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Original Research Article

Overview of fetomaternal outcome in twin gestation

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ABSTRACT

Background: Twin pregnancy, involving the presence of two fetuses in the uterus, has intrigued humanity across history. Key challenges presented by twin pregnancies include prematurity, low birth weight (LBW), intrauterine growth restriction (IUGR), birth trauma, asphyxia, and congenital anomalies. Preterm delivery poses the most significant risk, contributing to elevated perinatal mortality, neonatal morbidity, and long-term health issues for twins.
Methods: Retrospective study at Smt NHL Municipal Medical College analyzed 80 twin pregnancies from July 2022 to January 2024. Data included patient demographics, complications, and neonatal outcomes, informing findings through data analysis.
Results: In this study, the majority were under 30 years old (56%) and primigravida (68%), with 48% having a BMI over 30. Common complications included preterm labor (70%), pregnancy-induced hypertension (27.5%), and gestational diabetes (20%). Most twin pregnancies were dichorionic diamniotic (80%). Caesarean section rate was 47.5%. Deliveries mostly occurred between 33-36 weeks gestation, with cephalic-cephalic presentation being most common (40%). Neonatal complications were primarily prematurity (50%), resulting in high NICU admissions (62%) and a neonatal death rate of 13.76%.
Conclusions: Multiple pregnancies require early diagnosis and vigilant care to reduce maternal and perinatal risks. Access to skilled healthcare providers and advanced facilities is crucial. Antenatal care must be strengthened for timely referrals. Ultrasonography aids early complication detection. Further advancements and awareness are essential for improved outcomes.

Keywords: Complications, Neonatal complications, Prematurity, Twin gestation

INTRODUCTION

The term multiple pregnancy includes twins, triplets and higher orders multiples. Multiple pregnancy may result from either two or more fertilisation events, or from a single fertilisation followed by an "erroneous" splitting of zygote, or from a combination of both.[1] Twin foetuses commonly result from fertilisation of two separate ova and are termed as double ovum, dizygotic or fraternal twins. About a third as often, twins arise from a single fertilised ovum that subsequently divides into two similar structures, each with the potential for developing into a separate individual. These twins are termed as single-ovum, monozygotic, or identical twins.[2]

Multiple pregnancies carry higher risks of adverse fetal and neonatal outcomes and this has consequences for child health as well as for families and the health care system.[3]

Multiple pregnancies are high risk pregnancies. The occurrence of both maternal and neonatal complications is associated more with multiple gestation as compared to

singleton pregnancies. Obstetric complications that may arise from multifetal pregnancies include hyperemesis gravidarum, gestational diabetes, polyhydramnios, preterm labour, preterm premature rupture of membranes, anemia, pre-exlampsia, postpartum hemorrhage, single or both fetal demise, increased NICU admissions, discordant growth and others.

Globally, in the last two decades, with advances in assisted reproductive technology (ART), older maternal age and widespread use of ovulation inducing drugs, the incidence of twin gestation has witnessed a steep increase.[4] While this has increased the chances of conception, it has also raised concerns about the risks associated with multiple pregnancies, particularly among infertility patients, which might reduce the number of successful live births and take-home baby rate. In India, the occurrence of twin gestation is approximately 1% of all gestations but accounts for 10% of perinatal mortality. There is 2.5-fold increased risk of maternal mortality in twin gestation than in singleton pregnancies.[5]

In contemporary obstetrics, the use of advanced ultrasonographic techniques and colour Doppler has significantly improved the early detection of multiple pregnancies and related conditions. These technologies allow for the identification of chorionicity, growth discordance, vascular complications, twin-to-twin transfusion syndrome, intrauterine death of one or both fetuses, and congenital anomalies. This early diagnosis enables healthcare providers to better manage and monitor these pregnancies, potentially reducing the risk of complications and improving outcomes for both the mother and the babies.

Diligent obstetric care throughout the antepartum, intrapartum, and postpartum periods is essential for reducing maternal morbidity and mortality and improving foetal outcomes in multiple pregnancies. This care involves close monitoring of the mother and the foetuses, early detection and management of complications, and timely interventions when necessary. By providing vigilant care, healthcare providers can identify and address potential issues before they become serious, thereby minimising risks and optimising the health and well-being of both the mother and the babies.

METHODS

This study, conducted at NHL Municipal Medical College and SVP Hospital at Ahmedabad, is a retrospective analysis of labour room statistics from July 2022 to January 2024. A total of 80 women with twin pregnancies, admitted as either booked or referral cases, were included in the study. Various individual patient parameters such as parity, gestational age, mode of delivery, and complications were tabulated.

Inclusion criteria

Inclusion criteria were the women with twin pregnancy, gestational age more than 20 week.

Exclusion criteria

Exclusion criteria were singleton pregnancy, triplets and higher order pregnancies, gestational age less than 20 weeks, women with pre-existing medical disorders like chronic hypertension, pre gestational diabetes, cardiac disease, renal disease or collagen vascular disorder.

Statistical analysis

Statistical analysis was performed using Microsoft Excel.

RESULTS

The majority of patients (56%) were under 30 years old, and 68% were primigravida. Additionally, 48% of patients had a maternal BMI greater than 30. Positive family history and infertility treatment were observed in 16% and 32% of cases, respectively (Table 1).

Table 1: Distribution based on factors predisposing to twinning.

Predisposing factors	Number of patients	Percentage
Age <30 years	56	70
Higher parity (>3)	32	40
BMI >30	48	60
Treatment taken for infertility	32	40
Positive family history	16	20

Out of the 80 cases of twin pregnancies, 64 (80%) were diagnosed as dichorionic diamniotic (DCDA), 15 (18.75%) were monochorionic diamniotic (MCDA), and 1 (1.25%) was monochorionic monoamniotic (MCMA) (Figure 1).

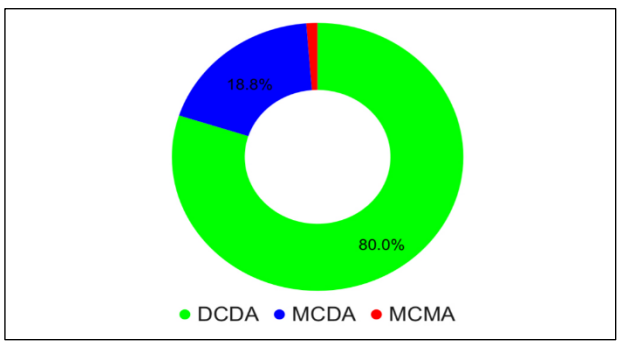

Figure 1: Distribution based on chorionicity.

The study also examined the complications associated with multiple pregnancies. Out of the 80 cases of twin pregnancies, 64 pregnancies were complicated in one or the other way. These findings highlight the significant risk of complications associated with multiple pregnancies.

Preterm labor was the most common complication, affecting 70% of patients. Other common complications included pregnancy-induced hypertension (27.5%) and gestational diabetes mellitus (20%) (Table 2).

Table 2: Distribution of maternal complications.

Complication	Number of patients	Percentage	Mathew et al[11] (%)	Singh et al[7] (%)
Preterm labour	56	70	64	74
Anaemia	12	15	8	44
Pregnancy induced hypertension	22	27.5	22	32
Antepartum haemorrhage	2	2.5	4.5	4
Gestational diabetes mellitus	16	20	25	-
Premature rupture of membranes	12	15	-	10.6
Cord prolapse	1	1.25	2.7	-
Post partum haemorrhage	10	12.5	13.7	13.33
No complications	16	20	-	-

Out of 80 cases, 47.5% patients underwent lower segment caesarean section and 52.5% patients delivered vaginally in our study.

The data shows that the majority of deliveries occurred between 33-36 weeks of gestation, with 50% of the total cases falling within this range. Within this gestational age group, vaginal delivery was the most common method, accounting for 30% of the cases, while caesarean section accounted for 20% of the cases. For deliveries at or after 37 weeks of gestation, caesarean section was slightly more common than vaginal delivery, with 16.25% and 13.75% of the cases, respectively (Table 3).

Table 3: Correlation of gestational age and mode of delivery.

Age of gestation in weeks	Vaginal delivery (52.5%)	Caesarean section (47.5%)	Total	Percentage
<= 28	2	2	4	5
29-32	5	7	12	15
33-36	24	16	40	50
>=37	11	13	24	30

In present study, malpresentation (39.5%) was the most common indication for caesarean section. Other indications for LSCS were premature rupture of membranes with non-progress of labor (10.5%), previous CS (31.5%), fetal distress (5.2%), non-progress of labor (7.9%), cord prolapse (2.7%) and eclampsia (2.7%).

In 1 patient caesarean section was done in 2nd baby, caesarean section was done due to hand prolapse (Figure 2).

In present study 40% cases were having both babies with cephalic presentation which was the commonest of all combinations of presentations.

In rest 60% cases there were other presentations like cephalic-breech (22.5%), breech-cephalic (17.5%), breech-breech (10%), breech-transverse (7.5%), cephalic-transverse (1.5%) and cephalic-breech was the second most common presentation (Figure 3).

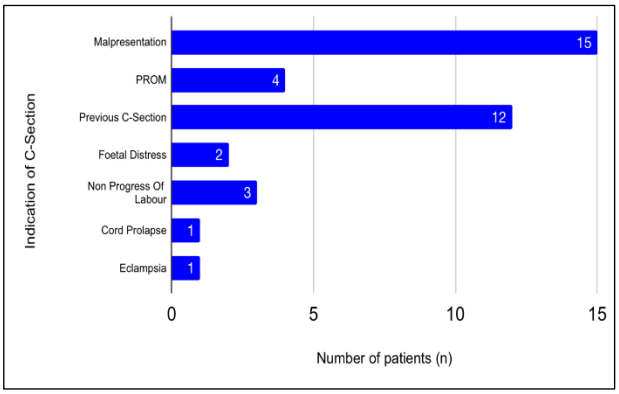

Figure 2: Distribution of indication of C-section.

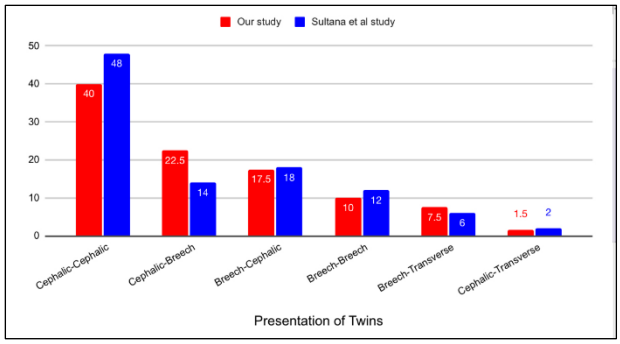

Figure 3: Distribution according to presentation of twins.

The majority of babies fell within the 1.5-2.5 kg weight range, with 48 babies each in the 1.5-2.0 kg and 2.0-2.5 kg categories. 40 babies had birth weights of 1.5 kg or less, indicating a proportion of infants born with low birth weight. Additionally, 24 babies had birth weights exceeding 2.5 kg (Table 4).

The most common neonatal complication was prematurity (50%) which also is an underlying reason for humongous rate of 62% of NICU admissions and 13.76% rate of neonatal death. Other prevalent neonatal complications are discordant growth, intrauterine deaths, doppler changes in one or both twins, etc. (Table 5).

Table 4: Distribution based on birth weights of babies.

Birth weight at delivery (in kg)	Number of babies	Percentage	Percentage as per Garima et al[13]	Percentage as per Vidya et al[6]
<= 1.5	40	25	28	33
1.5-2.0	48	30	29	35
2.0-2.5	48	30	28.9	31
>2.5	24	15	13	-

Table 5: Distribution based on neonatal complications.

Neonatal complication	Number of babies	Percentage
Prematurity	80	50
Both intra uterine death	4	2.5
Single foetal demise	10	6.25
Discordant growth	6	3.75
Foetal compression	2	1.25
NICU admissions	100	62.5
Neonatal death	22	13.76
Doppler changes	20	12.5

DISCUSSION

The present study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital in the western part of India from July 2022 to January 2024. Data of a total of 80 patients was recorded. In total, 160 babies were delivered from the 80 pregnancies.

The data was entered into a structured proforma and was analyzed after the completion of the study period.

During the present study at our institute, a total of 4000 deliveries were recorded, out of which 80 were twin pregnancies. The incidence of multiple pregnancies was calculated to be 2 per 100 deliveries, a figure consistent with findings from studies conducted by Vidyadhar et al in the western part of India and Singh et al in the eastern part of India with incidence 1.49% and 1.85% respectively.[6,7]

The study also found that mothers of dizygotic twins tended to be heavier and taller, which could be attributed to higher levels of circulating gonadotropins.[8] Additionally, the study noted a familial tendency for dizygotic twinning, with maternal history being more significant than paternal history. These findings suggest that both genetic and hormonal factors may contribute to the occurrence of dizygotic twinning, and further research is needed to better understand the underlying mechanisms. Positive family history was observed in 12% of cases, 15% patients had taken treatment taken for infertility; these results are comparable to the study conducted by Sultana et al with percentages 36% and 8% respectively.[9]

The study also examined the chorionicity of the multiple pregnancies. Out of the 80 cases of twin pregnancies, 64 (80%) were diagnosed as dichorionic diamniotic (DCDA), 15 (18.75%) were monochorionic diamniotic (MCDA), and 1 (1.25%) was monochorionic monoamniotic (MCMA).

These findings are consistent with the study conducted by Deepthi et al, which reported percentages of 53.31% for DCDA, 35% for MCDA, and 3.33% for MCMA.[10] This suggests that the distribution of chorionicity in multiple pregnancies is relatively consistent across different studies.

In the present study, the chorionicity of multiple pregnancies was primarily determined by: 1) Prenatal ultrasonography (USG) examination, which assessed the presence of the "T sign" or "lambda sign" in the

intervening membrane between the foetuses, 2) Postnatal examination of the placenta and membranes and 3) Postnatal examination of the sex of the babies.

The determination of chorionicity is crucial in obstetrical risk assessment and the optimal management of multiple pregnancies. The risk for twin-specific complications varies in relation to chorionicity and amnionicity, which refers to the number of chorions and amnions. Among these factors, chorionicity is considered the more important determinant.

These findings underscore the importance of accurate and timely determination of chorionicity in the management of multiple pregnancies, as it can significantly impact the risk of complications and guide clinical decision-making.

Specifically, there is increased rate of neurological injury and perinatal mortality in monochorionic twins compared with dichorionic pairs. The risk of fetal demise in one or both monochorionic twins was twice that in dichorionic multifetal gestations.[1]

In the present study, the most common complication observed was preterm labor (70%), which was comparable to Mathew et al and Singh et al studies.[11,7] Delivery before term is a major reason for the increased rate of neonatal morbidity and mortality in multiple pregnancy.

In the present study, the other common complication observed was anemia (15%), which was comparable to the findings of the study by Singh et al.[7] The increased iron requirement in multiple pregnancies is due to the expansion of the red cell mass and the additional iron requirement of multiple fetuses. Anemia can lead to fatigue, weakness, and other symptoms, and it can also increase the risk of preterm birth and low birth weight in infants. Therefore, it is important to monitor and manage anemia in multiple pregnancies to ensure the best possible outcomes for both the mother and the babies.

In the present study, hypertensive disorders of pregnancy were observed in 27.5% of cases, which included pregnancy-induced hypertension, preeclampsia, and eclampsia. These findings were comparable to those reported in the studies by Mathew et al and Singh et al.[11,7]

Hypertensive disorders due to pregnancy are more likely to develop with multiple fetuses. The number of fetuses and placental mass are involved in the pathogenesis of preeclampsia. Placental vasculogenesis is evident by 21 days after conception. Angiogenic imbalance is used to describe excessive amounts of antiangiogenic factors that are hypothesized to be stimulated by worsening hypoxia at the uteroplacental interface. Soluble Fms-like tyrosine kinase 1 (sFlt-1) is a variant of the Flt-1 receptor for placental growth factor (PlGF) and for VEGF. Increased maternal sFlt-1 levels inactivate and decrease circulating free PlGF and VEGF concentrations, leading to endothelial dysfunction. Soluble Fms-like tyrosine kinase 1 (sFlt-1) levels begin to increase in maternal serum months before preeclampsia is evident, and these high levels in the second trimester were associated with a doubling of the risk for preeclampsia.[1]

Women with twin pregnancies have levels of antiangiogenic soluble fms-like tyrosine kinase-1 (sFlt-1) that are twice that of singletons. Levels are seemingly related to increased placental mass rather than primary placental pathology. There was a stepwise increase in sFlt-1 concentrations, decrease in PlGF levels, and increase in sFlt-1/PlGF ratios compared with normotensive twin pregnancies. With multiple pregnancies, hypertension not only develops more often but also tends to develop earlier and be more severe.

APH was observed in 2.5% of cases which was comparable to Mathew et al and Singh et al studies.[11,7] In multiple pregnancy, placenta being larger, gets implanted nearer to lower segment leading to placenta previa. Also uterus being unduly enlarged, sudden decompression (sudden release of liquor after delivery of first baby) can lead to premature separation of placenta leading to abruption in 2nd baby.[1]

In the present study, 15% of patients had premature rupture of membranes (PROM), 1.25% had cord prolapse, and 12.5% developed postpartum hemorrhage (PPH). These findings were comparable to those reported in the studies by Mathew et al and Singh et al.[11,7]

Multiple fetuses and excessive amniotic fluid (polyhydramnios) can lead to undue enlargement of the uterus, which can result in reduced tone of the uterine muscle after delivery. This, in turn, increases the risk of atonic postpartum hemorrhage (PPH).

In summary, the findings of this study suggest that multiple pregnancies are associated with a higher risk of complications, including preterm labor, anemia, hypertensive disorders of pregnancy, and postpartum hemorrhage. Careful monitoring and management of these pregnancies are essential to ensure the best possible outcomes for both the mother and the babies.

The duration of gestation is shorter in multiple pregnancy due to undue stretching of uterus and excessive enlargement of uterus leading to early ripening of cervix and loss of polarity of uterus.[8]

About 47.5% patients underwent lower segment caesarean section and 52.5% patients delivered vaginally in our study, which was comparable to Amiben et al study done in southern part of India with 57% delivered vaginally and 44% delivered by caesarean section.[12]

The increase in the use of caesarean section to deliver twin pregnancies may be due to the increased incidence of other obstetric indications and complications observed in this study. These include hypertensive disorders,

malpresentation, cord prolapse, and premature rupture of membranes. Caesarean section may be deemed necessary in these cases to mitigate risks to both the mother and the babies associated with vaginal delivery.

In present study 40% cases were having both babies with cephalic presentation which was the commonest of all combinations of presentations which aligned with Sultana et al study at 48%.[9]

The findings of Table 4 suggest a diverse distribution of birth weights among the study population, with a significant portion falling within the normal range (1.5-2.5 kg). The presence of infants with low birth weight (<1.5 kg) underscores the importance of monitoring and managing pregnancies, particularly in cases of multiple gestations, to optimize fetal growth and development. Further analysis may be warranted to explore factors influencing birth weight distribution and their implications for neonatal outcomes in twin pregnancies.

The findings presented in Table 4 align closely with those reported in studies by Garima et al and Vidyahar et al, indicating consistency across different research settings.[13,6]

The high incidence of low birth weight (LBW) babies observed in this study is a significant concern, echoing previous research findings. Poor nutritional status, inadequate antenatal care, and associated maternal complications are likely contributing factors to the elevated prevalence of LBW among multiple pregnancies. These factors underscore the importance of comprehensive maternal healthcare during pregnancy, particularly in cases of twins or higher-order multiples.

It's noteworthy that LBW babies represent the most common complication observed in this study. Given that preterm delivery is a leading cause of LBW infants, it highlights the critical role of gestational age in determining neonatal outcomes in multiple pregnancies. Consequently, addressing preterm birth risk factors and implementing strategies to prolong gestation may help mitigate the incidence of LBW and improve overall fetal and neonatal health in multiple gestations.

In summary, the association between low birth weight and multiple pregnancies underscores the need for vigilant prenatal care and targeted interventions to optimize outcomes for both mothers and babies. Further research into the specific factors contributing to LBW in multiple pregnancies is warranted to inform effective preventive measures and management strategies.

Prematurity was the most prevalent neonatal complication, affecting 50% of the babies. The main reason for prematurity in twin gestation is that due to overstretching of uterus due to two babies occurs at a much earlier gestation as compared to singleton pregnancy leading to preterm labour, PPROM and preterm delivery of premature low birthweight babies. Other complications included intrauterine death (2.5+6.25= 8.75%), discordant growth 3.75%, fetal compression 1.25%, and Doppler changes 12.5%. A significant proportion of babies (62.5%) required admission to the neonatal intensive care unit (NICU), indicating the need for specialized care. Additionally, neonatal mortality was observed in 13.76% of cases. Other superadded complications that prevailed due to prematurity such as respiratory distress syndrome, septicaemia, asphyxia, intraventricular haemorrhage also lead to poor prognosis and in turn neonatal demise. These findings underscore the vulnerability of neonates in multiple pregnancies and highlight the importance of early detection, monitoring, and intervention to optimize neonatal outcomes.

CONCLUSION

In conclusion, twin pregnancies are inherently high-risk, necessitating early diagnosis and vigilant antenatal, intrapartum, and postpartum care to reduce maternal and perinatal morbidity and mortality. Access to skilled obstetricians, neonatologists, and well-equipped NICU facilities is essential for optimal management. Enhancing antenatal care services at primary healthcare levels is crucial for ensuring timely identification and referral of patients with twin pregnancies to tertiary care centers equipped with advanced ultrasound facilities. In modern obstetrics, the strategic utilization of ultrasonography and color Doppler techniques allows for the early detection of complications associated with twin pregnancies, thereby facilitating more effective patient management strategies. Advances in fetal medicine, including selective reduction and termination, have mitigated some hazards associated with twin pregnancies. However, intensive obstetric and neonatal care remains paramount to improving outcomes. Increased awareness, antenatal surveillance, and preventive measures can further lower complications and adverse outcomes. Overall, enhancing obstetric and neonatal care services is imperative for achieving better outcomes in twin pregnancies.

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