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Original Research Article

Maternal and neonatal outcomes in twin pregnancy: a prospective study

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ABSTRACT

Background: Twin pregnancies are found to be associated with greater risks to the mother and the babies. The normal length of gestation for an average pregnancy is around 40 weeks however in multiple pregnancies (twins, triplets, quadruplets, etc) it is usually shorter.
Methods: A prospective observational study of women with twin pregnancy was carried out in a tertiary care hospital, in Maharashtra, from October 2020 to October 2022 with the purpose to assess the maternal and neonatal outcomes. 100 women with twin pregnancies who were registered to the hospital were selected for the study as per the inclusion and exclusion criteria.
Results: 64% of women with twin pregnancies were in the age group of 21-30 years. Most of them had pregnancy as a result of the spontaneous type of conception. It was found that the vaginally delivered twins (20%) were at gestational age above 37 weeks and 8% at less than 32 weeks. 38% of twins were delivered by LSCS (elective LSCS 6% and emergency LSCS 38%). The gestational age at the time of delivery was found as 35-37 weeks (Mean ±SD 36 ± 1.2). 46% of neonates were shifted to NICU. The incidence of low birth weight and respiratory distress was more in babies born at 37 weeks and below. It was also observed that the as gestational age increased the perinatal deaths decreased.
Conclusions: Regular follow-up of women with twin pregnancies is necessary for attainment of positive outcomes..

Keywords: Maternal outcomes, Neonatal outcomes, Twins pregnancies

INTRODUCTION

Multifetal pregnancies result from two or more fertilization events from a single fertilization, followed by splitting of the zygote, or from a combination of both, and twins of all kind accounts for 90% of such multiple births. The number of pregnancies with twins has increased significantly in the past two decades, accounting for up to 2.5-3% of all live births.[1] Globally, in the last two decades, with advances in assisted reproductive technology (ART), older maternal age and widespread use of ovulation inducers, the incidence of twin gestation has witnessed a steep increase.[2]

Worldwide the incidence of multiple pregnancies varies considerably from 9-12 twin deliveries per 1000 births. The twining at a rate of 12.0 for the world as a whole means that one of every 42 children born on earth is a twin.[3]

Twin gestation is considered to be a high-risk pregnancy and challenging, causing several obstetric complications, some of them with serious perinatal consequences, especially for the second twin.[4] The various maternal complications are anaemia, hyperemesis, preterm labor, hypertensive disorders of pregnancy, antepartum haemorrhage, polyhydramnios, increased pressure symptoms, varicose veins, and gestational diabetes. Low birth weight, contributed by both prematurity and IUGR, is the main factor responsible for higher perinatal mortality in twins.[5] Twin pregnancies run a 46% higher risk of cesarean delivery, while first and second twins face a 20%

higher risk of low birth weight. In a cohort study, 462 twin births were included, 242 (52%) had a spontaneous onset of labor and 220 (48%) were induced. Indications for inductions were: gestational length (>38 weeks) 61 (28 %); preeclampsia 49 (22%); elective 42 (19%); intrauterine growth retardation 33 (15%); intrahepatic cholestasis 11 (5%); premature rupture of membranes 12 (5.5%); gestational hypertension 6 (3%) and others 6 (3%). Elective inductions comprised women with a wish to end their pregnancy because of physical discomfort and tiredness.[6]

Pregnancy normally lasts about 40 weeks, and babies born after 37 weeks are considered full-term. But twins are often delivered sooner because these babies have a higher risk of stillbirth – up to 13 times higher than singletons for twins that share a placenta and five times higher when the twins have separate placentas. The twins have more complications at birth, are more often born premature, and have lower birth weights and higher stillbirth and infant mortality rates. Early neonatal mortality among twins was significantly higher when compared to singleton neonates (adjusted odds ratio (AOR) 7.6; 95% confidence interval (CI) = 7.0-8.3) in a study conducted in 60 countries. Early neonatal mortality was also higher among twins than singletons when adjusting for birth weight in a subgroup analysis of those countries.[7]

The rate of perinatal mortality can be up to six times higher in twins compared to singleton pregnancies, largely due to higher rates of preterm delivery and fetal growth restriction seen in twin pregnancies.[8] The purpose of this study was to find out the gestational age at the time of delivery and the perinatal outcomes.

METHODS

A prospective observational study with the aim to assess the maternal and neonatal outcomes in women with twin pregnancies was carried out at the Department of Obstetrics and Gynaecology in a tertiary care hospital, in Maharashtra, for a period of two years from October 2020 to October 2022. This is a busy public hospital with a minimum number of 24 to 30 deliveries per day.

All women with twin pregnancies registered to the hospital were screened. Those with congenital anomalies or maternal co-morbidities which are directly affecting fetal growth and development were excluded study. Complete enumeration method was used to include all women with twin pregnancies who were registered to the hospital as per the inclusion and exclusion criteria. A total of 100 women with twin pregnancies were part of the study.

The women with twin pregnancies were followed up from the time of admission till discharged from the hospital at antenatal, labor, and post-natal periods. The women were categorized based on the completion of gestation weeks. The gestational age was determined by the standard criteria which include clinical history and the results of the earliest ultrasound (US) examination. The gestational age at the time of delivery (weeks +days) was categorized as ≤ 32+6 days 33-34+6 35-36+6 and ≥ 37.

The information sheet was filled about the type of conception (spontaneous versus assisted reproduction), maternal medical conditions, and any substance abuse. Information was collected about pregnancy and delivery complications including chorioamnionitis, hypertensive disorders, prior caesarean delivery, fetal growth restriction (FGR) (estimated fetal weight_10th% for GA based on data by Brenner et al[13]), oligohydramnios (greatest vertical pocket of_2.0 cm), polyhydramnios (greatest vertical pocket of_8 cm), and meconium-stained amniotic fluid.

The type of labor was determined by induction versus spontaneous versus none. Mode of delivery and indication for cesarean delivery was recorded. For those with a planned cesarean, the information on the indication for induction of labor was recorded. A placental examination was done to confirm the chorionicity. Details on gestational age at the time of delivery, birth weight, and APGAR score were noted. Perinatal morbidity and mortality for twins delivered at each week of GA was collected.

After delivery, following data on the new-born twins were recorded: birth weight, Apgar score, congenital abnormalities, respiratory distress syndrome, admission to the neonatal intensive care unit, and survival in the first week of life to measure the neonatal outcomes.

The outcome is measured in terms of gestational age at delivery (28-32 weeks, 33-35 weeks, 36, 37, 38 and 39-42 weeks), mode of delivery (Caesarean section/ vaginal delivery/ combined), presentations at birth, interval between delivery of first and second twin, Apgar scores at 0 and 5 minutes of both the twins, birth weight (>2500gms, 2500- 1500gms, <1500gms) of both the twins , gender (isosexuals/ heterosexuals), dead\ still\ live, admission to Neonatal Intensive Care Unit (NICU) of both the twins and neonatal complications of both the twins in NICU.

The New-borns weighing more than 2.5 kg were considered normal while those weighing less than 2.5 kg were classified as having low birth weight and those having less than 1.5 kg were identified as having very low birth weight. The Apgar score was classified into two categories of seven scores. Apgar scores less than 7 for 5 minutes were defined as a criterion of immediate neonatal morbidity.

Ethical clearance was obtained by the Institutional Ethical Committee and informed consent was obtained from the participants. The study population considered in our study was women admitted with a twin pregnancy. Data was entered into Microsoft Excel (Windows 7; Version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for Windows software (version 20.0; SPSS Inc, Chicago).

RESULTS

Maternal outcomes

Table: 1: Demographic variables of the women with twin pregnancies (n=100).

Variables	f	%
Maternal age in years		
≤20	04	04
21-30	64	64
≥31	32	32
Type of conception		
Spontaneous	92	92
ART	08	08
Chorionicity		
Dichorionic (DCDA)	60	60
Monochorinic diamniotic (MCDA)	35	35
Monochorinic monoamniotic (MCMA)	05	05
Gravida		
Primigravida	59	59
Multigravida	41	41

In this study, 100 women with twin gestations were studied. Most (64%) of them were in the age group of 21-30 years and 32% were found in the age of more than 31 years.

92% of twin gestations were conceived spontaneously and 8% by ART. 40% of twins were Monochorionc (MCDA 35% and MCMA 5%) while 60% were Dichorionic. (Table 1)

Table 1 illustrates that 64% women with twin pregnancy were in the age group 21 to 30 years and 32% above 31 years with majority as primigravida.

With regard to maternal outcomes majority of twins were delivered at the gestational week 33-34 and ≥ 37 weeks. The gestational age at the time of delivery was found between 35-37 weeks with Mean ±SD 36±1.2.

In this study, 54% women were delivered normally through vaginal delivery out of which 20% were found at the gestational age at and above 37 weeks. 46% of those who underwent cesarean section 8% had elective LSCS and 38% were taken for emergency caesarean section. Most of the emergency LSCS were at a gestational age between 33-34 as well as week 37 and above.

Most common presentation was found as vertex-vertex with 50%, (Mean 8.3±0.04) of women delivered at 37 and above weeks of gestation. This was followed by the breach-vertex presentation in 29% (Mean 4.8.±0.09) delivered at gestation week 33-34. Vertex–breach was found in 11% (Mean 1.83) and breech-breech 5% women. Transverse and others 5% was also seen in 5 cases irrespective of gestational age (Table 2).

Table 2: Maternal outcomes according to gestational age at delivery (n=100).

Variables	Gestational Age (Weeks+Days)				Total	
	≤ 32+6	**33-34+6**	**35-36+6**	**≥ 37**	**Total (%)**	**Mean±SD**
No. of deliveries	15	30	15	40	100	36.4±1.2
Mean gestational age at delivery±SD	30±4 ±0.6	33±4 ±1.5	35±5 ±1.4	38±3 ±1.6		
Mode of delivery						
Vaginal delivery	8 (8)	18 (18)	08 (8)	20 (20)	54	9.0±(5.4)
Elective LSCS	-	-	02 (2)	06 (6)	8	1.3±(1.0)
Emergency LSCS	7 (7)	12 (12)	05 (5)	14 (14)	38	6.3± (0.4)
Presentation						
Vertex-vertex	06 (6)	16 (16)	08 (8)	20 (20)	50	8.3 ± (0.04)
Vertex-breach	02 (2)	02 (2)	02 (2)	05 (5)	11	1.83
Breach-vertex	04 (4)	07 (7)	04 (4)	14 (14)	29	4.8±(0.9)
Breach-breach	02 (2)	02 (2)	-	01 (1)	5	0.83
Transverse and others	01 (1)	03 (3)	01 (1)	-	5	0.83

The Table 2 illustrates that mean gestational at the time of delivery was found as 36.4±1.2 (Mean±SD). Most of them (50%) had vertex -vertex presentation and 54% delivered normally. Among 100 women with twin gestations, 30% were found with maternal complications. 12% of women had pre-eclampsia, 5 % premature rupture of membrane (PPROM), 5% anaemia, 2% eclampsia, 3% gestational diabetes mellitus (GDM). Among the women studied 1% were found with placenta previa, 1% had HBsAg reactive status, and 1% were found with HIV reactive status (Figure 1).

Neonatal outcomes

The results revealed that the birth interval between two twins in 76% cases was less than 10 mins, 15% between

10 and 30 mins and 10% with more than 30 mins. (Table 3).

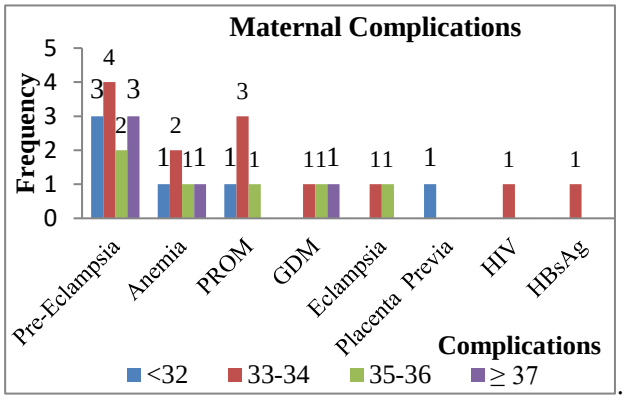

Figure 1: Maternal Complications among women with twin pregnancies.

Table 3 reveals that 76% babies were born at the interval of < 10 minutes. About Birth weight of twins, - among the first twin 30% of them were found under Low birth weight (< 1.5 kg) and 60% in the range of 1.5 - 2.5 kg. and only 10% of twins had birth weight >2.5 kg.

Table 3: Birth interval between the twins in minutes. (n=100).

Variables	Gestational age (Weeks) at the time of delivery n=100 (%)				
	≤32+6	33-34+6	35-36+6	≥37	Total
	Percentage				
Birth interval between twins (in min)					
<10	11	26	9	30	76
10-30	2	2	4	6	14
>30	2	2	2	4	10

Table 4: Neonatal outcomes based on birth weight and APGAR scores (n=200).

Variables	Twin -1 (n=100)				Twin -2 (n=100)				P value
	≤32+6	33-34+6	35-36+6	≥37	≤32+6	33-34+6	35-36+6	≥37	
Birth weight (kg)									
<1.5	12%	12%	02%	04%	13%	09%	04%	06%	* 0.866
1.5-2.5	03%	18%	12%	27%	02%	21	10	27	
>2.5	0	0	01%	09%	0	0	1	07	
APGAR score									
<7	05%	11%	07%	13%	06%	16%	06%	12%	* 0.560
>7	10%	19%	08%	27%	09%	14%	09%	28%	

* Not significant as p > 0.05

Table 5: NICU admissions and Neonatal complications among twins (n=200).

Complications	Gestational Age in weeks				Total
	≤32+6	33-34+6	35-36+6	≥37	f (%)
Admission to NICU	30 (15%)	30 (15%)	16 (8%)	16 (8%)	92 (46)
LBW	30 (15%)	60 (30%)	28 (14%)	62 (31%)	182 (90)
RDS	16 (8%)	16 (8%)	08 (4%)	12 (06%)	52 (26)
Jaundice	02 (1%)	04 (2%)	02 (1%)	12 (06%)	20 (10)
Asphyxia		04 (2%)		02 (1%)	3 (3)
Sepsis	2		2		4 (2)
Mortality	14 (07%)	12 (06%)	08 (04%)	06 (03%)	40 (20)

The birth weight among 32% of second twins was <1.5 Kg, 60% in the range 1.5 to 2.5 Kg. while 8% were found > 2.5 Kg. APGAR Scores at 5minutes of both the twins were almost similar. Low apgar scores are more seen at 37 weeks and below which was statistically significant. Comparison of birth weight and APGAR score of first and second twin was found not significant (Table 4). In the present study, 46% of neonates were shifted to NICU. It was also observed that NICU admissions were decreased with neonates born at higher gestational age. Seventy women with twin gestation did not have any obstetric comorbidity. Among these 70 uncomplicated pregnancies, 46% had NICU admissions mostly seen <34 weeks of gestation, the reason being low birth weight, respiratory distress, jaundice, and sepsis (Table 5).

Table 5 describes that 46% neonates were admitted to the NICU and most of them were with low birth weight.

In this study neonatal deaths were found among 20% of twins due to low birth weight. The mortality was lowest among the twins born at ≥ 37 gestational age.

DISCUSSION

In this study, 100 women with twin gestations were followed up from the time of admission till discharged

from the hospital during antenatal, labor, and post-natal periods to determine the maternal and neonatal outcomes. The results of present study majority of twins were delivered at the gestational week 33-34 and ≥37 weeks with Mean±SD gestational age at the time of delivery Mean 36±SD 1.2. The results of a study conducted by Gajera et al in which 46% of the women delivered were at 33- 36 weeks of gestation.[10] Berk et al studies classified the 197 twin sets according to the gestational age at delivery, 115 sets (58.4%) were born at 36≤37 weeks (Group I), 66 (33.5%) at 37≤39 weeks (Group II) and 16 (8.1%) at > 39 weeks (Group III).[11]

In this study 54% women delivered normally while 46% of those who underwent cesarean section 8% had elective and 38% were taken for emergency LSCS. Similar results were also found in the study conducted by Obeichina NJ et al with vaginally delivered twins at 58% and by cesarean section at 42%.[12] Lee HC stated that there is a rising trend in cesarean section in twin gestation over the last decade.[13] The study by Esteves et al revealed that twin gestation delivered vaginally was 16% whereas Isiaka L. et al. reported cesarean section as 84%.[14,15] The rate of cesarean section in a study by Pant et al also revealed a high number of cases 62.04%.[9]

The present study, most common presentation was vertex-vertex 50%, (Mean 8.3±0.04) breach-vertex 29% (Mean 4.8.±0.09) vertex-breach 11% (Mean 1.83), breech-breech 5%. transverse and others 5%. A retrospective study on 291 cases of twins by Lawal et al at Ilorin teaching hospital over 5 years found that the most common fetal presentation was cephalic, which constituted about 37.4%, followed by cephalic - breech (22.1%), breech-cephalic (21.4%) and 2.1% breech-breech.[15]

The complications among 100 women with twin gestations in this study was 12% with pre-eclampsia, 5% premature rupture of membrane (PPROM), 5% anaemia, 2% eclampsia, 3% gestational diabetes mellitus (GDM) and 1% was with placenta previa. 1% had HBsAg reactive status, and 1% HIV reactive status.

The outcomes among the neonates of the mother under study revealed that the birth interval between two twins in most cases was less than 10 mins while in 15% it was found between 10 and 30 mins and among 10% more than 30 mins. The study by Isiaka L et al, reported that the birth interval between the first and the second twin of less than 30 min in 89% of twins while the remaining 32 (11%) had an interval of greater than 30 min.[15]

Among the first twin 30% of them were found under Low birth weight (< 1.5 Kg) and 60% of new borns were found in the range of 1.5 - 2.5 Kg. Gajera AV, in our study, in twin1, 11.3% had a birth weight of >2.5 kg, 82.6% had LBW and 6% had VLBW. Similarly in twin 2, 6.7% had a birth weight of >2.5 kg, 62.2%had LBW and 31.1% had VLBW.[10] In the Lawal et al study, the overall mean birth weight of babies was 2.5 kg±0.52; for the first twins and 2.52 kg±0.54 for the second twin. The study by Esteves et al study reported mean birth weight as 2.6kg at 37-38 weeks.[14,15]

In the present study, 46% of neonates were shifted to NICU due to low birth weight, respiratory distress, jaundice, and sepsis. NICU admissions were required in 19.6% of the neonates due to LBW and prematurity in the study conducted by Pant et al.[9] As per Santana et al admission to NICU was (23.6% for the first and 29.3% for the second twin while Esteves et al required 31% NICU admission at <34 weeks which decreased with gestational age.[4,14] Meshram RM et al. found Jaundice (37.62%) and respiratory distress syndrome (36.67%) were the most common diagnosis in twin neonates.[16] Twin neonates have significantly higher mortality and longer hospital stay because of prematurity and low birth weight. The study by Esteves et al revealed that NICU admission was required by 31% of babies at <34 weeks which decreased with gestational age.[14] In our study, all mothers with twin gestations delivering at 28-32 weeks received 2 doses of steroids, 20% of mothers delivering at 33-35+6 weeks received steroids and 5% delivering at 36 weeks received steroids which contributed to better Apgar scores and lower incidence of respiratory distress among the babies. In this study perinatal death among 20% of twins was observed and deaths decreased as gestational age increased. In the Lawal et al study, there were 31 perinatal deaths among 291 twins. 8 (25.8%) and 13 (41.9%) occurred in the first and second twins respectively and 10 (32.3%) occurred in both twins. The majority of the deaths (67.7%) occurred in preterm fetuses, while 10 (32.3%) were term infants.[15]

CONCLUSION

Twin gestation is considered a high-risk pregnancy with characteristic complications which severe implications on the perinatal outcomes. Gestational age at the time of delivery is known to be the single most important factor affecting the neonatal outcome and perinatal mortality in both singleton and twin pregnancies. Efficient and routine follow-up of women with a twin pregnancy is necessary. Improved obstetric care facilities and NICU care facilities in saving the lives of twin babies.

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