

# Perinatal Outcome of Twin Pregnancy and Influence of Chorionicity on it

Roshni Radhakrishnan<sup>a</sup>, Ratish Radhakrishnan<sup>b</sup>

a. Department of Obstetrics and gynaecology, Sree Gokulam Medical College & Research Foundation, Kerala, India;

b. Department of CVTS, Medical College, Kottayam, Kerala, India\*

## ABSTRACT

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**Background:** Monochorionic twin gestations are at increased risk of a variety of pregnancy complications which can be minimized by early antepartum diagnosis and management. This study is to assess the influence of chorionicity in twin pregnancies on perinatal outcome.

**Materials and Methods:** A prospective study was conducted at, Institute of maternal and child health Calicut over a period of one year; 2005 to 2006. The total of, 200 cases of twin pregnancies were followed up from antenatal period, upon their admission to ward and labour room.

**Results:** Among 200 twin pregnancies, 62% were dichorionic diamniotic twins, 37% were monochorionic diamniotic. Average gestational age of monochorionic twin was 35.7 and that of dichorionic twin was 36.5. Perinatal mortality of monochorionic twin was 180/1000 when compared to 60.5/1000 for dichorionic twin.

**Conclusion:** Perinatal mortality of monochorionic twin is definitely more when compared to dichorionic twin.

**Keywords:** Chorionicity, Monochorionic, Dichorionic, Twin, Pregnancy

\*See End Note for complete author details

## BACKGROUND

Twin pregnancies are a unique but common obstetrical occurrence that has attracted the attention of both the obstetrician and the common man since time immemorial. The number and rate of twin triplet and other higher order multiple births have increased in the United States at an unprecedented pace over the past two decades (Kogan and colleagues, 2000; Martin and Park 1999). Advances in assisted reproduction and an increasing proportion of older mothers have contributed to a steep increase in twin pregnancies. This extraordinary increase in multiple births is a public health concern because these infants are less likely to survive and more likely to suffer lifelong disability due to preterm delivery. Multiple gestations currently accounts for 3% of all pregnancies (ACOG, 1998). Twins account for 94% of all multiple births each year. Despite advances in obstetrics and neonatology, the perinatal mortality rate among twins still remains high, estimated as accounting for approximately 10% of all perinatal mortality. The higher preterm delivery rate in twins, either from spontaneous or induced

labour, with its associated problems of prematurity remains the major cause of morbidity and mortality. Other factors which contribute to the higher perinatal mortality include fetal growth retardation, intratwin birth weight discordancy, fetal anomalies and problems specific to monochorionic twin gestations like twin to twin transfusion syndrome. In twins, about 30% are identical or monozygotic and 70% are fraternal or dizygotic. Monozygotic twins result from the fertilization of a single egg followed by early cleavage into two halves, which develop further separately. Monozygotic twins may be dichorionic diamniotic, monochorionic diamniotic, mono-chorionic monoamniotic and even conjoined, depending on the time between fertilization and cleavage. In 30% of monozygotic twins, cleavage occurs by the third day of fertilization resulting in dichorionic diamniotic pregnancy. In 70%, cleavage occurs between the 4th and 8th day, resulting in monochorionic diamniotic twins. Rarely, cleavage takes place after the 9th day resulting in monochorionic monoamniotic twins. If division is even later, after the embryonic disk is formed, cleavage is incomplete and conjoined twins are formed.<sup>1</sup> Dizygotic twins result from the fer-

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### Corresponding Author:

Dr Roshni Radhakrishnan, Assistant Professor, Department of OBG, Sree Gokulam Medical College & Research Foundation Kerala, India. E-mail: drroshnir@gmail.com

tilisation of two different eggs, by two spermatozoa and by definition each twin has its own placenta and amniotic sac (dichorionic diamniotic). Monochorionic twin gestations are at increased risk of a variety of pregnancy complications which can be minimized by early antepartum diagnosis and management. This study endeavors to evaluate the influence of chorionicity in twin pregnancies on perinatal outcome

## MATERIAL & METHODS

A prospective study was conducted during the period from September 2005 to August 2006 at Department of Obstetrics and Gynaecology, Institute of Maternal and Child Health, Calicut. 200 cases of twin pregnancies beyond 28 weeks of gestation admitted during this period were taken as the study group. Pregnancies with more than 2 children were excluded from the study. Cases were followed from the antenatal period upon their admission to the antenatal ward and the labour room. Detailed history was taken. Cases of IUGR, discordancy detected prenatally by ultrasound were recorded. Chorionicity by ultrasound was also taken into consideration. The usual investigations were done in all cases and special investigation (like PIH profile, FBS, PPBS, Doppler ultrasound) etc also were done whenever necessary. Antenatal corticosteroids were given routinely in all cases presenting with preterm labour and in complicated cases needing early termination. Induction was required in some cases for various obstetrical indications. Detailed clinical examination, local examination and per vaginal examination was also recorded. Chorionicity of placenta was noted after delivery of both the babies. The patients were discharged on the 3rd day after vaginal delivery. Only those who had undergone caesarean section or whose babies were in the NICU (neonatal intensive care unit) stayed back. The perinatal outcome of the babies were analysed based on the gestational age, birth weight, Apgar scores at birth, NICU admission and factors like number of macerated births, still births, Neonatal deaths etc. Perinatal mortality was calculated based on the formula;

### Perinatal mortality rate defines:

$$\frac{\text{Total number of late foetal death and early neonatal death having birth weight > 1000 g}}{\text{Total no of births}} \times 100$$

The relationship of IUGR and discordancy with respect to chorionicity was also evaluated. Statistical analysis was performed using SPSS-15

## RESULTS

Total number of deliveries during the study period was 21,718, and twins constitute 347 deliveries. The incidence of twin pregnancy was 1.6%, out of which 200 twin pregnancies were analysed. Incidence of preterm birth was 45% (90 cases). The majority, 55% of twin pregnancy had gestational age between 35-37 wks at the onset of labour, and 28% had onset between 38 and 40wks (**Table 1**).

**Table 1. Distribution of gestational age at onset of labour**

GA	Number	Percentage
28 – 31 wks	8	4
32-34 wks	26	13
35- 37 wks	110	55
38-40 wks	56	28
Total	200	100

The mean birth weight of the first twin was 2.09kg and 2nd twin was 2.03kg. Majority had birth weights between 2-2.4kg (**Table 2**).

**Table 2. Birth weight of first and second twin**

Birth weight in kg	1st twin		2nd twin	
	No	%	No	%
< 1kg	6	3.02%	6	3.02%
1-1.4kg	12	6.03%	21	10.5%
1.5-1.9kg	56	28.14%	56	28.14%
2-2.4kg	77	38.7%	79	39.7%
2.5-2.9kg	40	20.1%	29	14.5%
3 –3.4kg	8	4.02%	7	3.5%
3.5-3.9kg	0	0	1	0.5%
Total	199	100	199	100

The NICU admission was required in 28.5% of 2nd twin compared to 23% of 1st twin. Most common indication for NICU admission for twin was prematurity (35%) followed by IUGR (15%), LBW and birth asphyxia (15%).

Perinatal outcome in twin pregnancies among 400 twin babies show that there were 56 cases of peri-natal deaths, out of which 21 cases of macerated deaths, 4 still births and 31 neonatal deaths. Perinatal mortality rate was 110/1000 birth (excluding those having birth weight <1000 gm).

The most common cause for neonatal death (NND) was preterm with respiratory distress, hyaline membrane disease (HMD) (**Table 3**). Discordancy was present in 52 cases (26%).

Causes of NND	No
Preterm with respiratory distress, HMD	16
Preterm SGA with sepsis	4
Severe birth asphyxia	8
Hypoglycemia	1
Meconium aspiration syndrome	2

Regarding chorionicity 62 percent of the cases were dichorionic diamniotic pregnancy, 37% mono-chorionic diamniotic pregnancy. There was 1 case of mono-chorionic mono-amniotic (MCMA) pregnancy complicated by hydramnios, both babies lost with intra uterine death (IUD) at around 29wks, which were later induced and expelled. There was 1 conjoined twin; it was a G2P1Lo, had elective cesarean session at 36wks for conjoined twins 3.50kg, adhered at sacral region. Both babies died on 2nd postnatal day (Table 4).

Chorionicity	No	%
Monochorionic mono amniotic	1	0.5
Mono chorionic diamniotic	74	37
Dichorionic diamniotic	124	62
Conjoint	1	0.5

was 36.57(SD, 2.08).

Perinatal mortality according to Chorionicity was calculated. The number of macerated births, still births and neonatal deaths were definitely more for mono-chorionic twins. Perinatal mortality rate of mono-chorionic pregnancy was, 180/1000 (18%) compared to 60.5/1000 (6%) for dichorionic pregnancy, which shows a significant association with perinatal mortality and chorionicity (Chi-square 6.64 and p-value <0.01) (Table 5).

Discordancy was there in 31 cases (25%) of dichorionic pregnancy and 21(28%) cases of monochorionic

	Monochorionic	Dichorionic
No. of babies	150	248
Macerated birth	17	4
Still birth	3	1
NND	17	12
Total perinatal death	37	17
PMR/1000 live birth	180/1000 live birth	60.5/1000 birth

(Excluded those having B.W < 1000gms)

Average gestational age at delivery of monochorionic twin was 35.7 (SD, 2.27) and that of dichorionic twin

pregnancy. This relationship was tested by chi square test, and found to be not statistically significant (p value 0.57) (Table 6).

Discordancy	Monochorionic		Dichorionic	
	Number	%	Number	%
Present	21	28	31	25
Absent	54	72	93	75
Total	75	100	124	100

IUGR was present in 16 cases (21.3%) in monochorionic twins and 16 cases (12.9%) in dichorionic twins, which was found to be not statistically significant (p value 0.23).

## DISCUSSION

Preterm birth is the main reason for the poor perinatal outcome in multiple pregnancy. All studies of Perinatal mortality in multiple pregnancy agree that preterm birth is the greatest single threat to infants. The preterm birth rate in twins varies among populations from 30 to 50%. Incidence of preterm delivery in the present study was 45%. 84.5% of twins had spontaneous onset of labour, but in 15.5% (31 cases) labour was induced for obstetrical indications like PIH and its complications, intrauterine growth restriction, PROM and unfavourable cervix and for cases of single fetal demise. The incidence of preterm birth in studies conducted by Anahita et al 2003 and Houlton M,<sup>1,2</sup> 1981 were 61.2 & 50 respectively 55% had delivery between 35 and 37 weeks and 28% delivered between 38 and 40 wks. 13% delivered between 32- 34 weeks. A retrospective study of 188 twin pregnancies conducted by Anahita et al<sup>1</sup> reported that the period of gestation at onset of labour varied between 24 – 41 weeks, average being 33 weeks and only 38.29% continued beyond 37 weeks of gestation. This shows that the average gestational age in twins is 2-3 weeks prior to singleton pregnancy. Yin Bin Cheung et al suggested the optimal gestational age of twins to be between 37 – 39weeks; this is associated with minimum neonatal and infant morbidity and mortality.<sup>3</sup>

Majority of 1st and 2nd twin (39%) had birth weight between 2 to 2.4kg. 28% between 1.5 – 1.9kg. This may be explained by the increased incidence of IUGR and prematurity in twins. The average birth weight of 1st of twin was 2.09kg and 2nd of twin was 2.03kg. Anahita Pandole<sup>1</sup> also reported the average weight of the first twin as 2kg, while 1.7kg for 2nd of the twin.

The low birth weight in twin pregnancies is an indicator of prematurity and intrauterine growth restriction. The most common cause of NICU admission was prematurity followed by low birth weight, IUGR and birth asphyxia. Other causes were hypoglycaemia, sepsis, hyper-bilirubinaemia and meconium aspiration.

Regarding the perinatal outcome, there were 56 perinatal deaths in 400 fetuses. Neonatal deaths in the present study were 31. Most important cause of neonatal death was prematurity with respiratory distress and HMD. Other causes were severe birth asphyxia, prematurity and sepsis, hypoglycemia and meconium aspiration syndrome. This was comparable to another, reported 64 perinatal deaths in 376 fetuses.<sup>1</sup> Perinatal mortality in our hospital for singleton during the study period was 30.4/1000 births. Perinatal mortality in twin pregnancy in the present study was 110/1000 births or 11%. This shows that perinatal mortality in twin pregnancy is 3 to 4 times higher than singleton pregnancy. High incidence of prematurity, low birth weight, birth asphyxia associated with delay in delivery of 2nd of twin and high incidence of malpresentations contributed to this high perinatal mortality. High perinatal mortality rates of 17.02%, 11.5% and 17.4% have been already reported by Anahita Pandole, Chabra et al and Rani et al respectively in various studies conducted in our country.<sup>4,5</sup>

62% had dichorionic diamniotic presentation and 37% had monochorionic diamniotic presentation. There was one case of monochorionic monoamniotic pregnancy which presented at 29 weeks with hydramnios and intrauterine demise of both the babies. This explains the fatal outcome of MCMA, which is associated with 50% mortality of the fetus. There was 1 case of conjoined twin which was delivered by elective caesarean section around 36wks after discussing with paediatric surgeon. The point of juncture was in the sacral region, baby weighing 3.5kg, but succumbed to neonatal death on the 2nd postnatal day. This compares to the study of retrospective analysis of 261 twin pregnancies conducted by Mahmut et al where the incidence of dichorionicity was 69.3% and monochorionicity was 30.7%. The median gestational age at births for monochorionic twins is 36 weeks compared with 37 weeks for dichorionic twins<sup>6</sup> In the present study average gestational age of monochorionic diamniotic twins was 35.78 and that for dichorio-diamniotic twins was 36.5. Hatkar PA et al and colleagues in their study of 100 twin pregnancies identified the average GA of

monochorionic twins to be 35.5wks and dichorionic twins to be 35.7 wks.<sup>7</sup> In that study dichorionic twins constituted 71% and monochorionic twins 29%.

Total perinatal death was 37/1000 twin in monochorionic pregnancy when compared to 17/1000 twin in the case of dichorionic pregnancy. The relationship of chorionicity to perinatal outcome was statistically tested by chi-square test and the p value obtained was 6.64 E-22 which was statistically significant. Perinatal mortality rate of monochorionic pregnancy was 180/1000 or 18% when compared to 60.5/1000 ie 6% for dichorionic pregnancy. A study of perinatal outcome of twins in relation to chorionicity conducted at Now rosjece Wadia Maternity Hospital in Mumbai by Hatkar PA et al calculated the perinatal mortality rate of monochorionic to be 176.47/1000 twin and for dichorionic to be 88.88/1000 births.<sup>7</sup> This was comparable to our study. Thus it can be concluded that perinatal outcome of twins is influenced by the type of placentation. Antepartum diagnosis of the type of placentation (chorionicity) will help in identifying the twin pregnancies at risk of twin to twin transfusion, discordant growth and greater perinatal mortality. This will help in counseling the patient regarding the prognosis of her pregnancy.

Discordancy was identified in 52 cases (26%). IUGR was detected in 32 cases (16%). This shows the increased incidence of discordancy and IUGR in twin gestations. Ananth CV et al in 1998 reported that the percentage of SGA babies is 27% in twins.<sup>8</sup> Sebire et al in 1997 reported that discordancy occur in about 12% of twins. They had taken >25% discordance was significant but in our study the cut off for discordance ratio was >20%. In relation to chorionicity, discordancy was there in 31 cases (25%) of dichorionic pregnancy and 21 cases (28%) of monochorionic pregnancy. The relationship was tested by chi-square test and was not statistically significant. This compares to the study by Sebire et al.<sup>9</sup> He reported that although growth discordance complicates monochorionic (11.3%) as often as dichorionic (12.1%) twins, the growth pattern and underlying pathophysiology are probably different. The onset of discordant growth can present early or late in monochorionic pregnancy, whereas in dichorionic it usually becomes apparent only later in pregnancy. IUGR was identified in 21.3% of monochorionic twins compared to 12.9% of dichorionic twins. This was also statistically insignificant. Chance of both twins being SGA is 17% in monochorionic and 18% in dichorionic.



## CONCLUSION

Perinatal mortality of monochorionic twins is much higher than that of dichorionic twins. Antepartum diagnosis of the type of placentation will help in identifying the twins at risk for twin to twin transfusion syndrome, discordant growth and greater perinatal mortality. Good antenatal care, early diagnosis, recognition and treatment of antenatal risk factors, prevention of preterm labour and close fetal surveillance, particularly of monochorionic twins and prompt therapeutic intervention of TTTS are necessary to reduce perinatal mortality. Strict intrapartum monitoring, experienced obstetricians to conduct delivery, liberal use of LSCS along with good neonatal intensive care especially for premature babies, will lead to better outcome.

## END NOTE

### Author Information

1. Roshni Radhakrishnan, Assistant Professor, Department of Obstetrics and gynaecology, Sree Gokulam Medical College & Research Foundation, Kerala, India.
2. Ratish Radhakrishnan, Assistant Professor, Associate Professor, Department of CVTS, Medical College, Kottayam, Kerala, India

**Conflict of Interest:** None declared

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