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Original Research Article

The study of maternal and perinatal outcome in multiple pregnancies in tertiary care centre

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ABSTRACT

Background: Multiple pregnancies, involving twins, triplets, or higher-order multiples, present unique challenges and risks to both maternal and perinatal health. These pregnancies are associated with increased complications such as preterm birth, preeclampsia, and fetal growth restrictions, making their management a significant concern in obstetric care.
Methods: This hospital-based observational study, conducted from December 2017 to January 2019 in the department of obstetrics and gynaecology at a tertiary care center in Mumbai, examines maternal and perinatal outcomes in multiple pregnancies. The study population comprised pregnant women diagnosed with multiple pregnancies attending the hospital.
Results: The study aimed to identify the prevalence and risk factors associated with adverse outcomes in multiple pregnancies to inform better clinical management and improve both maternal and neonatal health. Findings underscore the heightened risks associated with multiple gestations and emphasize the need for specialized antenatal care to mitigate these risks effectively.
Conclusions: Key maternal outcomes assessed included rates of preeclampsia, gestational diabetes, preterm labor, and caesarean deliveries. Perinatal outcomes focused on preterm birth rates, low birth weight, neonatal intensive care unit (NICU) admissions, and perinatal mortality.

Keywords: Maternal, Perinatal, Multiple pregnancies, Neonatal health

INTRODUCTION

Factors both within and outside of the body interact intricately to cause multiple gestation pregnancies. Numerous pregnancies are associated with some known risk factors, including genetics, maternal age, ART, and advanced parity.[1] Worldwide, three percent of births are multiple births, a statistic that has grown in recent decades along with the rates of multiple pregnancies and multiple live deliveries.[2] Between 1980 and 2009, the rate of twin births in the US rose by about 75%. Other nations, including Western Europe, have also seen similar tendencies.[3]

With the exception of post-datism and macrosomia, issues affecting both mother and child become more common as the pregnancy progresses from the prenatal to the postpartum periods. Preterm birth is the most serious and prevalent consequence of multiple pregnancies; it raises the risk of perinatal morbidity and death in the short and long mature.[4] It is imperative to diagnose chorionicity in the early trimester because there are additional foetal complications that are unique to monochorionic pregnancies, such as discordant twins, twin-twin transfusion syndrome, twin anaemia polycythemia sequence, single foetal death, and congenital abnormalities.[5]

Aim and objectives

Aim

The aim of this study was to assess the maternal and perinatal complications in multiple pregnancies.

Objectives

The objectives were to study the risk factors associated with multiple pregnancies; to study the maternal complications like anemia, polyhydramnios, PIH, APH, PPH in cases of multiple pregnancies; to study the perinatal complications like prematurity, IUGR, malpresentation, TTS in cases of multiple pregnancies; and to find the association between multiple pregnancies with ovulation induction drugs.

METHODS

Study area

The study was conducted in the department of obstetrics and gynaecology of a tertiary care centre of Mumbai.

Study population

Pregnant females coming to our hospital with diagnosed with multiple pregnancy was the study population.

Type of study

It was a hospital based observational study.

Duration of study

The study duration was from December 2017 to January 2019.

Sample size

The sample size was calculated using following formula,

$$n=\frac{\frac{Z\alpha^2}{2}\times PQ}{E^2},$$

where,

n=sample size,

Zα/2=Z value at 5% error (1.96),

P=taken as 50% (ante-partum complications in twin pregnancies),

Q=1-P,

E=absolute error (taken as 20% of P),

$$n=\frac{(1.96)^2\times(0.50\times0.50)}{(0.01)^2},$$

n=96 (approximately).

So, by rounding off, we took 50 pregnant cases of twin pregnancies registered at our hospital and a similar number of controls.[8]

Inclusion criteria

Pregnant women with twin and singleton gestation during the study period and registered at our hospital were included in the study.

Exclusion criteria

Expectant mothers who already have a medical condition that raises the likelihood of problems during pregnancy; cases registered at other hospitals; one of the twins delivered elsewhere were excluded.

Methodology

We looked examined the incidence of relevant variables and difficulties throughout the prenatal period that are indicative of multiple foetal gestations, as well as the effects of these issues on the mother and foetal outcome measures (such as birth weight, Apgar score, admission to the neonatal intensive care unit, respiratory distress, abortion, and foetal death).

A thorough medical history was recorded.[12] Complications such as anaemia, hypertension, and jaundice were noted after a comprehensive physical examination. The dimensions, location, lie, and position of the uterus as well as its relationship to the delivery canal and the foetal heart sound were recorded during the per abdominal examination.[13] In order to record the progress of the labour, the mother's appearance, the condition of the membranes, and the adequacy of the pelvis, as well as to detect PROM and antepartum haemorrhage, a pelvic examination was performed.[14]

Protocol for delivery

Due to the high value of the unborn child, caesarean sections were intended for the delivery of full-term twins and triplets. Preterm labour, PPROM, IUFD, and abortions were all acceptable reasons for a vaginal birth.[15]

Protocol for delivery of second twin

The first twin's presentation, position, size, and relationship to the birth canal were evaluated promptly upon delivery. Continuous monitoring was done on the foetal heart rate of the second twin. The presentation component was secured in the pelvis after the membranes were torn after the cord prolapsed was excluded by the internal examination.[16]

Longitudinal lie

If there was no bleeding and the baby was not in distress, wait for the contractions to restart on their own for around 10 minutes if the baby was in a cephalic presentation.[17] If contractions stop happening, oxytocin augmentation is started. The fixing of the presenting section was followed by ARM. FHS was kept under constant observation. If the second stage took too long, forceps or hoover was used to intervene. Assistive breech birth was performed when the following conditions were met: a suitable maternal pelvis, an average foetal size, excellent uterine contractions, and a fully dilated and effaced cervix.[18]

Transverse lie

External version transformed a transverse lie into a longitudinal lie, allowing for vertex or breech presentation, as necessary. Under general anaesthesia, an internal podalic version is performed after breech extraction if the external version does not work or if the membranes rupture.[19] If there were certain indications, such as a non-vertex presentation, both twins presenting breech, severe pre-eclampsia, eclampsia, a non-reassuring foetal cardiac tracing, or antepartum haemorrhage, a lower segment caesarean section was performed on both babies.[20]

Postpartum period

Prophylactic uterotonics were used to actively control the third stage and minimise postpartum haemorrhage. Chorionicity and zygosity were studied using a placental examination.[21]

Investigations

The investigations done were blood grouping and typing; complete blood count; urine routine; HIV test done after counselling and written consent; HBsAg testing; liver function tests and renal function tests and fundoscopy wherever necessary; ultrasonography.

Operational definitions

The onset of labour prior to 37 weeks of gestation was deemed preterm.

Women who were previously normotensive and who developed hypertension during pregnancy, with or without proteinuria, were considered to have pregnancy-induced hypertension if their blood pressure was measured at 140/90 mm Hg twice or more after 20 weeks of gestation.[22]

A low birth weight was considered to be less than 2.5 kg.

The presence of typical radiographic findings and the necessity of oxygen at 24 hours were used to identify respiratory distress syndrome.

Severe infection was determined by the use of both clinical and laboratory criteria.

A birth weight discrepancy was described as a disparity in weight above 20%.

Statistical analysis

We compared the two groups on the following measures: maternal age, gravidity, mode of delivery, birth weight, APGAR score, foetal abnormalities, sepsis, respiratory distress syndrome, admission to the neonatal intensive care unit (NICU), newborn mortality, and maternal antenatal and postnatal complications.[23] Using Epi Info version 6, the final data was double-entered. The results were analysed with the help of SPSS 21. We compared the twin group to the singleton group in terms of maternal and foetal outcomes.[24] Student's t test was used to analyse the continuous variables, whereas Fisher's exact test was used for the categorical variables. The probability value of $p<0.05$ was used to determine statistical significance.

RESULTS

Most of the females (76%) belonged to age group of 26-35 years. There was no significant difference with respect to age distribution between the groups.

Most of the twins (72%) were born to primi mothers as compared to singletons (40%). The association of twin pregnancy with primigravida was statistically significant.

In this study, both tocolytics and steroids were used in 22 (44%) cases of twin pregnancy while they were used in only 1 and 4 cases of singleton pregnancy respectively. The use of tocolytics and steroids were significantly associated with twin pregnancy.

A significant association was observed between premature rupture of membrane and twin pregnancy (22% vs. 6%; $p<0.05$). No association was observed regarding development of pre-eclampsia (12% vs. 4%) and oligohydramnios (4% each).

On assessing the distribution of study subjects based on the mode of delivery, we observed that vaginal delivery was associated with 26% and 76% while LSCS was associated with 72% and 24% of twin and singleton pregnancies respectively.[25] The association of caesarean section with twin pregnancy was statistically significant ($p<0.05$).

In present study, most of the patients had full term deliveries (69%) while 31% had pre-term deliveries. Pre term deliveries were significantly associated with twin gestation (54% vs. 8%).

Postpartum haemorrhage was observed in 2% of twin deliveries as compared to none in singletons.

Table 1: Distribution of study subjects based on age distribution.

Age (years)		Group		Total
		Twins	Singleton	
20-25	N	5	4	9
	%	10.00	8.00	9.00
26-30	N	16	27	43
	%	32.00	54.00	43.00
31-35	N	20	13	33
	%	40.00	26.00	33.00
> 35	N	9	6	15
	%	18.00	12.00	15.00
Total	N	50	50	100
	%	100.00	100.00	100.00
P=0.17				

Table 2: Distribution of study subjects based on gravidity.

Gravidity		Group		Total
		Twins	Singleton	
Primi	N	36	20	56
	%	72.00	40.00	56.00
Multi	N	14	30	37
	%	28.00	60.00	44.00
Total	N	50	50	100
	%	100.00	100.00	100.00
P<0.05				

Table 3: Distribution of study subjects based on use of tocolytics and steroids.

Use of tocolytics		Group		Total
		Twins	Singleton	
Yes	N	22	1	23
	%	44.00	2.00	23.00
No	N	28	49	77
	%	56.00	98.00	77.00
Total	N	50	50	100
	%	100.00	100.00	100.00
P<0.05				

Table 4: Distribution of study subjects based on maternal complications.

Maternal complications		Group		Total	P value
		Twins	Singleton		
PROM	N	11	3	14	<0.05
	%	22.0	6.0	14.0	
PIH	N	6	2	8	0.14
	%	12.0	4.0	8.0	
Oligohydramnios	N	2	2	4	1.00
	%	4.0	4.0	4.0	

Table 5: Distribution of study subjects based on mode of delivery.

Mode of delivery		Group		Total
		Twins	Singleton	
Vaginal	N	13	38	51

Continued.

Mode of delivery		Group		Total
		Twins	Singleton	
	%	26.0%	76.0%	51.0%
LSCS	N	36	12	48
	%	72.0%	24.0%	48.0%
Abortions	N	1	0	1
	%	2.0%	0.0%	1.0%
Total	N	50	50	100
	%	100.0%	100.0%	100.0%
P<0.05				

Table 6: Distribution of study subjects based on type of delivery.

Type of delivery		Group		Total
		Twins	Singleton	
Full term	N	23	46	69
	%	46.00	92.00	69.00
Pre-term	N	27	4	31
	%	54.00	8.00	31.00
Total	N	50	50	100
	%	100.00	100.00	100.00
P<0.05				

Table 7: Distribution of study subjects based on post-partum complications.

Post-partum haemorrhage		Group		Total
		Twins	Singleton	
Yes	N	1	0	1
	%	2.00	0.00	1.00
No	N	49	50	99
	%	98.00	100.00	99.00
Total	N	50	50	100
	%	100.00	100.00	100.00
P=1				

Table 8: Comparison of mean birth weight and APGAR score.

Variables	Group	N	Mean	SD	P value
Birth weight (kg)	Twins	98	1.67	0.05	<0.05
	Singleton	50	2.93	0.06	
Apgar at 1 min.	Twins	98	7.56	0.95	<0.05
	Singleton	50	7.96	0.64	
Apgar at 5 min.	Twins	98	7.88	0.90	0.39
	Singleton	50	8.08	1.18	

Table 9: Distribution of study subjects based on fetal complications.

Fetal complications	Group		Total (n=148)	P value
	Twins (n=98)	Singleton (n=50)		
IUGR	9	1	10	0.17
	9.2%	2.0%	6.8%	
Fetal distress	7	2	9	0.71
	7.1%	4.0%	6.1%	
Discordant growth	12	0	12	
	12.2%	0.0%	8.1%	
TTS	2	0	2	

Continued.

Fetal complications	Group		Total (n=148)	P value
	Twins (n=98)	Singleton (n=50)		
	2.0%	0.0%	1.4%	
Abortions	1	0	1	1.00
	1.0%	0.0%	0.7%	

Table 10: Distribution of study subjects based on NICU admission.

NICU admission		Group		Total
		Twins	Singleton	
Yes	N	40	5	45
	%	40.00	10.00	30.00
No	N	60	45	105
	%	60.00	90.00	70.00
Total	N	100	50	150
	%	100.00	100.00	100.00
P<0.05				

Mean birth weight, Apgar score at 1 and 5 minutes was 1.67 kg and 2.93 kg, 7.56 and 7.96 and 7.88 and 8.08 in twin and singleton pregnancies respectively.[26] The mean difference of birth weight and Apgar score at 1 minute was statistically significant between the groups.[27]

Incidence of IUGR, fetal distress, and perinatal mortality was 9.2%, 7.1%, and 1% in twin deliveries as compared 2%, 4%, and 0% respectively in singletons. Discordant growth and twin transfusion syndrome were observed in 12.2% and 2% twins.

NICU admission was required by 40% and 10% of the delivered twins and singletons respectively. The difference was statistically significant.

DISCUSSION

Taking place at a Mumbai tertiary care facility, this study compared the outcomes of singleton pregnancies with those of multifetal gestations in order to better understand the effects on both the mother and the unborn child.[28]

Our institute had a 1.7% rate of twin pregnancy (1 out of 60 pregnancies). Different countries and ethnic groups have different rates of spontaneous twinning.[29] As a whole, the frequency was as follows: 1 in 70 for African Americans, 1 in 88 for Caucasian Americans, 1 in 86 for Italians, 1 in 150 for Greeks, 1 in 150 for Japanese, and 1/300 for Chinese. The use of assisted reproductive technology (ART) such *in vitro* fertilisation and inducement of ovulation has grown, and the number of pregnancies occurring at later ages has also been on the rise since the early 1990s, both of which contribute to the rising global prevalence of multiple births.[30] Our institution has a greater frequency of twins likely due to the larger number of ART births. The use of artificial reproductive procedures was linked to 48% of twin pregnancies, 2% of singleton pregnancies, and 0% of other pregnancies.[31]

Women between the ages of 26 and 35 made up the largest age group (76%). The average age of the twins in the research was 31.67 years, whereas the average age of the singletons was 27.96 years. Twin pregnancies occurred at a slightly greater rate among older women.[32] In comparison to singletons, the majority of twins (72%) were born to primi moms (40%). A statistically significant correlation was found with primi gravida and twin pregnancies. One possible explanation for the correlation is that older females are turning to IVF as a solution to their infertility problems.[33]

In this study, 26% of twin pregnancies and 76% of singleton pregnancies were delivered vaginally, whereas 72% of twin pregnancies and 24% of singleton pregnancies were delivered via LSCS, respectively. There was a statistically significant connection between caesarean section and twin pregnancy ($p<0.05$).

Operative delivery is more common in twin pregnancies, according to several research. Vaginal birth is associated with an increased risk of neonatal morbidity and mortality, and there are more malpresentations in the second twin.[34] Obstetricians would rather have a caesarean section while labouring with multiples. Obstetricians' worries lead to a greater occurrence of caesarean sections in twin pregnancies.[35]

Early delivery (54% vs. 8%) and preterm labour and delivery (22% vs. 8%) were the most common prenatal complications in twins and singletons, respectively. Oligohydramnios (4%) and postpartum haemorrhage (12%) were the additional complications.[36] Twin pregnancies had significantly greater rates of ante-partum complications and pre-term deliveries compared to singletons ($p<0.05$). Infants weighing less than 2.5 kg were

born in 98% of twin pregnancies, whereas only 16% of singletons were born in this way.[37] For twin and singleton pregnancies, the mean birth weight and Apgar score at 1 minute were 1.67 kg and 2.93 kg, respectively ($p<0.01$), and 7.56 and 7.96, respectively ($p<0.05$). There was a 9.2% increase in IUGR, a 7.1% decrease in foetal discomfort, and a 1% decrease in perinatal mortality in twin births compared to singletons, respectively.[39] A NICU hospitalisation was necessary for 40% of twins and 10% of singletons.[38] Issues with newborn prematurity and premature birth may explain why infants in our study spent more time in the hospital.[40]

We found support for our findings in a few previous experiments. In their study, Vogel et al looked at 279,425 women who gave birth to 276,187 (98.8%) alone children and 6,476 (1.2%) twins.[11,41] Twin pregnancies were associated with an increased risk of perinatal mortality and severe poor maternal outcomes (such as hysterectomy, blood transfusion, intensive care unit hospitalisation, or death) but no increased risk of early newborn death or stillbirth.[42]

Our study concludes that the dangers to both the mother and the infant are higher in pregnancies with multiple embryos. These hazards can be mitigated to some extent, although it might be difficult to discover multiple pregnancies at an early stage.[43] Antenatal care lessens risks to mother and child through increased rest and nutrition, early detection of foetal and maternal complications, and comprehensive intranatal and postnatal monitoring.[41] The majority of neonatal morbidities were associated with LBW, which is caused by early labour and intra uterine growth retardation. Birth weights of twins more than 1.5 kg have the potential to drastically reduce perinatal mortality. Therefore, twin perinatal mortality may be lessened with improved preterm infant care, planned births, and good prenatal care.[39]

Limitations

There are substantial gaps in the study on perinatal and maternal outcomes in multiple pregnancies conducted at the Mumbai tertiary care institution. To begin with, the study's limitations stem from the fact that it is an observational study conducted in a hospital setting, which limits its potential to generalise. The research patients received specialist treatment at a tertiary care facility, which might have led to better outcomes. The findings may be compromised due to the small duration of the investigation, which spans from December 2017 to January 2019. Lack of information on the study population's demographics and sample size may have an impact on the study's statistical power and generalizability. Research based on observation may be skewed by confounding circumstances. Lastly, the studies data reliability and validity depend on accurate reporting and record-keeping.

CONCLUSION

Our results imply that the main cause of the rise in the incidence of multiple gestations is the growing use of assisted reproductive technology. Reducing unfavourable perinatal outcomes such as PROM, PIH, preterm delivery, low birth weight, and IUGR is an urgent matter because of the substantial maternal and newborn consequences linked with repeated pregnancies. Mothers experiencing multiple pregnancies should seek out more obstetric care and be educated about the significance of early intervention and developmental monitoring for their children's optimal growth and development, since primary prevention for the risks associated with multiple pregnancies is frequently impossible.

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