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Original Article

Obstetrics and Gynaecology Section

Fetomaternal Outcome in Twin Pregnancies: A Retrospective Analysis from a Tertiary Care Centre

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ABSTRACT

Introduction: Twin pregnancies are among the major challenges faced by obstetricians globally. Increased maternal and foetal morbidity is observed with an increase in the incidence of twin pregnancies. Due to elevated rates of complications, a larger number of caesarean sections are performed in twin pregnancies in comparison to singleton gestation.

Aim: The study aimed to find out the incidence of twin pregnancy with associated maternal risk factors and foetal outcome in the study population.

Materials and Methods: This retrospective observational study was carried out at JNU Hospital and Medical College, Jaipur for a period of 4 years from December 2015 to December 2019. A total of 70 mothers, who presented with twin pregnancy, were included in this study. Data were collected from hospital records regarding maternal age, parity, whether spontaneous or assisted conception, gestational age, pregestational Body Mass Index (BMI) and family history. Details of maternal and foetal complications that occurred during the antenatal period and labour as well as the mode of delivery were collected and analysed. Statistical significance was considered if the p-value was ≤0.05. Qualitative data were represented as rate and proportions, while quantitative data were represented as mean and standard deviation.

Results: A total of 70 mothers with twin births, resulting in 140 babies during the 4 years study period were included. A total of 4240 deliveries overall during the study period, gave a twin pregnancy incidence rate of 16.5 in 1000 deliveries. Preterm labour (25.4%), anaemia (26.8%) and hypertension (22.5%) were common problems. The most common indication for caesarean delivery was foetal malpresentation (37.8%) The mean weight of the first twin was 2.12±0.35 kg while the mean weight of the second twin was 1.97±0.30 kg. Among foetal complications, Intrauterine Growth Restriction (IUGR) was seen in 11.4% and birth weight discordance in 21.4% of children. A low Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score was noted in 21.4% of babies, while 12.9% of babies died in the early neonatal period.

Conclusion: Maternal complications during twin pregnancy were mainly preterm labour, diabetes, hypertension and anaemia. Caesarean section was the main mode of delivery in this study with significant association with hypertension and preterm labour. Foetal complications were in the majority related to IUGR. More vigilance during the antenatal period and labour is needed for proper selection of mode of delivery. Active foetal surveillance and intervention with appropriate neonatal care can improve fetomaternal outcome.

Keywords: Caesarean section, Foetal risk, Maternal complications, Twin gestation

INTRODUCTION

Twin pregnancies are among the major challenges faced by obstetricians globally. Multiple pregnancies account for 3-4% of births globally, though the incidence rate appears to be variable among different parts of the world [1-4]. Increasing the use of assisted reproduction and the increasing maternal age at birth are probably the major causative factors for the increasing incidence of this trend [5].

Increased maternal morbidity is observed with an increase in the incidence of twin pregnancies [3]. Major maternal complications include increased rates of hypertensive disorders, preeclampsia, gestational diabetes and antepartum and postpartum haemorrhages [6].

Multiple pregnancies are also associated with poor perinatal outcomes [7]. There is an increased risk of complications in babies like prematurity, Low Birth Weight (LBW), growth restriction and congenital anomalies [8]. Given these high rates of complications, a greater number of caesarean sections are established in twin pregnancies compared with a singleton gestation [9,10]. The literature predicting maternal adverse outcomes among women with multiple gestations is now expanding [5]. Even with this available vast knowledge, there was failure to normalise the complications associated with multiple gestations compared with singleton pregnancies. So, this study was conducted to find out the burden of twin pregnancies and to assess the maternal risk factors and foetal outcome, with any possible association among them. The observations may help in dealing the situation better.

MATERIALS AND METHODS

This retrospective observational study was carried out at JNU Medical College and Hospital, Jaipur for a period of 4 years from December 2015 to December 2019 after obtaining IEC approval (JNUIMSRS/IEC/2019/111). During this period total 4240 deliveries were carried out, out of which 70 were twin pregnancies.

Inclusion criteria: Pregnant women carrying twins and delivered at the institute, conceived spontaneously or with treatment, were included.

Exclusion criteria: Pregnancies with triplets and higher-order multi-foetal pregnancies were excluded.

Data were collected from hospital records regarding maternal age, parity, whether spontaneous or assisted conception, gestational age, pregestational BMI and family history. Details of maternal and foetal complications that occurred during the antenatal period, labour as well as the mode of delivery were collected and analysed. Possible clinical association of relevant maternal factors with caesarean section delivery and preterm labour were tried to find out.

The presence of foetal high-risk conditions like Intrauterine Growth Restriction (IUGR), twin growth discordance, foetal anomaly, cord prolapse and foetal distress was also noted.

STATISTICAL ANALYSIS

Data collected were entered in Microsoft Excel 2010 software. Qualitative data were represented as rate and proportions, while quantitative data were represented as mean and standard deviation. Fisher-Exact test was used to see association of complications with mode of delivery and to identify factors affecting preterm delivery. The p-value <0.05 was considered significant.

RESULTS

In the study, 70 twin births resulting into 140 babies were studied. A total of 4240 deliveries overall, gave a twin pregnancy incidence rate of 16.5 in 1000 deliveries. All mothers were booked cases and the majority (78.6%) was in the 21-30-year age group. The mean age of the mothers was 27.6±3.4 years.

About 70% of mothers had a pregestational BMI of 18.5-24.9 (normal weight category) with a mean value of BMI 23.4±1.6 (kg/m^2). Gestational age at the time of delivery ranged from 26-38 weeks of gestation with a mean gestational age of 34.6±2.2 weeks [Table/Fig-1]. A total of 46 (65.7%) mothers had delivered before 37 weeks and among those 17 (24.3%) patients delivered before 34 weeks. Full term delivery after 37 weeks was seen in 24 (34.3%) cases.

Characteristic	Number	Percent
Maternal age (years)		
<20	6	8.6
21-30	55	78.6
31-40	8	11.4
> 40	1	1.4
Parity		
Primipara	34	48.6
Multipara	36	51.4
Pregestational BMI (kg/m^2)		
<18.5	5	7.1
18.5-24.9	49	70.0
25-29.9	16	22.9
Period of gestation (In weeks)		
<34	17	24.3
34-37	29	41.4
>37	24	34.3
History of ovulation induction		
Yes	18	25.7
No	52	74.3
Family history of twin Pregnancy		
Yes	15	21.4
No	55	78.6

[Table/Fig-1]: Maternal demographic profile.
BMI: Body Mass Index

Maternal complications are shown in [Table/Fig-2]. Preterm labour (25.4%), anaemia (26.8%) and hypertension (22.5%) were common problems. PROM was seen in 13 mothers (18.3%). Antepartum haemorrhage occurred only in 1 (1.4%) mother.

During the study period, there were no cases of maternal mortality among mothers with twin pregnancies. Caesarean section was the most common mode of delivery as in 43 (61.4%) mothers and vaginal delivery occurred in 25 (35.7%) mothers. Combined vaginal-abdominal delivery occurred in 2 (2.9%) cases due to the inability to deliver the second baby vaginally.

The most common indication for caesarean delivery was foetal malpresentation (37.8%) followed by hypertension complicating pregnancy (22.2%) and foetal distress (17.8%). In 2 cases, (4.4%) there were abnormalities of labour involving the second child after successful vaginal delivery of the first. In one case it was prolapse of the cord and in other, there was non-descent of second child after transverse arrest. So out of total 45 caesarean deliveries, 43 were upfront planned for both babies and in 2 cases it was emergency conversion for the second baby [Table/Fig-3].

Maternal complications	Number	Percent
Diabetes mellitus	4	5.6
Anaemia	19	26.8
Hypertension	16	22.5
Preterm labour	18	25.4
PROM	13	18.3
Antepartum haemorrhage	1	1.41

[Table/Fig-2]: Maternal antenatal complications (Total no of complications N=71). (Total Number is more than 70. In some patients more than one complication was present.);
PROM: Premature rupture of membranes

Indications	Number	Percent
Abnormalities of labour	2	4.4
Antepartum haemorrhage	1	2.2
Foetal malpresentation	17	37.8
Foetal distress	8	17.8
Hypertensive disorder	10	22.2
Previous caesarean	7	15.6

[Table/Fig-3]: Caesarean indications (N=45).

As in 2 cases, the first birth was by successful vaginal delivery, so they were included in the vaginal birth group for the convenience. Among the hypertensive mothers, 15 were delivered by caesarean while, only one was vaginal. The difference was statistically significant with a p-value of 0.006 (Odds Ratio 13.929). Preterm labour was also associated with increased chances of caesarean delivery (p-value-0.046). There was no statistically significant association between mode of delivery and other medical problems (PROM, antepartum haemorrhage) [Table/Fig-4]. Separate analysis of factors affecting prematurity was seen. However, there was no statistical significant

Characteristic	LSCS (N=43)	Vaginal (N=27)	p-value	OR (95% CI)
Anaemia				
Yes	13	6	0.647	1.517 (0.497-4.633)
No	30	21		
Hypertension				
Yes	15	1	0.006	13.929 (1.717-113.004)
No	28	26		
Preterm labour				
Yes	7	11	0.046	0.283 (0.093-0.863)
No	36	16		
PROM				
Yes	5	8	0.117	0.312 (0.090-1.086)
No	38	19		
Diabetes				
Yes	3	1	0.748	0.148 (0.026-0.766)
No	40	26		
Antepartum haemorrhage				
Yes	1	0	1.653	0.478(0.108-0.924)
No	42	27		

[Table/Fig-4]: Medical complications and association with mode of delivery. (Fisher-exact test was used); PROM: Premature rupture of membranes; LSCS: Lower segment Caesarian section

association regarding maternal age, parity, hypertension or diabetes with preterm delivery except anaemia which has a p-value of 0.024. PROM (premature rupture of membranes) seems to have some positive association with preterm delivery but not clinically significant. (p-value 0.056 and odds ratio 8.118) [Table/Fig-5]. It seems quite logical also, as membranes rupture ultimately leads to delivery either assisted or in the natural course.

Factor	Preterm		p-value	OR (95% CI)
	Yes (46)	No (24)		
Age				
Up to 30	40	21	0.755	0.952 (0.216-4.197)
31 and above	6	3		
Parity				
Primipara	20	14	0.353	0.549 (0.202-1.492)
Multipara	26	10		
Anaemia				
Yes	8	11	0.024	0.249 (0.082-0.753)
No	38	13		
Hypertension				
Yes	7	9	0.071	0.299 (0.094-0.948)
No	39	15		
PROM				
Yes	12	1	0.056	8.118 (0.987-66.792)
No	34	23		
Diabetes				
Yes	2	2	0.833	0.149 (0.062- 0.548)
No	44	22		

[Table/Fig-5]: Factors affecting preterm delivery.
(Fisher-Exact test was used); PROM: Premature rupture of membranes

Neonatal outcomes were separately analysed. There were 140 babies with all live births. When chorionicity was studied, dichorionic diamniotic twins (n=78) were more common than monochorionic diamniotic twins (n=20) (55.7% vs. 14.3%). About 42 twins (30%) were monoamniotic monochorionic. A total of 38 (27.1%) twins were both males, 36(25.7%) were both females and the remaining, 66 (47.1%) were one male and the other female child.

The mean weight of the first twin was 2.12±0.35 kg while the mean weight of the second twin was 1.97±0.30 kg. Out of 140 babies understudy, majority (45.7%) were Low Birth Weight (LBW) (birth weight between 1.5 kg-2.499 kg) and 28.6% were normal weight (Birth weight ≥2.50 kg). Very Low Birth Weight (VLBW) (weights between 1.00-1.499 kg) children were 20% and Extremely Low Birth Weight (ELBW) (birth weight ≤999 grams) was 5.7% [Table/Fig-6].

Weight	Number	Percent
ELBW	8	5.7%
VLBW	28	20.0%
LBW	64	45.7%
Normal	40	28.6%

[Table/Fig-6]: Classification of babies according to weight (n=140).
LBW- Low Birth Weight: VLBW- Very Low Birth Weight: ELBW: Extremely Low Birth Weight

Intrauterine Growth Retardation (IUGR) was seen in 11.4% and birth weight discordance in 21.4% of children. A low APGAR score was noted in 21.4 % of babies, while 12.9% of babies died in the early neonatal period [Table/Fig-7].

Foetal complications	Number	Percent
Nil	46	32.9%
IUGR	16	11.4%
Birth weight discordance	30	21.4%
Early neonatal deaths	18	12.9%
Low APGAR score	30	21.4%

[Table/Fig-7]: Foetal complications (n=140).
IUGR: Intrauterine Growth Retardation; APGAR: Appearance, pulse, grimace, activity, and respiration

DISCUSSION

Despite the advances in perinatal care, twins and pregnancies of higher-order have challenged the obstetricians today. This is because of the high risk to both the mother and foetus. In India, twin pregnancies complicate 1% of pregnancies and are the cause of 10% of perinatal mortality [6-8]. A comparative analysis of few important studies, including our own results was done to have a broad idea about variability of the different parameters [Table/Fig-8] [1,2,7,11,12].

Our analysis of twin pregnancies over 4 years shows the twinning rate to be 16.5/1000 deliveries. There is a wide variation in incidence rates among the world countries and the Indian subcontinent depending on the racial and geographical factors ranging from 6 to 18 per thousand [13-15]. This study incidence rate matches with the literature, though it is on the higher side of the range. This could be because the study represents a cross-section of high-risk pregnancies referred to this tertiary center with anticipated complications to mother and foetus.

Among the mothers included in this study, the majority were in the age between 21-30 years, with a mean age of 28.11±4.68 years. Almost similar mean maternal age of 28.3±4.05 years (range 20-40 years) was observed from the study done by Jhaveri RR and Nadkarni TK at Nowrosjee Wadia Maternity Hospital [8]. Lee YJ et al., in their analysis from Seoul, Korea showed the increased average age of twinning in mothers who had assisted contraception with average age of 32.0±1.4 [6]. There is no difference seen in distribution of twin pregnancy cases according to primigravida and multigravida group and majority of the cases presented with either first or second parity. Few studies independent of racial distribution showed slightly increased rates of twins with the increase in parity though the definitive reason could not be made out [8,11].

Various theories inferring that increased BMI increases the chance of twinning has been put forth. In this study, the mean pre-gestational BMI was 23.4 (±SD 1.6) (normal weight category). However, obesity (BMI >30) was not seen in any delivered mother. Gestational weight gain is correlated with the morbidity in twin pregnancies by the study by Wang L et al., from China [9]. High gestational weight gain was seen in 10% of the study population and was positively correlated by the morbidity of hypertensive disorder of pregnancy. The history of twins in the family was there in 21.4% of patients in the present study. A variable no. of cases (in range of 8-36%) has been associated with a family history in various studies [13,14].

The inadvertent use of ovulation induction drugs and Artificial Reproduction Techniques (ART) has contributed to the rise in the higher order of gestation [15,16]. Ovulation induction was done in 25.7% of patients in present study, out of which 3 were in-vitro fertilisation pregnancies. Mcdowell S et al., showed ovulation induction as a major risk factor for multi-order pregnancies. In their study, the majority were dichorionic twins, with the risk of triplets reported as 0.3-0.5%, quadruplets 0.3% and quintuplets 0.13% [17]. All antenatal cases (100%) were booked being located in an urban area in Rajasthan with good health indices in present study. Many of them were referred for better obstetric care and neonatal facilities. Probably the timely referral resulted in better maternal and perinatal outcomes.

The present study included 24.3% very preterm (<34 weeks), 41.4% preterm (<37 weeks) and 34.3% term deliveries respectively. The mean gestational age at the time of delivery was 34.6 (±SD 2.2) weeks. Multiple pregnancies are associated with greater

	Present study (Kamlesh Kumari et al.,) (N=70)	Vogel JP, et al., [1] (N= 3,238)	Mathew R et al., [2] (N=109)	Su R-N et al., [7] (N= 253)	Rezavand N et al., [11] (N=142)	Konar H et al., [12] (N=70)
Incidence of twin delivery	1.65 %	1.2%	2%	1.66%	0.48%	-
Mean maternal age (Years)	27.6±3.4	36.8±3.0	28.11 (±SD 4.89)	29.6±5.0	27	-
Percentage of cesarean delivery	64.3%	42.9%	78%	85.8%	-	35.71%
Maternal complications						
Diabetes	5.6%	-	25.68%	23.7%		
Anaemia	26.8%	2.1%	8.25%	31.5%		
Hypertension	22.5%	7.6%	25%	19%		
Eclampsia/Preeclampsia	-	1.1%	-	-		
Preterm labour	25.4%	35.2%	64.22%	53.85%		29.3%
PROM	18.3%	8.4%	-	18.2%		
Antepartum haemorrhage	1.4%	12.4%	4.58%	-		
Postpartum haemorrhage	-	-	13.76%	17%		
Hypothyroidism	-	-	14.67%	-		
Cord prolapse	-	-	2.75%	-		
Wound infection	-	-	7.3%	-		
Puerperal fever	-	-	8.25%	-		
Foetal complications						
IUGR	11.4%	9.7%	11.47%	17.8%	-	12.2%
Birth weight discordance	21.4%	38.4%	6.8%	-	-	
Early neonatal deaths	12.9%	3.1%	2.29%	-	-	
Late neonatal deaths	-	-	1.37%	-	-	
Stillbirth	-	4%	0.46%	-	-	3.855
Perinatal mortality	12.9%	7.1%	-	-	10.55%	
Low APGAR score	21.4%	10.9%	-	-	-	24.4%
Congenital anomalies	-	-	1.83%	0.8%	11.8%	

[Table/Fig-8]: Comparative analysis of different studies on twin gestation [1,2,7,11,12].
PROM: Premature rupture of membranes; IUGR: Intrauterine growth restriction; APGAR: Appearance, pulse, grimace, activity, and respiration

complications in the mother than in a singleton pregnancy. Preterm delivery was the major problem faced by mothers in this study as 25.4% of mothers delivered preterm. Several studies have shown a significant risk of preterm birth with twin gestation with a risk of 42-70% [13-16].

In present study, 64.3% of mothers had to undergo a caesarean section. Foetal malpresentation and foetal distress were the common causes responsible for 37.8% and 17.8% cases, respectively. Hypertensive disorder and history of previous caesarean section were the other major responsible causes. Overall, caesarean section delivery rate is quite variable among different study groups from different parts of world, ranging from 42-78% [12-16]. The inherent complications associated with multiple gestation are probably responsible for this increased rate of caesarean deliveries compared with singleton pregnancies. What should be the best way to deliver twin pregnancies is still a debatable question, though obstetricians increasing inclination towards caesarean section is seen. This is probably to ensure better maternal and perinatal outcomes [10].

Improved and appropriate obstetrical and neonatal care over the years is primarily responsible for the improved foetal and perinatal outcomes in multiple pregnancies [18]. This includes better use of steroids, tocolytics and appropriate neonatal Intensive Care Unit (ICU) care. In present study, 28.6% babies had normal birth weight, among 140 total babies. The mean weight of the first and second twin was 2.12±0.35 and 1.97±0.30 kg, respectively. About 21.4% of babies showed birth weight discordance. WHO Multicountry Survey on Maternal and Newborn Health by Santana DS reported 51.7% of babies to be Short for Gestational Age (SGA) [3].

Other foetal complications that were seen included neonatal asphyxia (low APGAR score), IUGR and birth weight discordance. We have not observed any single foetal demise and congenital anomalies. Perinatal mortality at 12.9% in present series, (1.29/1000 total births) was less compared to other Indian studies [13,15,16]. All cases were of early neonatal death. Variable rates of perinatal mortality (0.8-2.6/1000 births) have been described in the literature [18]. Fewer complications are seen in dichorionic than monochorionic twins [3]. Good neonatal facilities probably helped us to attain this good result.

Limitation(s)

The limitations of this study were small sample size and restriction to certain selected variables for study analysis. However, even with these limitations, this study contributes to the existing knowledge by establishing the Indian data on twin gestation.

CONCLUSION(S)

Management of twin pregnancies is a challenging task for obstetricians. Twin pregnancy rates were more in the younger age group. Maternal complications during twin pregnancy were mainly preterm labour, diabetes, hypertension and anaemia. Caesarean section was the main mode of delivery in this study. Dichorionic gestations had less foetal complications and low perinatal mortality probably due to better biology. Foetal complications were in the majority related to intrauterine growth restriction. More vigilance during the antenatal period and labour is needed for proper selection of mode of delivery. Active foetal surveillance and intervention with appropriate neonatal care can improve fetomaternal outcome.

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