Original Research Article

Study of the effect of chorionicity on neonatal outcome in twin gestation

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Abstract

Background: Twin pregnancy is significantly related to increased maternal and fetal morbidity and mortality as compared to singleton pregnancy. The rate of twin specific complications varies in relation to zygosity and chorionicity, with the latter being the more important determinant. **Design:** Prospective observational study **Aims and Objective:** to study the effect of chorionicity on neonatal outcome in twin gestation **Methods:** 75 Patients with sonographically confirmed twin pregnancy attending ante-natal care outpatient department (ANC OPD) and labor room at a tertiary care hospital were enrolled in this study and followed till delivery and thereafter in the neonatal period. **Results:** In this study, 97% of monochorionic twins were less than 2500 grams while 68% of the dichorionic twins were low birth weight. 86.67% of the monochorionic twins delivered before term while 73.33% of the dichoronic twins delivered preterm. 26% of the monochorionic twins required NICU admission whereas 19% of dichorionic twins required NICU admission. Perinatal deaths were 26.6% in monochorionic twins while 15.8% in dichorionic twins. **Conclusion:** Twinning in pregnancy is a high-risk factor which can cause various maternal as well as fetal complications. Monochorionic twins had more perinatal complications than dichorionic twins. Prompt antenatal care and timely intervention is required to avoid these complications.

Key Word: Twin gestation, chorionicity, neonatal outcome.

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INTRODUCTION

Twin fetuses usually result from fertilization of two separate ova–dizygotic or fraternal twins. Less often, twins arise from a single fertilized ovum that subsequently divides monozygotic or identical twins. Either or both processes may be involved in the formation of higher numbers. Twin pregnancy is significantly related to increased maternal and fetal morbidity and mortality as compared to singleton pregnancy[1,2,3.] The rate of twin specific complications varies in relation to zygosity and chorionicity[4], with the latter being the more important determinant. Monochorionic twins have higher complications than dichorionic twins[5]. High fetal death rate of monochorionic twins may Result from cord entanglement, congenital anomaly, preterm birth, or twin-twin transfusion syndrome. Chorionicity can be determined by any one of the following methods.[1] Sonographic Evaluation[2] Placental Examination[3]Infant Sex and Zygosity. Chorionicity should be determined in each twin pregnancy best in the first trimester. Detecting it at the earliest helps both the patient as well as the obstetrician to anticipate the possible forthcoming complications related to chorionicity. Our study is designed to explore the effects of chorionicity on neonatal outcome.

MATERIAL AND METHODS

75 Patients with sonographically confirmed twin pregnancy attending ante-natal care outpatient department (ANC OPD) and labor room at a tertiary care hospital were enrolled in this study and followed till delivery and thereafter in the neonatal period. Birth weight was

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recorded. Preterm delivery was noted. Neonates requiring NICU admission were followed till 28 days and outcome was noted. Data was collected and analysed using Statistical Package for Social Sciences.

Inclusion and Exclusion Criteria

Inclusion Criteria: Twin pregnancy with sonographically confirmed chorionicity. Exclusion Criteria: Triplets or higher order multiple pregnancy, twin pregnancy which could not cross age of viability.

OBSERVATIONS AND RESULTS

Chorionicity: The chorionicity could be confirmed from the earliest ultrasonography available, preferably first trimester ultrasonography. 80% patients had diamniotic dichorionic twins while 13.33% twins were diamniotic monochirionic. 6.67% had monoamniotic monochorionic twins. table 1

Table 1: Outcome Of Baby

Chorionicity	No. of cases (n = 75)	Percentage
Diamniotic / Dichorionic	60	80
Diamniotic / Monochorionic	10	13.33
Monoamniotic/ Monochorionic	5	6.67

Birth Weight

Out of the total 150 babies delivered among study group 11.33% babies had weight at birth less than 1 kg. 15.33% babies were weighing between 1 to 1.5 kg. 47.33% were between 1.5 to 2.5 kg. 26% foetuses were more than 2.5 kg table2. 74% babies were low birth weight babies with prematurity being the major contributor table3.

Table 2: Birth Weight

Birth Weight (Kilogram)	No. of cases(n = 150)	Percentage
<1	17	11.33
1-1.5	23	15.33
1.6-2.5	71	47.33
>=2.5	39	26

Preterm Labour

Among the 150 neonates born, 76% were preterm. Median age at the time of delivery was 34 weeks 02 days. As shown below, 10 patients i.e. 13.33% delivered before 28 completed weeks. Another 10 patients i.e. 13.33% delivered between 28 to 32 weeks. 37 patients i.e. 49.33% delivered between 32 to 37 weeks. Remaining 36 patients i.e. 24% delivered at term table3.

Table3: Gestational Age At The Time Of Delivery

Sr. No.	Gestational age At time of delivery	No. of cases (N = 150)	Percentage
1	< 28 WEEKS	20	13.33
2	28 – 32 WEEKS	20	13.33
3	>32 - <37 WEEKS	74	49.33
4	37 – 42 WEEKS	36	24

Perinatal Outcome

Among the 150 foetuses Total 14 fetuses (8%) died in utero of which. two foetuses were anomalous. While among the live babies, 30(22%) required NICU stay. 5.7% babies died in early neonatal period while 3.6% neonates died in late neonatal period. table 4

Table 4: Outcome of the baby

Outcome of baby	Total No. of babies (N = 150)	%
IUD	14	9.3
	Total live births (N = 136)	
APGAR<=7	6	4
NICU	30	22
Early NND (within 7 days)	8	5.7
Late NND (between 7 to 28 days)	5	3.6

Malformations

Two foetuses (1.3%) were having malformation. No recognised cause could be found for the occurrence of malformation on routine investigations.

Chorionicity And Preterm Birth

86.67% of the foetuses with monochorionic placenta were born preterm while 73.33% of those with dichorionic placenta delivered preterm. Table 5

Table 5:

chorionicity	preterm birth YES	preterm birth NO	total
Monochorionic	26	04	30
Dichorionic	88	32	120
Total	114	36	150

chorionicity and low birth weight

97% of those with monochorionic placenta birth weight below 2500 grams whereas 68% of newborns with dichorionic placenta had low birth weight. table 6

Table 6:

Chorionicity	Low birth weight Yes	Low birth weight No	Total
Monochorionic	29	1	30
Dichorionic	82	38	120
Total	111	39	150

Chorionicity And Nicu Admission

26% twins with monochorionic placenta and 19% of those with dichorionic placenta required NICU admission. table 7

Table 7:

Chorionicity	Nicu admission (n = 136) Yes	Nicu admission (n = 136) No	Total
Monochorionic	06	17	23
Dichorionic	22	91	113
Total	28	108	136

Chorionicity And Perinatal Deaths

Among all of the perinatal deaths 27% were among those with monochorionic placenta. While 50% of the foetuses with intrauterine deaths had monochorionic placenta only 7% of those babies dying in the neonatal period had monochorionic placenta. Thus monochorionicity contributing more to intrauterine deaths than neonatal deaths. 87.5% of those foetuses with monochorionic placenta died in utero while 37 % of those with dichorionic placenta died in utero. table 9, 10 Though 27% of the foetuses with monochorionic placenta died in perinatal period and 16% of the foetuses with dichorionic placenta died in the perinatal period a difference which may sound significant initially, there is no statistically significant difference in the perinatal deaths and overall outcome among the foetuses with monochorionic and dichorionic placenta (p value 0.147).

Table 9: Chorionicity And Perinatal Deaths

Chorionicity	Perinatal death		Total
	Yes	No	
Monochorionic	08	22	30
Dichorionic	19	101	120
Total	27	123	150

P value = 0.147, chi square (DF=1) = 1.659

Table 10:

Chorionicity	Perinatal death		Total Deaths
	Intrauterine Death	Neonatal death	
Monochorionic	07	01	08
Dichorionic	07	12	19
Total deaths	14	13	27

Table 11:comparison of perinatal outcome with chorioncity

	Monochorionic twins (20%) N=30	Dichorionictwins (80%) N=120	Total N=150
Preterm	26 (86.67%)	88 (73.33%)	114 (76%)
LBW	29(97%)	82(68%)	111 (74%)
Perinatal deaths	08(26.6%)	19(15.8%)	27 (18%)
NICU admission	06(26%)	22(19%)	28 (18.6%)

DISCUSSION

The study group included all the patients with sonographically confirmed twin pregnancy. Hence the chorionicity could be confirmed from the earliest ultrasonography available preferably first trimester ultrasonography. 80% patients had diamniotic dichorionic twins while 13.33% twins were diamniotic monochorionic. 6.67% patients had monoamniotic monochorionic twins. Rodis JF, McIlveen PF, Egan JF, *et al*[6] studied monoamniotic twins with earlier diagnosis of chorionicity and found improved perinatal survival with accurate prenatal diagnosis and antenatal fetal surveillance. Thirteen monoamniotic pregnancies resulting in 26 infants who were born alive were managed. The average gestational age at diagnosis was 16.3 weeks. All had antenatal fetal surveillance including serial sonograms and nonstress tests. The average gestational age and birth weight at delivery were 32.9 weeks and 1669 gm, respectively. Cord entanglement was noted in all cases, with knotting in 8 of 13. Two pairs of 26 newborns had evidence of twin-twin transfusion syndrome. Eight of 13 monoamniotic pregnancies were delivered because of nonreassuring results of nonstress test, two because of preterm labor, two electively because of lung maturity, and one because of intrauterine growth restriction. Two of the 26 infants died in the neonatal period, one of congenital heart disease and one of sepsis and asphyxia. Oldenburg A, Rode L, Bødker B, Ersbak V, Holmskov A, Jørgensen FS, Larsen H, *et al* (2012)[7] had a study regarding influence of chorionicity on perinatal outcome in a large cohort of Danish twin pregnancies. Among 2038 twin pregnancies, 1757 (86.2%) were dichorionic (DC) and 281 (13.8%) were monochorionic diamniotic (MC). In MC pregnancies, the rate of spontaneous fetal loss in both second and third trimesters was more than threefold higher than the comparable rate in DC pregnancies: 6.0% vs. 1.9% for at least one fetus in the second trimester ($P < 0.001$) and 2.1% vs. 0.7% in the third trimester ($P = 0.03$). In 98.4% of DC pregnancies and in 91.1% of MC pregnancies, at least one infant was liveborn. Amongst pregnancies with two live fetuses at 24 weeks, the proportion with two live infants at 28 days after delivery was 97.5% and 95.1%, respectively Manso P, Vaz A, Taborda A, Silva IS (2011)[8] studied a case series over 10 years and tried to find out the association of Chorionicity and perinatal complications in twin Pregnancy and concluded that as the morbidity and mortality associated with monochorionic pregnancies are higher, it is essential to perform an early detection of chorionicity by ultrasound (11-13 weeks) in order to place differentiated prenatal and appropriate peripartum surveillance. In a cohort study of 238 consecutive sets of twin pregnancies Baghdadi s *et al*[9] concluded that chorionicity did not affect the overall fetal loss rate amongst the twin pregnancies and there were differences in patterns of loss according to chorionicity, which require further investigation. Monochorionic twins represent considerable challenges to both obstetricians and neonatologists and should be monitored and delivered at tertiary centers according to marta M *et al.*[10] Lakshmi *et al*[11] concluded that Mono-chorioncity 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. Hatkar *et al*[12] found in their study that monochorionic twins showed increased incidence of discordant growth (34.48%) as compared to that of dichorionic twins (14.08%) 3.4% of monochorionic twins showed severe discordancy probably as a result of twin-to-twin transfusion syndrome, which, also resulted in increased incidence of macerated still births in monochorionic twins. The neonatal morbidity can be roughly assessed by the duration of NICU stay. The percentages of monochorionic and dichorionic twins transferred to NICU were comparable. But four (6.89%) of monochorionic twins had longer stay in NICU (>30 days) as compared to only 1(1.75%) of dichorionic twins. Ebony B carter *et al*[13] concluded in their study of 2301 twin pregnancies over 20 years that There are no significant differences in maternal outcomes by chorionicity; however, monochorionicity is associated with increased fetal risks. This information may be helpful in guiding more targeted counseling to expectant parents of twins that, although the presence of an additional placenta does not confer additional maternal risks, monochorionic infants tend to deliver earlier and require longer hospital stays.

CONCLUSION

Perinatal deaths were 26.6% in twins with monochorionic placenta while 15.8% in those with dichorionic placenta. 97% of those with monochorionic placenta birth weight below 2500 grams whereas 68% of newborns with dichorionic placenta had low birth weight. 86.67% of the foetuses with monochorionic placenta were born preterm while 73.33% of those with dichorionic placenta delivered preterm. 26% twins with monochorionic placenta and 19% of those with dichorionic placenta required NICU admission. There is no statistically significant difference in the perinatal deaths and overall outcome among the foetuses with monochorionic and dichorionic placenta (p value 0.147).

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