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Original Research Article

Study of perinatal outcome in twin gestation in rural referral hospital in Maharashtra (India): a cross sectional study

Mahesh Asalkar, Bijal Kasar*, Swapnil Dhakne, Patit Paban Panigrahi

Department of Obstetrics and Gynecology, MIMER Medical College, Talegaon (D) Pune, Maharashtra, India

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*Correspondence:

Dr. Bijal Kasar,

E-mail: bijal.mistrykasar85@gmail.com

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ABSTRACT

Background: Incidence of twin pregnancy is increasing all over the world. It can occur after Assisted Reproductive Technology (ART) or spontaneously and associated with increased maternal and neonatal complications both in the developed and developing countries.

Methods: A descriptive (Cross sectional) study of 64 cases of twins was undertaken between January 2013 till December 2015. Data collection was done prospectively from the patients admitted to the hospital with twin gestation. Inclusion criteria: All pregnancy with twin gestation more than 28 weeks of gestation. Twin pregnancies with both fetuses alive are included. Exclusion criteria is multiple gestation other than twins, cases with congenital malformation and intrauterine death (in one or both twins) were excluded. Data included thorough antenatal history, demographic details and intrapartum and postpartum maternal and neonatal details.

Results: Prevalence of twins in our study was 1.61% (95% CI 1.3-2%). Out of 69 cases of twin pregnancy 64 cases fulfilled the inclusion criteria. History of ovulation induction was associated with 23% cases. Commonest complications observed were preterm labour (56.5%) anaemia (43.4%) and PIH (22.3%). 30.2% cases delivered vaginally whereas 69.8% patients required c. section, malpresentation being commonest indication. No intrapartum still birth was recorded. Early neonatal death was seen in eight cases, causes were prematurity, hyaline membrane disease and neonatal jaundice. Diamniotic-dichorionic twins were 90% and 3% cases were monoamniotic monochorionic. Zygosity was calculated by Weinbergs formula and 84% cases were dizygotic while 16% cases were monozygotic. No maternal mortality related to twin pregnancy was reported in present study.

Conclusions: All twin pregnancy should be considered as high risk pregnancies and should have mandatory hospital delivery. Early diagnosis, adequate antenatal, intrapartum and postpartum care as well as good NICU back up are the key factors in reducing the complications and improving the perinatal outcome in twin pregnancies.

Keywords: Pregnancy outcome, Preterm delivery, Twin pregnancy

INTRODUCTION

Twin is a type of multiple birth in which the mother gives birth to two offspring from the same pregnancy. Incidence of twin pregnancy is increasing all over the world. It can occur after Assisted Reproductive Technology (ART) or spontaneously. It occurs one in 80 pregnancies globally.¹⁻³ The prevalence of spontaneous twin pregnancies ranges from approximately 0.6% of

pregnancies in Asia and 1-2% in Australia, Europe and the United States of America (USA) to about 4% in Africa.⁴

Neonatal mortality rate is five to six times higher than that of singleton pregnancy.⁵ (4) The main causes of adverse neonatal outcomes in multiple pregnancies are related to prematurity, fetal growth restriction and low birth weight.⁶(5) Though maternal deaths related to twin

gestation is on the decline, maternal morbidity in terms of Anemia, preterm labour, Preeclampsia, Ante partum hemorrhages, increased rates of caesarean section and PPH are still very high.⁷ Hence periodic review of the outcome of twin pregnancy is necessary to scale up efforts aimed at reducing associated complications. The objective of this study was to know the incidence of twin in the tertiary care hospital, to study high risk factors associated with twin pregnancies and to describe the maternal and perinatal outcome in twin pregnancies delivered at a tertiary hospital.

METHODS

Descriptive (Cross sectional) study was conducted at MIMER Medical college from January 2013 to December 2015. Out of 69 twin deliveries 64 satisfied the inclusion criteria and are included in the study.

Inclusion criteria

- Patients with twin pregnancy beyond 28 weeks of gestation and delivered at study institution.
- Patients where neonatal follow up to one week of life was available.

Exclusion criteria

- Multiple gestation other than twins were excluded.
- Cases with congenital malformation which are incompatible with life (in one or both twins) and intrauterine death of either or both of twins were excluded.

Data collection

Data was collected in a uniform, consistent and reliable manner by trained qualified doctors with the use of standard proforma. Key variables such as age, parity, duration of gestation, physical examination, mode of delivery antepartum, intrapartum and postpartum complications was tabulated. Previous obstetric history and history of infertility treatment (ovulation induction), use of any oral contraceptive prior to conception was noted. Results of routine and specialized investigations and ultrasonography were recorded. After delivery and caesarean section placental morphology was studied in detail particularly taking note of number, type and weight of placenta. To determine the type of placenta, the relationships of membranes were carefully studied. Maternal and neonatal morbidity and mortality upto one week of post delivery was recorded.

Data management

Stringent quality assurance measures were followed at various stages of data handling so as to ensure completeness, accuracy and reliability of the data. Data entry and consistency check were done manually.

Statistical analysis

Statistical analysis was done using Epi-info7 software.

RESULTS

Table 1 shows most of our patients were in the age group of 31-35 (40.7%). Majority of cases around the age of 30 years (67% cases in 25-35 age group).

Table 1: Demographic variables in the study.

Socio demographic variable	No. of cases	%
Age		
<20 years	2	3.1
21-25	14	21.9
26-30	17	26.6
31-35	26	40.6
>35	5	7.8
Gestational age		
28-31.6	7	10.9
32-34.6	10	15.6
35-36.6	19	29.7
≥37 weeks	28	43.8
Parity		
Primi	28	43.8
Multi	36	56.3
Occupation		
Housewife	40	62.5
Employed	13	20.3
Farmer	11	17.2
Educational status		
Illiterate	02	3.1
<8 th Std.	08	12.5
8-12 th Std	19	29.7
Graduation	29	45.3
Post graduation	06	9.4

43.6% patients were delivered after 37 weeks indicating high prevalence of preterm deliveries (56.4%) in twin gestation. Most of our patients were (56%) were multigravidas and 62.5% were housewife. Most of our patients were having education upto graduation (46%).

Table 2: Risk factors association.

Risk Factor	Cases	Percentage (95% CI)
OCP use prior to current pregnancy	5	7.8 (2.9-16.5)
Family history of twinning	6	9.4 (3.9-18.5)
History of treatment for infertility	15	23.4 (14.3-35.0)
Age (26-35)	43	67.2 (55.0-77.8)
Parity (Multiparity)	36	56.3 (44.0-68.0)

Table 2 shows association of various factors such as OCP use prior to current pregnancy in 7.8% cases, family

history of twinning in 9.2% cases and h/o infertility treatment was noted in 23% of cases.

Table 3: Distribution of patients by fetal presentation.

Presentation	Number	Percentage (95% CI)
Vertex-Vertex	33	51.6 (39.4-63.6)
Vertex-Breech	10	15.6 (8.2-26.1)
Vertex-Transverse	01	1.6 (0.08-7.5)
Breech-Vertex	12	18.8 (10.6-29.7)
Breech-Breech	08	12.5 (10.6-22.4)
Breech-Transverse	00	0.0

Table 3 shows commonest presentation was vertex-vertex in 52.6% cases followed by breech-vertex in 18.4% cases and vertex-breech in 15.7% cases. Table 4 shows various complications observed in present study participants such

as preterm labour was commonest in 56.5%, followed by anaemia in 43.4% cases and PIH in 22.3% cases, other complications such as IUGR, placenta previa, PROM, abruptio placentae and polyhydromnios have been reported as mentioned in table.

Table 4: Complications encountered by mothers.

Maternal outcome	Number	Percentage (95% CI)
Preterm labour	36	56.3(44-68)
Anaemia	28	43.8(32-56.1)
PIH	14	21.9(13-33.2)
PROM	11	17.2(9.4-27.9)
GDM	02	3.1(0.5-9.9)
IUGR	09	14.1(7.1-12.2)
Placenta previa	06	9.4(3.9-18.5)
Abruptio placentae	02	3.1(0.5-9.9)
Polyhydromnios	03	4.7(1.2-12.2)
No complications	18	28.1(18.2-40.0)

Table 5: Distribution by mode of delivery.

Mode of delivery	Twin 1	%	Twin 2	%	Total	% (95% CI)
Spontaneous vaginal	13	20.3	09	14.1	22	17.2 (11.4-24.5)
Assisted breech	03	4.7	05	7.8	08	6.3 (3-11.5)
instrumental	04	6.3	05	7.8	09	7.0 (3.5-12.5)
LSCS	44	68.8	45	70.3	89	69.5 (61-77)

Vaginal deliveries (including Assisted breech and instrument) = 19; LSCS = 45 (One patient required LSCS for 2nd twin after first baby born vaginally) hence LSCS was required in 44 cases for 1st twin and for 45 cases in 2nd twin.

Table 5 shows 64 cases of twins gave birth to 128 babies, out of 128 babies 20.3% of 1st twin had spontaneous vaginal delivery and 14% of 2nd twin had spontaneous vaginal delivery. 4.6% of first twin were delivered by assisted breech and 7.8% of second twin had assisted breech delivery.

Instrumental (Forceps/Vacuum) was required in 6.2% cases of first twin and 7.8% cases of second twin.

Number of assisted breech as well as instrumental delivery were more observed in second twin, indicating more requirement of skilled techniques and manoeuvres for delivering the second twin. 69.5% cases required LSCS for delivery and in one case c. section was required for 2nd baby of twin where first has delivered vaginally.

Table 6 shows 84.4% cases were monozygotic and 15.6% cases were dizygotic calculated by Weinbergs formula.

90.6% cases were diamniotic-dichorionic and mono amniotic-mono chorionic combination was seen in 3.12% cases. Male to female (65:63) ratio in present study was 0.97:1 with slight higher preponderance of female fetuses in twins.

Table 6: Sex combination, chorionicity and zygosity.

Twin delivery variable	Number	% (95% CI)
Sex combination		
Male-male	18	28.1 (18.2-40)
Female-female	19	29.7 (19.5-41.7)
Male-female	15	23.4 (14.3-35)
Female-male	12	18.8 (10.6-29.7)
Chorionicity		
Dichorionic diamniotic	58	90.6 (81.5-96.1)
Diamniotic monochorionic	04	6.3 (2-14.4)
Monochorionic monoamniotic	02	3.1 (0.5-9.9)
Zygosity		
Monozygotic twins	10	15.6 (8.2-26.1)
Dizygotic twins	54	84.4 (73.9-91.8)

Like sex twins: 18+19=37 (57.8%, 95%CI 45.5-69.4%); unlike sex twins: 15+ 12=27 (42.2%, 95% CI, 30.6-54.5%)

Table 7 shows perinatal parameters of the neonates, (1st twin versus 2nd twin) low APGAR at 1 min (4.6% Versus 9.3%) and at 5 min (1.5% Versus 6.2%) as well as NICU requirement (36% Versus 59%), all were more common

in 2nd twin than first twin. Also, neonatal death was seen among 6 cases of 2nd twin as compared to only 2 cases in 1st twin. There was no still birth reported in our study. There was no maternal mortality seen in present study. 3

(4.7%) pairs out of 64 pairs of twin showed discordant growth in the birth weight (Birth weight difference more than 15%).

Table 7: Perinatal outcome (morbidity and mortality).

Neonatal outcome	Number (1 st twin)	Percentage	Number (2 nd twin)	Percentage	Total	Percentage
APGAR <7 At 1 minute	3	4.7	6	9.4	09	7.0 (3.5-12.5)
APGAR <7 at 5 minutes	1	1.6	4	6.3	5	3.9 (1.4-8.4)
Admission to NICU	23	35.9	37	57.8	60	46.9 (85.6-98)
Neonatal death in 1 st week	2	3.1	6	9.3	8	6.3 (3-11.5)
Birth weight <2.5 kg	38	59.4	43	67.2	81	63.3 (54.7-71.3)
B.w <2.5 kg						
<1.0 kg	3.1	3.1	03	4.7	05	3.9 (1.4-8.4)
1-1.5kg	9.4	9.4	07	10.9	13	10.2 (5.8-16.3)
1.5-2.0kg	15.6	15.6	11	17.2	21	16.4 (10.7-23.6)
2-2.5kg	31.3	31.3	22	34.4	42	32.8 (25.1-41.3)
Birth weight >2.5kg	26	40.6	21	32.8	47	36.7 (28.7-45.3)
Neonatal mortality						
Fresh still birth	0	0	0	0	0	0
Neonatal death	03	4.7	05	7.8	08	6.3 (3-11.5)
Cases with discordant growth	3 pairs out of 64 twins showed discordant growth with birth weight difference of more than 15% in the twin pair.					

DISCUSSION

From prehistorical times, right up to the dawn of the new millennium, mankind has always been fascinated by the phenomenon of multiple pregnancy. Serious efforts have been made to unify all kinds of contribution on twins into a new branch of science named “Gamellology”

The female child is programmed by nature to mono-ovulate, to nurture one fetus and to take care of one neonate at a time. Recent advances in ovulation induction, diagnostic ultrasound and Assisted Reproductive Technologies (ART) have caused a new spurt in incidence of twin gestation.

The incidence of twin pregnancy varies widely throughout the world. The highest incidence has been reported in blacks of West African descent and the lowest in asian Mongolians.^{8,9} In this study the incidence of twin deliveries was 1.6%. This was higher than reported in previous study carried out in India. The difference may be due to genetic influences, increased use of ovulation induction drugs and also more number of cases being referred to tertiary care center by nearby PHCs and private practitioners. Basirat et al found frequency of twins in 1.4 cases while another study by Kavehmahesh et al showed frequency of twinning in 1.8% cases.^{10,11} Prevalance of twins was reported to be in 1 in 80 by Usta in United States, 1 in 48 births by Musili et al in Kenya and 1 in 43 births by Mutihir et al in Nigeria.^{9,12,13} In general, growing use of assisted reproductive technology

is causing an increase in the prevalence of twin pregnancy throughout the world.¹²⁻¹⁴

Twin birth registries are rare in low and middle income countries(LMIC) and twin specific research is generally based on hospital based studies, secondary analyses of interventional trials or retrospective analyses of demographic and health survey (DHS) data, all with significant limitations and bias.¹⁵⁻¹⁷ In LMICs medical record documentation is suboptimal which may affect the data quality.¹⁶

Previous studies have shown increasing maternal age and parity have been found to be strongly associated with increased incidence of twinning.^{1,16,18} In present study 41% cases were in the age group of 31-35, followed by 26% in the age group of 26-30. There is clustering of cases around the age of 30, reflecting the increase in the postponement of pregnancy until the thirties as women increasingly pursue careers before childbearing. In present study 29% cases had their education till graduation and 21% were working women, this reflects increase priority towards education and career are associated with increased maternal age and indirectly may be associated with twinning due to increased maternal age.

Apart from maternal age, Parity have been found to be strongly associated with increased incidence of twinning.^{1,16,18} Most of our patients were multigravida (56%). which corroborates with study of Chaudhary et al

with figure of 64.2% for multigravida showing association with increased parity.¹⁹ Even higher frequency of 84.25% twinning in multigravida was reported by Spellacy et al.²⁰ However age and parity together influence towards higher incidence of twinning or they contribute independently towards increased incidence of twinning is not studied and needs evaluation.

A number of factors apart from age and parity have been associated with increased incidence of twinning. These include use of fertility drugs for ovulation induction, family history of twinning, use of OCP prior to conception, maternal height and weight, previous history of twin delivery and diet.^{21,22} In present study 23% had history of treatment taken for the infertility, family history of twinning was present in 9% cases while 8% cases conceived within 3 months of stoppage of OCP. Other factors like maternal height, weight and diet etc have not been considered in present study. Family history of twinning has been reported in 19% by Chowdhury et al and 30% by Sultana et al. Twin after ovulation has been reported in 17% and 14% by Chowdhury and Sultana et al respectively.

Table 3 demonstrates the fetal presentation at delivery. Vertex-Vertex was found in 52.6% cases and Vertex-Nonvertex in 17% cases (Vertex-Breech in 15.7% and Vertex-Transverse in 1.3%) and Nonvertex presentation in 30% cases (Breech-Vertex 18.4%, Breech-Breech 12%). Shevernak et al and Chowdhury in their studies found majority of foetal presentation as vertex-vertex in 42.5% and 47.5% respectively followed by vertex-nonvertex (38.4% and 26.5% respectively).^{19,23}

30% patients delivered vaginally (includes spontaneous vaginal deliveries, instrumental deliveries and assisted breech deliveries) while 70% cases required LSCS commonest indication being mal-presentation. Study by Chowdhury et al and Sultana et al showed rates of LSCS 49.1% and 56% respectively for twin pregnancies.

64 cases of twins gave birth to 128 babies, out of 128 babies 20.3% of 1st twin had spontaneous vaginal delivery and 14% of 2nd twin had spontaneous vaginal delivery. 4.6% of first twin were delivered by assisted breech and 7.8% of second twin had assisted breech delivery. Instrumental (Forceps/Vacuum) was required in 6% cases of first twin and 7.8% cases of second twin. Number of assisted breech as well as instrumental delivery were more for 2nd twin than 1st twin, indicating more requirement of skilled techniques and manoeuvres for delivering the second twin.

All cases of twins vaginal deliveries were conducted in operation theatre with keeping the facilities of c. section ready. In one case after vaginal delivery of first twin, 2nd twin required LSCS in view of transverse lie with oligohydramnios making the internal podalic version difficult and the on call obstetrician preferred delivery by LSCS than IPV as a safe mode of delivery. Delivery of

second baby in twin puts more challenges to the obstetrician in terms of skills and timely decision making as compared to delivery of first twin.

Preterm labour (56%) was the commonest obstetric complication recorded in present study, followed by anaemia (43%), incidence of pregnancy induced hypertension was significantly higher (22%) in twin pregnancies, this has been attributed to higher maternal age at conception as well as exposure to superabundant chorionic villi in twin pregnancies.²⁴

28% cases didn't have any complication while rest had either one or two obstetrical high risk associated such as PROM (17%), IUGR (13%), placenta previa (9%), abruption (2%), polyhydramnios (5%). Few patients had more than one obstetrical high risk associated such as placenta previa with IUGR etc. Hence the total number of complications are more than total number of cases studied. Other studies have also reported higher incidence of obstetrical complications with twins.^{25,26}

Though there was no maternal mortality in our study, one patient following vaginal twin delivery had post-partum haemorrhage not responding to conservative medical management with oxytocics, required conservative surgery B-Lynch compression sutures with internal iliac ligation. It was nearly missed mortality with increased morbidity requiring blood transfusion, ICU care and prolonged hospitalization. Previous studies of Chowdhury and Sultana also did not report any maternal mortality, however one study done in Nigeria described maternal mortality of 2% for twin deliveries.^{19,25,27} In spite of high association with maternal obstetrical complications zero maternal mortality could be due to tertiary care facilities with ICU, blood bank availability and skilled manpower to handle complication 24 hours.

63 (49%) and 65 (51%) of twin births were males and females respectively giving male to female sex ratio of approximately 0.97:1. The sex combinations in twin deliveries were male-male in 18 (28%), female-female 19 (29%), male female 15 (23%) and female-male 12 (18%). Muthir et al reported 54.7% of twin pregnancies to be boys, while Kavehmanesh et al reported 58.2% if babies were girls and 41.8% were boys.^{9,28} However Melamed et al and Chittachoen et al indicated that female neonates are significantly more frequent in twin pregnancies.^{29,30} This may be due to tendency of genetically female zygotes for division or the nutritional and spatial limitations associated with the presence of multiple fetuses may reinforce this tendency.³⁰

Placental examination of twin deliveries showed that 58 (91%) dichorionic-diamniotic, 4 (6%) diamniotic monochorionic and 2 (3%) were monochorionic monoamniotic. According to Weinberg rule monozygotic twins and dizygotic twins constituted 16% and 84% respectively in our study. This rule states that the number of monozygotic twins in a given twin population is the

result of the total number of like sex twins minus unlike sex twins. The rule is based on the assumption that the total number of like sex dizygotic twins in a given large population of at least 1,00,000 people in a community equals that of unlike sex dizygotic twins. Therefore, the excess of the total like sex twins over the total unlike sex twins will be due to monozygotic twins.³¹ The rate of monozygotic twins was lower in this study when compared to other studies.^{6,31} This difference may be explained by the different methods used to identify zygosity among different studies.

Out of total 128 neonates 9 (7%) babies had APGAR score less than 7 at min., (APGAR <7 for 5% of twin 1 and 9% of twin 2) while 4% neonates had APGAR <7 at 5min (APGAR <7 at 5 min in 1.5% twin 1 while 6% in twin 2) this reflects 2nd baby is at high risk of asphyxia as compared to first twin. NICU was required in 47% of twins. NICU requirement was seen 36% for twin1 and 58% for twin2. Previous studies by Chowdhary et al showed APGAR score <7 in 7.5% of first twins and 13% of second twins.¹⁹

Early perinatal mortality (within 7 days) was also higher for second baby of twin as compared to first twin. Overall 8 neonatal death among 128 neonates reported. 3% of first twin and 9% of 2nd twin had neonatal death within 7 days. There was no intrapartum still birth recorded in present study. Overall 37% of babies had birth weight more than 2.5kg. 41% of twin 1 and 33% of twin 2 had birth weight more than 2.5kg. 63% of total newborn in study had birth weight less than 2.5kg, 59% of twin1 and 67% of twin 2 had birth weight less than 2.5kg. Those weighing less than 2.5kg were further sub-categorized as shown in table and most of the babies showed birth weight between 2-2.5kg (33%), while 16% had birth weight between 1.5-2kg and 10% were between 1-1.5kg and 8% were below 1kg. These categories also showed twin 2 birth weight slightly lower than twin 1.

Increased rate of perinatal death observed in twin pregnancies may be explained by the increased rate of intrauterine growth restrictions, premature rupture of membranes, preterm deliveries, low birth weight and low APGAR scores among twin deliveries.^{25,26} Prematurity is the leading cause of perinatal mortality in multiple pregnancy as was also revealed by studies of Koram et al and Ziadeh S.^{32,33}

This study may have its own limitation in that it was conducted in one referral hospital, where most of the laboring mothers come because of complications. This might have overestimated the incidence of twin pregnancy and will not represent the general population and home deliveries that need further community based studies. Also cases of twins with one twin having intrauterine death have been excluded and hence complications due to intrauterine death of other twins could not be obtained from this study.

CONCLUSION

Complications associated with higher order pregnancies cannot be prevented but can be detected early and controlled adequately by proper and prompt management. Regular and more frequent antenatal checkup, referral services to well equipped centres, liberal hospital admission policy and perform deliveries in well equipped centres under supervision are essential measures to reduce adverse pregnancy outcome. Periodic review about the perinatal statistics and prevalence of twin delivery is important to scale up the services required to reduce the perinatal mortality in twin deliveries.

This study addresses significant gap in the literature on the outcomes of twin deliveries in low and middle income countries, where frequency of twin birth is often high and epidemiological research on multiple birth is challenging. This study not only briefs about the perinatal outcome in twins but also identifies association of various factors with twin pregnancies such as Age, Parity, family history, OCP and ovulation inducing agents with twin gestation. It emphasizes the documentation and importance of the of twin birth registries in LMIC to have the periodic review of outcome in twins so as to scale up the efforts to give the best perinatal outcome and to reduce maternal and perinatal morbidity as well as morbidity.

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