd were monochorionic. The mean gestational age for Monochorionic (MC) twins was 33.2 weeks whereas it was 35.6 weeks for Dichorionic (DC) twins. Preterm delivery was significantly associated with mono-chorionicity. Elective CS was done more for MC twins compared to DC twins. The mean birth weight of MC twins was 1.7 kg compared to 2.1 kg among DC twins. Low APGAR scores were seen in 31.3% of MC twins compared to 15.8% of DC twins. The number of asphyxiated babies (12.5%), stillborn (7.5%) and macerated babies (10%) were more in MC group in comparison to DC group where it was (9.9%, 2.1%, 0.7%) respectively. Risk of IBN admissions were more in MC than DC twins. (31.3% Vs 21.1%) Adverse perinatal outcome was associated more with MC pregnancies (37.5%) than DC. (11.8%).

**Conclusions:** Mono-chorionicity was significantly associated with pregnancy complications and adverse perinatal outcome. Hence early diagnosis of chorionicity and referral to a tertiary centre with fetal medicine unit and newborn care is very important in reducing morbidity and perinatal mortality among MC twins.

**Keywords:** Dichorionic, Monochorionic, Pregnancy outcome, Perinatal outcome

### INTRODUCTION

Twinning is one of the most interesting events occurring in human reproductive biology. At present, multiple pregnancy accounts for 3% of all the pregnancies (ACOG, 1998), out of which 94% are twins.

In India, twins account for 1% of all pregnancies, but contribute to 10% of perinatal mortality.<sup>1,2</sup> Twin

pregnancies are also responsible for 12.2 % of preterm births and 15.4% of neonatal deaths.<sup>3,4</sup>

Over the last few decades, the incidence of twinning has been on the rise. This significant increase was not only due to the postponement of maternity, but also due to inadvertent use of ovulation induction drugs in artificial reproductive techniques. Perinatal morbidity and mortality was higher among multiple gestations due to

increased incidence of ante-partum complications, preterm labour and utero-placental insufficiency.

Zygoty refers to the type of conception and chorionicity refers to placentation. Among twins, 30% are identical or monozygotic and 70% are fraternal or dizygotic. In comparison to dichorionic twins, 15-20% of monochorionic twins have increased risk of complications due to imbalance in placental sharing between fetuses.

Studies have shown that monochorionicity is associated with higher perinatal mortality and with increased incidence of preterm births, low birth weight and prolonged stay in neonatal ICU.<sup>5-7</sup>

Objective of present study was to compare the obstetric and perinatal outcome between monochorionic and dichorionic twins.

## METHODS

This was a clinical, non-interventional descriptive study which was conducted at SATH, Medical College, Thiruvananthapuram, which is a tertiary care hospital, over a period of one year. A detailed history was taken, clinical examination and analysis of investigation including ultrasound were done. Consent was obtained from the patients included in the study. Institutional Ethics committee clearance was also obtained.

### Inclusion criteria

There was a total of 15310 deliveries during the study period, of which there were 252 cases of twin pregnancies. 232 cases of twin pregnancies who had a first trimester detection of chorionicity by ultrasound, who subsequently delivered in the same hospital, were enrolled into the study.

### Exclusion criteria

Those twins which suffered miscarriage in the first trimester itself, and / or whose chorionicity was not commented by the ultrasound scan was excluded from the study.

These patients were followed from antenatal period upon their registration in OP, and after admission, through their delivery and until discharge from hospital. The antepartum complications, mode of onset of labour, mode of delivery, condition of the newborns and perinatal outcome was studied with special reference to chorionicity.

Chorionicity was diagnosed on the basis of first or second trimester ultrasound and confirmed by examination of placenta postnatally. Chorionicity was classified as dichorionic diamniotic (DCDA), monochorionic

diamniotic(MCDA) and monochorionic monoamniotic (MCMA).

Preterm delivery was defined as delivery before 37 completed weeks of gestation. Perinatal mortality was defined as death of an infant >500gms within 1 week after delivery, including stillbirth.

Stillbirth was defined as intrauterine demise of a fetus >500g and >or =20 completed weeks of gestation. Early neonatal death was defined as death of an infant during the first 7 days of life and late neonatal death as death between 8 and 28 days after birth.

### Statistical analysis

Statistical methods used to analyze the results were chi-square tests and students tests. P <0.05 was taken as significant. Data entry was done using Microsoft excel and analysis done using SPSS.

## RESULTS

There was a total of 232 cases of twin deliveries during the 1 year study period. There were 152 cases of DCDA twins (65.5%) and 80 monochorionic twins (34.5%) of which 74 were monochorionic diamniotic and 6 were monochorionic monoamniotic twins. 2/3<sup>rd</sup> were dichorionic twins whereas 1/3<sup>rd</sup> were monochorionic twins.

**Table 1: Pregnancy outcome with respect to chorionicity.**

Parameter	P value	$\chi^2$
Twin complications	<0.01	43.4
Obstetric complications	>0.05	32.39
Medical disorders	>0.05	12.297
Presentation	Not significant	
Prematurity	<0.01	
Mode of onset of labour	>0.05	1.48
Mode of delivery	Comparable	
Post-partum complications	Comparable	
Time interval between delivery	Comparable	
Nursery admission	<0.01	4.157
APGAR	<0.01	20.978
Discordance at birth	<0.01	15.689
Perinatal mortality	<0.01	22.647
Birth weight	<0.01	20.82

The summary of present findings is listed in Table 1.

Obstetric complications peculiar to twins were seen in 85 /232 cases (36.6%).

TWIN complications were seen more in monochorionic twins, 55% compared to 19.8% in dichorionic twins and the finding was statistically significant (Table 2).

**Table 2: Twin complications.**

Complications	Monochorionic		Dichorionic	
	No.	%	No.	%
<b>Fetal growth abnormalities</b>				
IUGR	14	18.2	10	7
Discordance	10	13	8	5.6
Congenital anomalies	5	6.5	2	1.4
Abnormal doppler	3	3.9	1	0.7
<b>Fetal demise</b>				
Fetus papyraceus	1	1.3	3	2.1
SFD	12	15.6	5	3.5
Both IUD	3	3.9	2	1.4
<b>Vascular accidents</b>				
Conjoined twin	1	1.3	-	-
TTTS	4	5.2	-	-
Cord entanglement	2	2.6	-	-
	55	68.75	30	19.73

*Presentation and frequency of presentation*

32.4% of all the twins had a non-vertex presentation. The commonest presentation frequency amongst twins were that of vertex- vertex (40.9%). The frequency of presentation was also comparable for both the types.

**Table 3: Frequency of presentation.**

Presentation	MC	%	DC	%	Total	%
Vertex-vertex	30	37.6	66	43.4	96	40.9
Vertex- breech	24	30	34	22.4	58	25
Breech-breech	15	18.8	32	21.1	47	20.3
Breech-vertex	8	10	14	9.2	22	9.5
Vertex-transverse	1	1.3	2	1.3	3	1.3
Breech-transverse	-	-	4	2.6	4	1.7
First transverse	2	2.5	-	-	2	0.9
Total	80	100	152	100	232	100

*Perinatal outcome*

The number of asphyxiated babies (12.5%), stillborn (7.5%) and macerated babies (10%) were more in MC group in comparison to dichorionic where it was (9.9%,

*Gestational age at termination of pregnancy*

75.4% of all the twins suffered a preterm birth of which 28% were extreme pre-term and 44.4 % were near term, which is a significant finding in present study.

**Table 4: Gestational age at termination of pregnancy.**

Gestational age	MC	%	DC	%	Total	%
<20 weeks	5	6.3	2	1.3	7	3
20-28 weeks	7	8.8	4	2.6	11	4.7
28-34 weeks	21	26.3	33	21.7	54	23.3
34-37 weeks	35	43.8	68	44.7	103	44.4
37-40 weeks	12	15	45	29.6	57	24.6
Total	80	100	152	100	232	100

*Prematurity and chorionicity*

Prematurity and chorionicity is elaborated in Table 4. Prematurity was significantly associated with monochorionicity. The mean gestational age at delivery of monochorionic twins in this study was 33.2 weeks, whereas it was 35.6 weeks for dichorionic twins.

*Mode of onset of labour*

Mode of onset of labour was spontaneous in majority of twins, irrespective of their chorionicity. Elective caesarian section was done more for monochorionic compared to dichorionic twins ( $\chi^2 = 1.478$  p = Not significant).

*Mode of delivery*

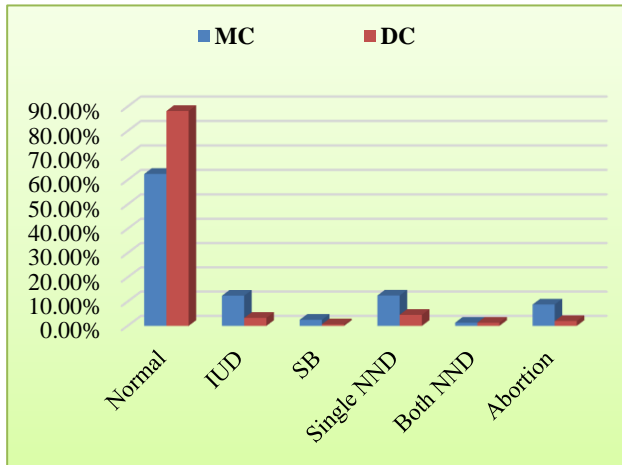
LSCS rates was high for twins compared to singletons, being done for 46.1% of all the twins. 36.3% of monochorionic twins had LSCS whereas 51.3% of dichorionic twins had LSCS. Majority of MCMA twins were delivered by elective CS (Table 5).

**Table 5: Mode of delivery.**

Mode of delivery	Monochorionic number (%)		Dichorionic number (%)		Total twins number	
Miscarriage (14-20weeks)	5	5 (6.3%)	2	2 (1.4)	7	7 (3.1)
Vaginal	Spontaneous	42	44		86	
	Induced	2	7	72	14	
	Instrumental	2	18	(47.3)	20	118 (50.8)
	VBAC	-	3		3	
LSCS	Elective	17	31	78	48	
	Emergency	12	47	(51.3)	59	107 (46.1)
Total	80		152		232	

2.1%, 0.7%) respectively. Adverse perinatal outcome was associated more with MC pregnancies (37.5%) than DC. (11.8%) The risk of macerated fetuses, stillbirths and severely asphyxiated babies were significantly more associated with monochorionic twins.  $\chi^2 17.417$ ,  $p < 0.05$ .

The risk was more for second of twin compared to the first.  $\chi^2 = 21.236$  (Figure 1).



**Figure 1: Perinatal outcome of twins.**

*Sex of babies*

Monochorionic twinning was associated with like sexed babies only. Whereas 36.8% of dichorionic twins were unlike-sexed. This association was statistically significant. Incidence of both female babies was significantly more than both males (Table 6).

**Table 6: Sex of babies.**

Sex of babies	MC	%	DC	%	Total	%
Both Males	34	42.5	44	28.9	78	33.6
Both females	46	57.5	52	34.2	89	38.4
Male and female	-	-	56	36.8	65	28
Total	80	34.5	152	65.5	232	100

$\chi^2 = 17.097$ ,  $p < 0.001$

*Birth weight of babies*

The mean birth weight of MC twins was 1.7 kg compared to 2.1 kg among DC twins. Low birth weights were significantly associated with mono-chorionic twins and with the second of twin ( $\chi^2 = 20.802$   $P < 0.10$ ).

*Apgar score of babies*

Low APGAR scores were seen in 31.3% of MC twins compared to 15.8% of DC twins and association with monochorionicity was statistically significant. The second of twin was associated with low Apgar scores compared to the first.

*Neonatal ICU admission*

Risk of NICU admissions were more in MC than DC twins (31.3% Vs 21.1%) (Table 7).

**Table 7: NICU admission.**

NICU care	MC	%	DC	%	Total	%
Needed	25	31.3	32	21.1	57	24.6
Not needed	55	68.8	120	78.9	175	75.4
Total	80	34.5	152	65.5	232	100

$\chi^2 = 4.157$ ;  $p < 0.005$

*Discordance detected at birth*

Incidence of birth weight discordance was more in the monochorionic twins in comparison to dichorionic twins. Thus, the association between discordance and chorionicity was found to be statistically significant (Table 8).

**Table 8: Discordancy.**

Discordancy	MC	%	DC	%	Total	%
Present	32	40	25	16.4	57	24.6
Absent	48	60	127	83.6	175	75.4
Total	80	34.5	152	65.5	232	100

$\chi^2 = 15.689$ ;  $p < 0.001$

**DISCUSSION**

*Fetal complications*

In comparison to dichorionic twins, 15-20% of the monochorionic twins have increased risk of complications due to imbalance in placental sharing. Incidence of fetal complications like congenital malformations, discordant growth, IUGR, TTTS and antepartum fetal demise were all higher in monochorionic compared to dichorionic twins. Studies by Chauhan et al showed a prevalence of IUGR in 46% of monochorionic twins compared to 26% of dichorionic.<sup>8</sup> Domingues et al also has found a higher incidence of growth discordance among monochorionic twins (24.1% in MC Vs 12.1% in DC).<sup>9</sup> Results were comparable to studies by Sebire et al.<sup>10</sup>

*Frequency of presentation*

Majority of the monochorionic (37.6%) and dichorionic, (43.4%) twins presented as vertex-vertex. Malpresentations in the second of twin was common in MC twin (50%) compared to DC (47.4%). Malpresentation in the 1st of twin was similar in both monochorionic and dichorionic twins (31.3% versus 32.9%). In a study conducted by Divon and colleagues, the reported incidence of Vertex-Vertex was 42% and Vertex-Breech was 27%.<sup>11</sup>

*Gestational age at delivery*

Mean gestational age at delivery of monochorionic twin in this study was 33.2 weeks whereas it was 35.6 weeks for dichorionic twins.

According to Smits J, preterm labor is the one major complication on which zygosity has an influence.<sup>12</sup> The present study also supports this. In a study conducted by Hatkar et al<sup>13</sup> and colleagues of 100 twin pregnancies, they identified the average gestational age of monochorionic as 35.5 weeks and dichorionic as 35.7 weeks.<sup>13</sup> In a study conducted by Radhakrishnan R at Calicut medical college during the same time period, the gestational age for monochorionic twins was found to be 35.7% and dichorionic was 36.5% and the incidence of preterm labour was 45%.<sup>14</sup>

Cheung YB et al suggested optimum gestational age of twins was between 37 and 39 weeks.<sup>15</sup> Increased incidence of preterm babies in monochorionic twin population may be due to higher incidence of preterm premature rupture of membranes, polyhydramnios etc.

#### ***Mode of onset of labour***

Onset of labour was spontaneous in (62.5%) monochorionic and (57.9%) of dichorionic twins. Induction was more in dichorionic twins (19.7%) compared to monochorionic (13.8%). In studies by Radhakrishnan R, 84.5% of twins went into spontaneous onset of labour and 15.5% was induced.<sup>14</sup>

#### ***Mode of delivery***

Elective caesarian section was done more for monochorionic (22.5%) compared to dichorionic (21.7%) twins. This can be attributed to risk of twin complications like discordance, IUGR, TTTS.

The rate of caesarian section in previous studies done in the hospital were 19.7% in 1986 and 27.37 % in 1994. Among the MCMA twins, 2 of them delivered vaginally spontaneously. Majority of MCMA twins were delivered by Elective caesarian section (50%). Among MCDA twins, 58.8% of them delivered vaginally spontaneously. Emergency caesarian was done for another 8.8% for other reasons. Elective caesarian was done for 16.2%. Majority of the DCDA delivered spontaneously.

Emergency caesarian section was done for 25.4% and elective caesarian for 20.4%. There were 3 cases of vaginal birth after caesarian section. In studies by Radhakrishnan R, 62.5% of twins delivered vaginally and 35.5% were delivered by caesarian section of which 8% was elective CS and 27.5% was emergency CS.<sup>16</sup> These results were comparable to studies by Samra JS et al.<sup>17</sup>

#### ***Condition of babies***

The number of asphyxiated babies (12.5%), still births (7.5%) and macerated babies (10%) was more in the monochorionic group compared to dichorionic, where it was (9.9%, 2.1% and 0.7% respectively). The poor perinatal outcome in monochorionic twins may be related to increased incidence antenatal complications like

IUGR, discordance TTTS etc. Incidence of congenital anomalies were comparable in both types of twins.

#### ***Sex of the babies***

All the monochorionic twins were like sexed whereas 36.8% of dichorionic twins were unlike sexed. Among the like-sexed twins, incidence of both females was higher compared to males (P value <0.001). and the relation is statistically significant.

#### ***Time interval between the delivery***

Time interval between delivery of the babies was not found to be significantly affected by chorionicity. Majority of the twins 58.8% of monochorionic and 67.1% of dichorionic delivered within 5 minutes.

#### ***Birth weight of babies***

Risk of low birth weight babies was more for monochorionic twins compared to dichorionic. Low birth weight was associated with 2nd of twin compared to first. Both the associations were statistically significant. In the present study, mean birth weight of monochorionic twins was 1.7 Kg and mean birth weight of dichorionic twins was 2.1 Kg. Low birth weight was more common in monochorionic compared to dichorionic (60% Vs 40.2%). According to Mather Gut et al, the mean birth weight of twins is affected by the length of pregnancy, sex of the twins and zygosity.<sup>18</sup> Previous studies by De Assunacao et al showed mean birth weight of 2.16kg for dichorionic and 1.8kg for monochorionic pregnancies.<sup>19</sup> Results were similar in studies by Blecker and Hemrika.<sup>20</sup>

#### ***Apgar of babies***

Low Apgar Scores were seen in the 31.3% monochorionic twins compared to 15.8% of dichorionic twins. Apgar score was lower for the second of twin compared to first in both monochorionic and dichorionic twins. Both the associations were found to be statistically significant. It has been felt that the risk of diminished placental perfusion increases with prolonged birth interval. These were statistically significant difference at birth favoring the first twin.

#### ***NICU (neonatal ICU) admission***

Risk of NICU admission was more in monochorionic gestation 31.3% compared in 21.1% of dichorionic and the association was found to be statistically significant. In studies by Hatkar et al, 6.8% of monochorionic had longer NICU stay compared to 1.75% of dichorionic twins.<sup>13</sup>

#### ***Perinatal outcome***

Adverse perinatal outcome was associated with monochorionic pregnancy (37.5%) compared to

dichorionic pregnancy (11.8%) and the association was found to be statistically significant. Incidence of intrauterine death was 12.5% in monochorionic compared to 3.3% in dichorionic. Incidence of still birth and neonatal death was also higher in monochorionic compared to dichorionic. This can be explained by the decreased ability of the preterm and compromised babies to withstand the stress of labour and delivery.

According to Naeye et al, the overall mortality for monozygotic twins was about 2.5 times greater than for dizygotic twins and was mainly due to amniotic fluid infection, TTTS and congenital anomalies.<sup>21</sup>

The perinatal mortality among monochorionic pregnancies was 18% and in dichorionic was 6% in studies by Radhakrishnan R.<sup>14</sup> Another study on perinatal outcome of twins in relation to chorionicity, conducted at Nowrosjee Wadia Maternity hospital in Mumbai by Hatkar PA et al calculated a PNM of monochorionic twins to be 176.47/1000 and dichorionic as 88.88/1000.<sup>13</sup>

#### **Discordance in birth weights**

Discordance in birth weights was seen in 40% of monochorionic compared to 16.4% of dichorionic. This means that monochorionicity is associated with significant risk of discordance and the risk is found to be statistically significant. Radhakrishnan R in their study demonstrated discordance of 25% in dichorionic and 28% in monochorionic twins.<sup>14</sup> Also, Sebire et al in his studies reported discordance complicates monochorionic in 11.3% and dichorionic in 12.1%.<sup>10</sup>

#### **Pregnancy outcome based on gestational age at delivery and chorionicity**

In the <28 weeks gestational age, the majority of the twins delivered were monochorionic compared to dichorionic. There were 7 cases of spontaneous abortions in the <20 weeks gestational age and 3 cases in 20-28 weeks gestage. Majority of the single fetal demise occurred between 28-34 weeks gestation. The neonatal deaths were distributed almost uniformly between 20-34 weeks gestation.

The risk of prematurity and preterm delivery was found to be significantly associated with monochorionic gestation.

#### **CONCLUSION**

Mono-chorionicity was significantly associated with pregnancy complications and adverse perinatal outcome. Hence early diagnosis of chorionicity and referral to a tertiary centre with fetal medicine unit and newborn care is very important in reducing morbidity and perinatal mortality among MC twins.

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