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Original Research Article

Fetomaternal outcome in twin gestation

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ABSTRACT

Background: Twin pregnancies are among the major challenges faced by obstetricians globally. Increased maternal and fetal morbidity is observed with an increase in the incidence of twin pregnancies. The major problems occurring in twin pregnancy are prematurity, low birth weight, intrauterine growth restriction (IUGR), birth trauma and birth asphyxia. The incidence of twin gestation has increased mainly due to advanced maternal age and ART. Objectives were to evaluate maternal and neonatal complications and pregnancy outcomes in twin pregnancies.

Methods: A prospective study conducted in Baroda Medical College, Vadodara over the period of 1 year evaluated 178 women with twin pregnancies fulfilling the inclusion and exclusion criteria. After taking informed consent detailed history of patient, all routine antenatal investigations were done. Patients will be followed up till discharge from hospital.

Results: Majority of the women belonged to the age group 18-25 years. Maximum number of mothers 60.11% delivered between 32-36 weeks of gestation. Out of them 94.38% of the women conceived by spontaneous conception. Caesarean section (CS) was the most common mode of delivery 63.48% and vaginal delivery occurred in 36.5% mothers. Preterm labor is the most common complication occurring in 93.2% mothers, followed by hypertension in 30.8% mothers. Among those with hypertension 3.93% mothers also had oligohydramnios. Anemia occurred in 10.1% mothers among which 33.3% developed anemia post-partum.

Conclusions: Maternal complications during twin pregnancy were mainly preterm labor, diabetes, hypertension and anemia. Fetal complications were mostly related to IUGR. Active fetal surveillance can improve fetomaternal outcome.

Keywords: Twins, Prematurity, Dichorionic diamniotic, Monochorionic, Monozygotic

INTRODUCTION

Multifetal pregnancies can occur in two main ways: either from two separate fertilizations, or from a single fertilization followed by the splitting of the zygote. In some cases, both of these mechanisms might be involved.

Newborns born from multiple pregnancies are more likely to be very low birth weight compared to those from single pregnancies.¹

Hellin's law, also known as Hellin-Zeleny's law, is an observation in population studies that predicts the frequency of multiple births. According to this law, the risk of multiple births decreases as the number of fetuses

increases. For example, twin births occur about once for every 89 singleton births, and triplet births occur about once for every 89 singleton births.²

In describing multiple pregnancies, it is common to use terms like zygosity, amnionicity, and chorionicity. These terms refer to the number of zygotes, amnions (membranes surrounding the fetuses), and chorions (outermost membranes), respectively. Twin fetuses are usually formed when two separate eggs are fertilized, resulting in dizygotic or fraternal twins. However, twins can also result from a single fertilized egg that splits into two, leading to monozygotic or identical twins. Dizygotic twins are not considered true twins because they come from two separate eggs fertilized in the same cycle. Genetically, they

are similar to any other sibling pair. Twins of different sexes are almost always dizygotic.

The exact reasons behind monozygotic twinning are not fully understood. One possible factor is the use of assisted reproductive technologies, such as *in-vitro* fertilization (IVF). The incidence of monozygotic twins appears to be higher when blastocysts are transferred instead of embryos at a later stage. This might be due to the effects of the culture media used in the process. Multiple pregnancies are associated with higher maternal risks.³ As the number of fetuses increases, so does the risk of complications like hypertension, preeclampsia, gestational diabetes, and bleeding during or after delivery.⁴ Multiple pregnancies are also linked to lower birth outcomes for the babies. There is an increased risk of preterm birth, low birth weight, growth restrictions, and birth defects.⁵ Due to these complications, CS are more commonly performed in multiple pregnancies than in single pregnancies.⁶⁻⁸ The risk of twin-twin transfusion syndrome is lower in monoamniotic twins compared to monochorionic diamniotic (MCDA) pregnancies. This may be because monoamniotic twins often develop a type of blood vessel connection that is protective. Labor and delivery of multiples can be more complicated. There is a higher chance of issues like poor uterine contractions, abnormal baby positions, umbilical cord prolapse, placenta previa, placental abruption, urgent surgical delivery, and postpartum bleeding due to uterine atony. Additionally, the second baby born at full term tends to have worse outcomes than the first, regardless of how the babies are delivered. Factors that influence twinning include maternal age. Studies show that the frequency of dizygotic twins increases significantly between the ages of 15 and 37. During this period, increased levels of follicle-stimulating hormone can lead to the development of multiple eggs. Parity, or the number of previous pregnancies, is also a factor. The risk of twinning is higher with each additional pregnancy, at least in part due to the use of assisted reproductive technologies. Family history plays a role as well. A mother's own history of being a dizygotic twin is more predictive of having twins than the fathers. A study of nearly 4,000 records found that women who were dizygotic twins were about 1 in 58 births to have twins. Infertility treatments, particularly those involving follicle-stimulating hormone or clomiphene citrate, can significantly increase the chance of multiple ovulations. These treatments are often the first step before *in vitro* fertilization. In dichorionic pregnancies, the separating membranes are composed of four layers-two amnions and two chorions. A specific sign called the twin peak sign, or lambda/delta sign, can be seen when examining the area where the membranes divide on the placenta.⁹ In contrast, monochorionic pregnancies have thin dividing membranes that may not be visible until the second trimester. These membranes are less than 2 mm thick and consist of only two layers. The way the membranes and placenta are positioned forms a right angle, and there is no placental tissue extending between them, known as the T sign. Most fetal complications related to twinning are seen in

monozygotic twins. The incidence of twin-twin transfusion syndrome is lower in monoamniotic twins compared to MCDA pregnancies. This difference might be because monoamniotic twins commonly have arterioarterial anastomoses, which may offer some protection. Umbilical cord entanglement is a common occurrence.

While colour-flow Doppler ultrasound can help detect entanglement, the causes of umbilical vessel tightness are not well understood. There are also unique and unusual cases of twinning. These include conditions that result from partially split embryos or from the fusion of separate embryos. These can result in various fetal malformations such as external parasitic twins, fetus-in-fetu, and twin reversed arterial perfusion (TRAP) sequence.^{10,11} Whether these connections are harmful depends on how balanced the blood flow between the twins is. If there is a significant pressure or flow difference, a passage can form between the twins. This can lead to conditions such as twin-twin transfusion syndrome, twin anemia-polycythemia sequence, or TRAP sequence.

METHODS

Study type

It was a prospective cohort study.

Study duration

Study conducted for 1 year (from October 2023 to September 2024).

Study population

All antenatal women with multiple gestation coming to the Obstetrics and gynecology department, SSG Hospital, Baroda, satisfying the inclusion and exclusion criteria, will be considered for this study.

Inclusion and exclusion criteria

Pregnant women above 18 years of age carrying twins and conceived spontaneously or with treatment, giving consent for the study, delivering at SSG Hospital with no previous adverse maternal or fetal outcome were included in the study. Women were excluded if they had pre-existing medical disorders like chronic hypertension, pre-gestational diabetes, cardiac disease, renal disease or collagen vascular disorder. with triplets and other higher order pregnancy. Molar pregnancy, grand multipara, patients with a history of previous uterine rupture, myomectomy and patients with uterine anomalies and cervical incompetence were also excluded from the study.

Study procedure

The study will be carried out in the Department of Obstetrics and Gynecology at SSG Hospital, Baroda. The

patients will be enrolled in the present study and will be informed about the nature and purpose of the study. The 178 consenting patients fulfilling the inclusion and exclusion criteria will be considered for my study. After taking informed consent, a detailed history of the patient will be taken as per the proforma. All routine recommended antenatal investigations will be done, including details. Patients will be followed up till discharge from hospital. All information thus collected will be recorded on a pre-designed study proforma and will be entered into a Microsoft excel sheet to prepare a master chart.

Statistical analysis

A standard template was created using Microsoft excel 2017 to enter the data collected in the present study. Categorical variables were reported as numbers and percentages.

RESULTS

The majority of the women studied with twin gestation were in mean age group of 24.75 ± 3.9 years. The proportion of the women in the age group of 18-25 years was 71.3%, 21.3% in the age group 26-30 years and 7.3% in more than 30 years.

Table 1: Age distribution, gestational age, mode of delivery.

Variables	No. of mothers	Percentage
Age (in years)		
18-25	127	71.3%
26-30	38	21.3%
>30	13	7.3%
Gestational age (in weeks)		
28-32	59	33.14%
32-36	107	60.11%
>36	12	6.74%
Mode of delivery		
Vaginal delivery	65	36.5%
CS	113	63.48%

The most common indication for cesarean delivery was fetal distress (37.8%) followed by fetal malpresentation (11.23%) and previous CS (8.42%).

Among the maternal complications, preterm labor is the most common, occurring in 166 (93.2%) mothers with twin gestation in my study, followed by hypertension (eclampsia and PIH) in 55 (30.8%) mothers. Among those with hypertension, 7 mothers (3.93%) also had oligohydramnios. Anemia occurred in 18 (10.1%)

mothers, among which 33.3% of the mothers developed anemia post-partum due to post-partum hemorrhage. 4 (2.24%) mothers also had polyhydramnios in my study.

Table 2: CS indications.

Indications	No. of mothers	Percentages
Abnormalities of labour	7	3.93%
Antepartum haemorrhage	7	3.93%
Foetal malpresentation	22	12.35%
Foetal distress	58	32.58%
Previous caesarean	15	8.42%
AEDF in one twin	4	2.24%
Total	113	

Preterm delivery (42.6%) is the most important cause of increased incidence of low birth weight and perinatal morbidity in twin pregnancy, the second most common being respiratory distress syndrome (22.4%). There was a difference of 20% in the weight of both twins in 39.8% of cases. Out of 22 perinatal mortalities in twin 1 and 26 perinatal mortalities in twin 2, 7 were IUFD in each.

The mean weight of the first twin was 1.66 ± 0.47 kg, while the mean weight of the second twin was 1.64 ± 0.49 kg. The majority of the babies (both twin 1 and twin 2) (57.85%) were low birth weight (LBW), and 8.70% were normal weight. Very low birth weight (VLBW) (weights between 1.00-1.499 kg) children were 28.34%, and extremely low birth weight (ELBW) (birth weight ≤ 999 grams) was 5.33%.

The Table 5 shows that out of 178 twin pregnancies included in the study, 79.2% were DCDA type of twins and 20.7% were MCDA type. The rate of CS was higher in the monochorionic group (72.9%) as compared to the dichorionic group (60.99%). There was no difference in neonatal complications between the groups except in IUGR, with MCDA twins showing increased rates of IUGR (8.1%) as compared to DCDA twins (4.96%).

As shown in the Table 5, the most common presentation was cephalic-cephalic-127 (71.3%), followed by breech-cephalic 29 (16.29%) and cephalic-breech 11 (6.17%). More than 50% breech-cephalic presentations were delivered by CS, while more than 50% cephalic-breech presentations were delivered vaginally. The most frequent mode of delivery in twin gestation overall was LSCS-113 (63.48%). Malpresentation was one of the most common factors for LSCS.

Table 3: Complication encountered by the mother.

Maternal morbidity	No. of mothers	ND	CS	Percentages
Hypertension (eclampsia and PIH)	55	17	38	30.8%
Preterm labour	166	16	105	93.2%

Continued.

Maternal morbidity	No. of mothers	ND	CS	Percentages
Pre-labour-rupture of membranes	39	5	34	21.9%
Anaemia	32	12	19	17.97%
Antepartum haemorrhage	6	0	6	3.37%
Post partum haemorrhage	6	3	3	3.37%
Gestational diabetes	3	1	2	1.68%
Polyhydramnios	4	0	4	2.24%
Oligohydramnios	7	2	5	3.93%

Table 4: Fetal complications and birth weight.

Variables	Twin 1	Percentage	Twin 2	Percentage
Fetal complications				
Prematurity	76	42.69%	70	39.3%
Respiratory distress syndrom	40	22.4%	37	20.7%
IUGR	14	7.86%	10	5.61%
Septicaemia	6	3.37%	4	2.247%
Jaundice	14	7.86%	12	6.74%
Asphyxia	7	3.93%	11	6.17%
Discordant twins	71	39.88%	71	39.88%
No complications	13	7.30%	17	9.55%
Birth weight				
ELBW (<1 kg)	12	6.74%	7	3.93%
VLBW (1-1.5 kg)	50	28.08%	51	28.65%
LBW (1.5-2.5kg)	104	58.42%	101	56.74%
≥2.5 kg	12	6.74%	19	10.67%

Table 5: Type of twins and mode of delivery.

Variables	Mode of delivery-ND	Mode of delivery-CS	Total	Percentage
Type of twins				
DCDA	55 (39%)	86 (60.99%)	141	-
MCDA	10 (27%)	27 (72.9%)	37	-
Mode of delivery				
Cephalic-cephalic	44	83	127	71.3%
Cephalic-breech	8	3	11	6.17%
Breech-cephalic	10	19	29	16.29%
Breech-breech	0	4	4	2.24%
Transverse-breech	3	4	7	3.93%

DISCUSSION

The present prospective cohort study evaluated fetomaternal outcomes in 178 women with twin gestation. Twin pregnancy continues to be associated with a high incidence of maternal and neonatal complications, primarily because of preterm birth, low birth weight, hypertensive disorders, and increased operative delivery rates.

The majority of women in the present study were between 18 and 25 years of age, with a mean maternal age of 24.75±3.9 years. Most women delivered between 32 and 36 weeks of gestation (60.1%), and the mean gestational age at delivery was 33.2±2.5 weeks, emphasizing the well-recognized association between twin gestation and preterm birth. Similar observations were reported by Kalyankar et al in which most women belonged to the 18-25-year age

group and the highest proportion of deliveries occurred between 32 and 38 weeks of gestation.¹² These findings indicate that preterm delivery remains one of the most consistent characteristics of twin pregnancies across different populations.

Most pregnancies in the present study occurred following spontaneous conception (94.4%), and nulliparous women constituted the largest proportion of the study population. CS was the predominant mode of delivery (63.5%), while vaginal delivery was achieved in 36.5% of women. Fetal distress was the leading indication for caesarean delivery, followed by fetal malpresentation and previous CS. A higher CS rate has also been reported by Kalyankar et al and Shobha Rani et al although the overall rates varied between studies because of differences in institutional protocols, referral patterns, and obstetric indications.^{12,13} The increased frequency of operative delivery reflects the

higher incidence of fetal malpresentation and intrapartum fetal compromise commonly encountered in twin gestation.

The average birth weights of the first and second twins were comparable (1.66 ± 0.47 kg and 1.64 ± 0.49 kg, respectively), with more than half of the neonates (57.9%) being of low birth weight. Preterm delivery was the major contributor to low birth weight and subsequent neonatal morbidity, while respiratory distress syndrome was the second most common neonatal complication. Similar findings have been reported by Shobha Rani et al and Kullima et al who also identified prematurity and low birth weight as the principal determinants of adverse neonatal outcomes and increased perinatal mortality in twin pregnancies.^{13,14}

Akaba et al also reported that twin gestation was associated with a high incidence of low birth weight and stillbirth, with poorer neonatal outcomes in the second twin compared with the first.¹⁵ They observed a higher frequency of birth asphyxia among second twins than first twins. Comparable findings were noted in the present study, where birth asphyxia occurred more frequently in the second twin (10.0%) than in the first twin (5.6%). Similarly, the stillbirth rate was higher among second twins (14.6%) than first twins (12.3%), highlighting the increased perinatal vulnerability of the second twin during labour and delivery. These findings emphasize the importance of vigilant intrapartum monitoring and prompt obstetric intervention to improve second twin outcomes.

The meta-analysis by D'Antonio et al evaluating dichorionic diamniotic (DCDA) twin pregnancies complicated by fetal growth restriction demonstrated increased risks of intrauterine fetal death, neonatal death, preterm birth, and neonatal morbidity, particularly respiratory complications.¹⁶ Consistent with these observations, the present study demonstrated a high incidence of preterm birth (42.6%), low birth weight, respiratory distress syndrome (22.4%), intrauterine fetal demise (3.9% in each twin), and intrauterine growth restriction (7.9%). Furthermore, neonatal complications were largely comparable between monochorionic and dichorionic twins, except for intrauterine growth restriction, which was more frequent among MCDA twins (8.1%) than DCDA twins (5.0%). These findings reinforce the need for intensive antenatal surveillance, particularly in pregnancies complicated by fetal growth restriction and monochorionic placentation.

Preterm labour was the commonest maternal complication in the present study, affecting 93.3% of women, followed by hypertensive disorders of pregnancy (30.8%). Anemia was observed in 10.1% of women, and one-third of these cases developed postpartum anemia secondary to postpartum hemorrhage. These findings are broadly consistent with those reported by Nwankwo et al and Shobha Rani et al who similarly identified preterm labour, pregnancy-induced hypertension, anemia, and postpartum

hemorrhage as the predominant maternal complications in twin gestation.^{13,17} Although the reported incidence varied among studies, these differences are likely attributable to variations in patient characteristics, antenatal surveillance, referral status, and healthcare settings.

The most frequent fetal presentation in our study was cephalic-cephalic (71.3%), followed by breech-cephalic and cephalic-breech presentations. Cesarean delivery was more frequently performed in breech-cephalic presentations, whereas over half of cephalic-breech presentations were delivered vaginally. These findings are in agreement with those reported by Kalyankar et al who also observed cephalic-cephalic presentation as the predominant fetal presentation in twin pregnancies.¹²

Regarding chorionicity, DCDA twins constituted 79.2% of pregnancies, whereas MCDA twins accounted for 20.8%. CS was more frequently required in monochorionic pregnancies, and fetal growth restriction was also more common in this group. These findings are consistent with the established evidence that monochorionic twin pregnancies are associated with increased obstetric and perinatal risks because of shared placental circulation and vascular anastomoses, necessitating closer antenatal surveillance and timely intervention.

Overall, the findings of the present study reinforce that twin gestation remains a high-risk pregnancy associated with significant maternal and neonatal morbidity. Early diagnosis of chorionicity, regular antenatal surveillance, timely referral, and delivery at centres equipped with comprehensive obstetric and neonatal intensive care services are essential to improve fetomaternal outcomes.

Limitations

The present study was conducted at a single tertiary care center and therefore the findings may not be generalizable to the entire population. Small sample size and high loss to follow-up rate also adds to the limitations. The study required a long follow-up period which was one of the reasons that there were high chances of loss to follow-up of the subjects.

CONCLUSION

Multiple pregnancy is a significant risk factor for maternal and perinatal morbidity and mortality. The knowledge of maternal and fetal complications helps in better surveillance and in prevention of morbidity and adverse outcomes.

Diagnosis of twin pregnancy and determination of chorionicity is essential to anticipate abnormalities of monochorionicity. Antenatal care, with increased rest and nutritional supplementation, early detection of fetal and maternal complications together with thorough intranatal and postnatal vigilance, has much to its credit in lowering both maternal and fetal dangers. Most of the complications

in multiple gestations are preventable. High-risk units in the obstetric ward and a well-developed NICU setup would reduce maternal and perinatal morbidity and mortality. Hence the need for better obstetric care, neonatal care, and health services to achieve better outcomes.

Maternal complications during twin pregnancy were mainly preterm labour, diabetes, hypertension and anemia. CS was the main mode of delivery in this study, with significant association with hypertension and preterm labor. Fetal complications were mostly related to IUGR. More vigilance during the antenatal period and labour is needed for proper selection of mode of delivery. Active fetal surveillance and intervention with appropriate neonatal care can improve fetomaternal outcome.

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