Original Research Article

Comparative study of neonatal outcome between first and second twin babies delivered by vaginal route

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Abstract

Introduction: The incidence of twinning has been increasing due to availability and increased use of ovulation inducing drugs and assisted reproductive technology. Despite substantial concerns over the well-being of the second twin with regard to intra partum events, outcome studies on this issue are conflicting. Some have reported no increase in perinatal complications, while others showed significant associations between labor and delivery of the second twin and increased perinatal morbidity and mortality.

Material and methods: 106 cases of twin pregnancy fulfilling of age 18 - 35 years, at more than 32 weeks gestation, first twin with cephalic presentation and selected for vaginal delivery were included in the study. Intrauterine death of either one of the twins before the onset of labour, pregnancies complicated or fetal malformations and those with contraindication to vaginal birth were excluded. After thorough screening of included cases delivery was performed according to fixed protocol. After delivery, mode of delivery, cry, APGAR score, birth weight, complications, birth injury, time interval between deliveries, NICU admission and condition on discharge of each baby was noted.

Results: 106 twins were included as delivered vaginally, including 3 patients who were delivered by vaginal delivery for 1st twin followed by caesarean delivery for 2nd twin. Stillbirth and early neonatal deaths resulted in 24 deaths. There is no significant difference between mortality of 1st and 2nd born twins. The neonatal mortality was equal in first and second twin. Neonatal morbidity was more in 2nd twin than 1st twin (27.65% v/s 15.95%). There were 41 NICU admissions (19.34%), out of those 36.6% were for first twin (n=15) and 63.4% for second twin (n=26), (p value 0.056). Incidence of RDS, invasive ventilator support, NICU Stay >7 days is significantly higher in second twin as compared to first twin. Breech presentations were associated with 10% neonatal mortality for second

twin compared to none for first twin. Most common group for neonatal mortality and morbidity was birth weight 1000-1499 gm. Neonatal morbidity was 100% for discordancy 30 to 40% group while 85.71% for discordancy 20 to 30% group. These results are significant when compared for heavier twin v/s lighter twin (p value 0.001).Neonatal mortality and morbidity between first and second twin is statistically significant when compared according to Apgar score (p value 0.037). Incidences of stillbirth + early neonatal death for 2nd twin less in early preterm group but increased in in late preterm group. Neonatal outcome of 2nd twin was better in dichorionic pregnancies 11% v/s 16.67% in monochorionic pregnancies (p>0.05).

Conclusion: Twin vaginal delivery is safe in first cephalic presentation in twin pregnancy. Caution should taken while delivering babies < 1500 gm, birth discordancy > 20% , gestational age < 34 weeks, as vaginal delivery in these conditions is associated with increased early neonatal morbidity and neonatal mortality.

Key words

Twin pregnancy, Perinatal, Morbidity of second twin, Mortality of second twin, Vaginal delivery.

Introduction

Managing a twin gestation is potential challenge for an obstetrician. Twins constitute a significant number of preterm, low birth weight and growth restricted infants. They are also at higher risk of long-term mental and physical handicap and tend to have significantly higher health care costs. Compared with singleton pregnancy, twin pregnancy are associated with significant increases in cardiac/hematologic morbidity, amniotic fluid embolism, pre-eclampsia, gestational diabetes, postpartum hemorrhage, prolonged hospital stay, the need for obstetric intervention, hysterectomy and blood transfusion [1].

The incidence of twinning has been increasing due to availability and increased use of ovulation inducing drugs and assisted reproductive technology. Incidence of twin pregnancy in India is estimated to be 9–16 per 1000 births [2].

Perinatal mortality is higher in twins than in singletons [3]. This increased risk is mainly owing to factors unrelated to mode of delivery. Nevertheless, vaginal birth of twins at term is well recognized as a high-risk area. It is associated with increased rates of perinatal death and a depressed Apgar score, primarily because of intra partum asphyxia of the second twin [4].

The optimal mode of birth for twin pregnancy is controversial. A great vulnerability [5, 6] of second twin at birth appears to arise mainly and if not entirely on account of its peculiar and favorable position. Retrospective reviews in the literature provide support for both caesarean birth and vaginal birth for the second non-vertex twin.

Clinically, it is well recognized that the second twin is at increased risk of complications during labour due to difficulties in fetal monitoring and the possibility of traumatic delivery following vaginal birth of the first twin [7].

Though vaginal delivery of a second twin is recognized as obstetric risk, we do not know whether second twins are at increased risk of perinatal death. Despite substantial concerns over the well-being of the second twin with regard to intra partum events, outcome studies on this issue are conflicting. Some have reported no increase in perinatal complications, while others showed significant associations between labor and delivery of the second twin and increased perinatal morbidity and mortality as morbidity and mortality risks are higher with monochorionic gestations.

Intra partum management plays an important role in the ultimate outcome of any delivery,

especially in twin gestations. The risks associated with delivery of the presenting twin differ from those for the second twin, often depending on the mode of delivery [5, 6, 7] and delivery interval.

Vaginal delivery of both twins presenting by the vertex is recommended. Many studies suggest that in twins with vertex-breech or vertex-transverse presentations after the thirty-fifth week of gestational age the neonatal outcome of the second twin was not significantly influenced by the route of delivery [9].

It is suggested that the potential advantages of elective delivery in women with twin pregnancy from 37 weeks' gestation include a reduction in perinatal mortality and morbidity recommended by NICE guidelines [10]. Twin pregnancy is a high risk delivery as timing and mode of twin delivery are affecting maternal and perinatal outcome [11].

In view of the high incidence of twinning in this environment and the associated maternal and fetal risks, it is important to constantly study this, high risk pregnancy. Changing epidemiology of multiple births led to study the factors contributing to perinatal outcome in twins.

Considering the need of data on the safety of second twin delivery, especially in India the study is undertaken to assess the perinatal outcome of second of twin delivering vaginally, with minimum neonatal mortality and morbidity. This present series concerned with comparative study of neonatal outcome between first baby and second baby of twin, delivered by vaginal route. Thus gives insight for relative benefits and risks of planned for twin pregnancy, for the infants and the mother.

Material and methods

Cases of twin pregnancies admitted to labour room of B J Medical College and Sassoon Hospital, Pune during period of 2010 to 2012 were studied. Patients were selected according to inclusion criteria of age 18-35 years, at more than 32 weeks gestation, first twin with cephalic presentation and selected for vaginal delivery.

Exclusion criteria: Intrauterine death of either one of twins before the onset of labour, Pregnancies complicated by twin-twin transfusion or fetal malformations, lethal anomaly of either twin, Contraindication to vaginal or vaginal birth.

Selected patients were studied and evaluated in details with history, clinical examination, investigation and follow up for neonatal outcome. Investigations and ultrasound examination was carried out at our hospital. The consent of the patients was taken for participating in this study. All cases were attended by pediatrician.

Detailed patient history and obstetric examination was done. No sedation, epidural analgesia was given and spontaneous delivery was awaited after proper patients' preparations. The progress of labour, maternal vitals and fetal heart rates were monitored and studied. Detail history of patients was obtained with routine hematological and USG investigation. Along with these routine investigations, screening for antenatal risk factors like hydramnios, anemia, and pregnancy induced hypertension was carried out.

Augmentation was done with escalating doses of intravenous oxytocin infusion when needed. Immediately after delivery of first twin lie, presentation, fetal heart rate was confirmed. Per vaginal examination was done to confirm presentation, to rule out cord prolapsed, to note cervical dilatation, station of presenting part. For uterine inertia augmentation was done or continued. Continuous monitoring of fetal heart rate, uterine contractions, maternal vitals and progress of labour was done to avoid complications. IPV, ECV or instrumental delivery were done when required after individualization of case.

Following delivery interval between these two deliveries noted. Oxytocic drugs were soon added as intravenous oxytocin infusion immediately following delivery of second twin and intramuscular injection ergometrine 0.2 mg after delivery of placenta.

Babies were monitored by pediatricians. Spontaneous respiratory efforts and cry are observed. In case of poor spontaneous respiratory efforts and cry resuscitation done immediately.

Mode of delivery, cry, sex, APGAR score, birth weight, complications, birth injury, time interval between deliveries, NICU admission and condition on discharge of each baby was noted. Babies were monitored for infection, proper breast feeding, hygiene, immunization. Babies in post natal ward were discharged with other and follow up advice on day 7.

Statistical analysis

Findings of proportions were tabulated as number and percentage distribution. Data was analyzed using Statistical Package of social science (SPSS) version 16 statistical software. Comparison of results for difference between two proportions was done using Chi square test. Proportion level of up to 5% was considered statistically significant ($p<0.05\%$).

Results

All women having multiple pregnancies received in the Obstetrics and Gynecology Department from September 2010 to August 2012 were recruited for this study. The patients were selected after applying the inclusion criteria i.e. women more than 32 weeks gestation, aged 18-35 years old, with first twin is presenting in the cephalic position and selected for vaginal delivery.

Total 154 twin pregnancies out of 292 were eligible for this study. Out of which 106 twins were included as delivered vaginally, including 3 patients who were delivered by vaginal delivery for 1st twin followed by caesarean delivery for 2nd twin for shoulder presentation and fetal distress. 48 patients underwent emergency caesarean delivery and hence were excluded from study.

Early neonatal outcome of twins

Stillbirth and early neonatal deaths resulted in 18 twin pregnancies of either twins or both twins, totaling 24 deaths. The perinatal mortality rate was 113/1000 total births. There was statistically no significant difference of stillbirths, early neonatal mortality and live birth in 1st and 2nd born twins. (**Table - 1**) Neonatal morbidity (NICU admissions) was more in 2nd twin than 1st twin (27.7 % v/s 15.9%).

Table – 1: Neonatal outcome of twins (n=106).

Perinatal outcome	1st twin	2nd twin	P-value
Stillbirth	4 (3.8%)	8 (7.5%)	>0.05
Early neonatal deaths	8 (7.5%)	4 (3.8%)	
Alive	94 (88.7%)	94(88.7%)	

Neonatal complications

Babies were examined immediately after delivery and follow up kept till 7 days postpartum. As per **Table - 2**, of 212 babies, 57.1% (n=121) babies did not require any neonatal resuscitation, 6.1% (n=13) were stillbirth. Rest of 36.8% required resuscitation (n=78). When outcome was compared between first and second twin, second twin required resuscitation (46 v/s 32) and NICU admission (26 v/s 15) more often than first twin ($p>0.05$).

There were 41 NICU admissions (19.34%), out of those 36.6 % were for first twin (n=15) and 63.4% for second twin (n=26), which is statistically not significant (p=0.056). Incidence of respiratory distress syndrome is significantly higher in both first and second twins (**Table - 3**)

Presentation and early neonatal outcome

Presentation combinations for 1st and 2nd twins were vertex – vertex in 88.67% (n=94), vertex –

non vertex in 11.32% (n=12). Neonatal outcome of 2nd twin was comparable in vertex – vertex pregnancies 11.69 % v/s 10% in cephalic-non cephalic pregnancies.

Table – 2: Early neonatal outcome of twins.

	n	Not required resuscitation	Required resuscitation			Still birth
			Live birth	NICU admission	Neonatal mortality	
First twin	106	67	12	15	5	7
Second twin	106	54	14	26	6	6
Total	212	121 (57.1%)	26 (12.3%)	41 (19.3%)	11 (5.2%)	13 (6.1%)

(P value 0.969, Not significant)

Table - 3: NICU admissions (n=41).

	First twin (n=15)	Second twin (n=26)
Early neonatal mortality	5 (33.3%)	6 (23.1%)
Respiratory distress syndrome	14 (93.3%)	22 (84.6%)
Sepsis	2 (28.7%)	7 (26.9%)
Ventilation	7 (46.7%)	16 (61.5%)
Convulsion	4 (26.7%)	9 (34.6%)
Stay > 7 days	8 (53.3%)	19 (73.1%)

Vertex – vertex pair had high incidence of neonatal morbidity and mortality. Neonatal mortality for first and second twin was 13% and 12% respectively (P-value= 0.307). Neonatal morbidity was 15% and 28% for first and second twin, but the findings were statistically not significant (P-value 0.056).

Breech presentations were associated with 10% neonatal mortality for second twin compared to none for first twin. NICU admissions were 10% v/s 30% for first and second twin respectively. Excess NICU admissions were due to multiple factors like prematurity, low birth weight, birth weight discordancy acting together. Most common cause was respiratory distress syndrome mostly due to prematurity.

Both Vertex – Transverse presentation pregnancies were delivered by vaginal delivery for first followed by caesarean section for second twin. No neonatal mortality and morbidity noted among them.

Mode of delivery and early neonatal outcome

According to distribution of mode of delivery and presentation most common route was vaginal. Out of 212 twin births 203 (95.8%) were vaginal while only 6 (2.8%) instrumental deliveries and 3 (1.4%) caesarean section for second twin. There is no significant difference (P>0.05) in between first and second twin of Stillbirth + Early Neonatal Death delivery by vaginal route, instrumental deliveries or first twin by vaginal route and second twin by caesarean section. (**Table - 4**)

Birth weight and early neonatal outcome

Mean birth weight for first twin was 1782.6 gm and second twin was 1774.5 gm. Low mean birth weights of first and second twins are mainly due to 94% preterm patients in this study. Most common birth weight group was 1500 – 1999 gm, 33 (31.17%) and 37 (34.90%) for first and second twin respectively. Most common group for early neonatal death was birth weight < 1000 gm, 1 (33%) and 2 (66%) for first and second

twin respectively. Stillbirth rate was most commonly noted in birth weight < 1000 gm, 1 (33%) and 1 (50%) for first and second twin respectively among that group. Most common group for neonatal morbidity was birth weight 1000 - 1499 gm, 12 (42.85%) and 23 (82.14%) for first and second twin respectively.

Birth weight discordance and early neonatal outcome

As per **Table - 5**, it was clear that incidence of neonatal mortality and morbidity for smaller twin was increasing as discordance goes on increasing. 100% mortality was noted in discordancy > 40%, these results are significant when compared for heavier twin v/s lighter twin (p value 0.001).

Study of APGAR score of both twins

As per **Table - 6**, low APGAR score was direct indicator of neonatal mortality and morbidity. Comparison of neonatal mortality and morbidity between first and second twin is statistically significant (P-value 0.037).

Table – 4: Mode of delivery and early neonatal outcome.

Mode of delivery	Live birth		Stillbirth + Early neonatal death		NICU admission	
	1st twin	2nd twin	1st twin	2nd twin	1st twin	2nd twin
Vaginal (n=203)	88	91	12	12	14	26
Instrumental(n=6)	6	0	0	0	1	0
Vaginal - Cesarean (n=3)	0	3	0	0	0	0
Total	94	94	12	12	15	26

(P=0.999, Not significant)

Table – 5: Birth weight discordance and early neonatal outcome.

Discordancy	No.	Heavier twin			Lighter twin		
		Live	Stillbirth + Early neonatal death	NICU admission	Live	Stillbirth + Early neonatal death	NICU admission
>10 %	55	47	8	12	54	1	3
10– 20 %	26	23	3	2	25	1	6
21– 30 %	14	13	1	1	12	2	12
31– 40 %	8	8	0	0	3	5	3
>40 %	3	3	0	0	0	3	0
Total	106	94	12	15	94	12	26
Chi-Square value (Heavier Twin v/s Lighter Twin) =18.852							
p value < 0.001							

Delivery interval and early neonatal outcome

We had shortest interval of 0 minutes and longest of 92 minutes. Average time interval was 13.33 minutes and mode was 5 minutes. Comparison of time interval with early neonatal mortality and morbidity was statistically not significant (**Table - 7**).

Unexpectedly high incidence of neonatal morbidity and mortality in second twin with delivery interval less than 5 minutes can be explained on the basis of high number of preterm and low birth weight babies.

Gestational age and neonatal outcome

In our study mean gestational age was 34.42 weeks. Pre-term labour (< 37 weeks) was reported in 97 patients (91.5%). (**Table - 8**) In 14 cases (n=14; 13.20 %) had iatrogenic pre-term delivery for medical/obstetric reason.

Neonatal outcome was better in 1st twin as compared to 2nd in late preterm (34–37 Weeks) and term (≥ 37 weeks) groups. Neonatal morbidity was less in 1st twin as compared to 2nd in all groups. Incidence of stillbirth + early neonatal death was similar in both groups. Incidences of stillbirth + early neonatal death for 2nd twin less in early preterm (32–34 Weeks) group but increased in late preterm (34–37 Weeks) group. (**Table - 8**)

Table – 6: Comparison of APGAR score and early neonatal outcome.

APGAR score	First twin			Second twin		
	Live	Stillbirth + Early neonatal death	NICU	Live	Stillbirth + Early neonatal death	NICU
0	0	6	0	0	11	0
1 – 4	6	5	6	14	0	14
5 – 7	6	1	4	5	0	8
>7	80	0	5	75	1	4
Total	94	12	15	94	12	26
Chi-Square Value (1st Twin V/S 2nd Twin)=8.471						
P Value =0.037						

Table – 7: Delivery interval and early neonatal outcome.

Time interval between delivery	Total	Second twin		
		Live	NICU admission	Early neonatal mortality
<5 Minutes	41	34	12	7
5to10 Minutes	25	20	8	5
11 to20 Minutes	23	23	3	0
21 to 30 Minutes	5	5	0	0
>30 Minutes	12	12	3	0
Total	106	94	26	12
Chi-Square value (Time interval v/s early neonatal outcome)=7.288				
p value =0.121				

High neonatal mortality and similar neonatal morbidity noted in those not received weekly antenatal glucocorticoids compared to those received weekly antenatal glucocorticoids in first and second twins. Among those received antenatal glucocorticoids neonatal mortality and morbidity was less in those received 3 doses of antenatal glucocorticoids. Neonatal mortality and

morbidity both were more in those not received antenatal glucocorticoids compared to those received antenatal glucocorticoids. (**Table - 9**)

When neonatal outcome of second twin compared with first twin, high neonatal mortality noted among those not received antenatal glucocorticoids (43.75% v/s 31.25%). (**Table - 9**)

Table – 8: Gestational age and neonatal outcome.

	Number of patients	1st twin			2nd twin		
		Live	Stillbirth + Early neonatal death	NICU admission	Live	Stillbirth + Early neonatal death	NICU admission
32–34 wks	44 (41.5 %)	32	12	14	44	10	18
35 to 37 wks	53 (50%)	53	0	1	51	2	7
>37 wks	9 (8.49 %)	9	0	0	9	0	1
Total	106	94	12	15	94	12	26
Chi-Square value (1st Twin v/s 2nd Twin)=2.182							
p value =0.140							

Table – 9: Antenatal Glucocorticoids and early neonatal outcome.

Antenatal Glucocorticoids	Total	1st twin			2nd twin		
		Live	Stillbirth + Early neonatal death	NICU admission	Live	Stillbirth + Early neonatal death	NICU admission
1 Weekly Dose	16	12	4	5	11	4	8
2 Weekly Doses	10	9	1	2	8	2	5
3 or More Doses	2	2	0	0	2	0	0
Not Received	16	9	7	7	12	4	5
Total	44	32	12	14	34	10	18
Chi-Square value (1st Twin v/s 2nd Twin)=2.444							

Discussion

In present study included 106 twin births at more than 32 weeks gestation, with first twin having cephalic presentation and detected for vaginal delivery.

Chorionicity and neonatal outcome

Analysis of chorionicity revealed 94.3% (n=100) twins as dichorionic, and 5.66% (n=6) monochorionic diamniotic. Neonatal outcome was better in dichorionic pregnancies 8% v/s 66.7% in monochorionic pregnancies. Neonatal outcome of 2nd twin was better in dichorionic pregnancies 11% v/s 16.67% in monochorionic pregnancies, their difference of proportion was statistically not significant (p>0.05).

Early neonatal outcome of twins

Stillbirth and early neonatal deaths resulted in total 24 deaths. The perinatal mortality rate was 113/1000 total births.

High neonatal morbidity in second twin was noted in our study, but the results were statistically not significant. High neonatal morbidity was mainly due to preterm births, with multiple factors like low birth weight, birth weight discordancy, maternal complications (**Table - 1, 2, 3**).

Armson, et al. [12] in his study concluded that second twin is at greater risk of adverse perinatal outcome than the first twin, independent of presentation, chorionicity, or infant sex. Our study also concludes greater risk of perinatal outcome for second twin but was related to chorionicity. Neonatal outcome was better in dichorionic pregnancies than in monochorionic pregnancies.

Mode of delivery and early neonatal outcome

No neonatal mortalities were noted in deliveries conducted by instrumental deliveries or first twin by vaginal route and second twin by caesarean section. Incidence of stillbirth and early neonatal death was similar in both groups delivered by vaginal route which is clinically not significant (**Table - 4**).

In Schmitz, et al. [7] study states planned vaginal delivery after 35 weeks of gestation is a safe option for management of the second twin delivery. Our study supported this finding.

In a meta-analysis by Rossi, et al. [6] found that when outcomes were stratified for presentation and delivery mode, mortality rate was lower after vaginal delivery than caesarean section for both vertex and non vertex second twin.

Chasen, et al. [13] have reported that neonatal respiratory disease was more common in twins born by caesarean section compared to those born vaginally. Our study not noted any neonatal respiratory disease in twins born vaginally at more than 36 weeks (**Table - 4**).

Our study supports attempt of vaginal delivery in twins' birth weight more than 1500 gm, gestational age more than 34 weeks and birth weight discordancy less than 20%. (**Table - 5**)

It has also been suggested that the method of delivery for vertex–vertex twins should be based on the infant's birth weight. For example, SOGC have recommended recommendations have been based on the expert opinion rather than the results from randomized controlled trials or observational studies. Our findings are consistent with these recommendations [14].

Presentation and early neonatal outcome

Presentation is most important factor for mode of delivery as non-vertex presenting twin is considered for caesarean section. We analyzed neonatal outcome on basis of presentation. Most common presentation combinations were vertex – vertex in 88.67%, followed by vertex – non vertex in 11.32%.

Vertex – vertex pair had high incidence of neonatal morbidity and mortality. Neonatal mortality for first and second twin was 13% and 12% respectively (P-value 0.307). Neonatal morbidity was 15% and 28 % for first and second twin, but the findings were statistically not significant. Vertex-transverse combination had 100% caesarean delivery for second twin (**Table - 6**).

For twin gestations with a cephalic-presenting first twin, vaginal delivery remains a safe option irrespective of presentation of second twin only caution should taken in twins with birth weight less than 1500 gm, gestational age less than 34 weeks and birth weight discordancy more than 20%.

Birth weight and early neonatal outcome

Birth weight is an important predictor of neonatal outcome of twin gestation. As low birth weight might be associated with prematurity, IUGR, pre-eclampsia, birth weight discordancy, acting as single factor or simultaneously.

Mean birth weight for first twin was 1782.6 gm while mean birth weight for second twin was 1774.5 gm.

Low mean birth weights of first and second twins were mainly due to 94 % preterm patients in this study. Increased incidence of preterm labour is due to increased preterm labour, PPROM, fetal or maternal indication for pregnancy termination al lesser gestation age due to increasing complications associated with increasing gestational age.

According to our study we confirmed the findings that trial of labour is advised for birth weight > 1500 gm while route of delivery must be cautiously choosen for birth weight less than 1500 gm due to high incidence of neonatal mortality and morbidity in this group.

APGAR score and early neonatal outcome

Low APGAR score is direct indicator of neonatal mortality and morbidity. Comparison of neonatal mortality and morbidity between first and second twin is statistically significant (p value 0.037). When this is compared with relation to birth weight, low APGAR is seen with low birth weight babies (**Table - 6**).

Minakami H [15] studied effect of inter-twin delivery time on APGAR scores of the second twin. Gestational age is the most important factor influencing the APGAR scores of second twins. The addition of delivery interval improves the predictivity of second twin APGAR score by gestational age. Our study noted gestational age as the most important factor influencing the APGAR scores of second twins.

Birth weight discordance and early neonatal outcome

Fetuses of a multiple gestation generally do not grow at the same rate as singleton fetuses. Discordance can be caused by structural or genetic fetal anomalies; discordant infection; an unfavorable placental implantation or umbilical cord insertion site; placental damage (i.e., partial abruption); or complications related to monochorionic placentation, such as twin–twin transfusion syndrome [16].

100 % mortality was noted in discordancy > 40%, followed by 62.5% for discordancy 30 to 40% group. Neonatal morbidity was 100% for discordancy 30 to 40% groups while 85.71% for discordancy 20 to 30% group. Results were significant when compared for heavier twin v/s lighter twin (**Table - 5**).

From **Table - 9**, it is clear that incidence of neonatal mortality and morbidity for smaller twin was increasing as discordance was goes on increasing. Similar findings noted by Amaru, et al. [17], Bagchi and Salihu [18].

Similarly Vergani P [19] our study noted that gestational age at delivery and birth weight discordance are the most important independent predictors of perinatal mortality or morbidity among preterm twins.

Our study noted adverse neonatal outcome in lighter twin with birth weight discordance between 20% and 40% (**Table - 5**). We recommend that in such cases mode of delivery should decided in individual case with proper assessment of associated risk factors.

Time interval and early neonatal outcome

We noted highest neonatal mortality in twins with delivery interval less than 5 minutes (58.33%), followed by 41.66% with delivery interval 5 to 10 minutes. No mortality noted in delivery interval more than 10 minutes, which is against general consensus. Comparison of time interval with early neonatal mortality and morbidity was statistically not significant ($p>0.05$) (**Table - 7**).

The perinatal mortality rate in second twins born at term is higher than in first twins, and this increased mortality is mainly due to intra partum hypoxia [20], which may result from premature separation of the placenta after the vaginal delivery of the first twin or a longer period of aortocaval compression for the second twin [21].

Therefore, this risk in second twins can theoretically increase with increasing time between the deliveries of twins.

Schneuber, et al. [22] found that twin delivery time was inversely related to 1 minute and 5 minutes APGAR scores. Our study supports these findings. Arnold and colleagues [23] noted The risk of RDS was increased for the second twin compared to the first if delivery was vaginal.

Gestational age and neonatal outcome

Preterm birth is observed commonly in twin pregnancies, few of these births have a iatrogenic origin and are related to maternal or fetal complication while the other half consists of cases of spontaneous premature labor or premature membrane rupture.

In our study mean gestational age was 34.42 weeks. Most common gestational age was 32 weeks. Pre-term labour was reported in 97 patients (91.50%). In 14 cases had iatrogenic pre-term delivery for medical/obstetric reason (**Table - 8**).

Preterm birth is a major contributing factor to increased morbidity and mortality due to the immaturity of lung tissues and consequent suboptimal oxygenation. Intra partum management plays an important role in the ultimate outcome of any delivery, especially in twin gestations. The risks associated with delivery of the presenting twin differ from those for the second twin, often depending on the mode of delivery and delivery interval.

In our study pregnancies more than completed 37 weeks were monitored and allowed for spontaneous labour if no medical or obstetric indication present. Our study supports administration of weekly antenatal glucocorticoids for twin pregnancies with risk of preterm labour. (**Table - 9**)

Studies indicate an increase in risk of stillbirth in twin pregnancy with advancing gestational age, the lowest risk of perinatal mortality and morbidity being observed with birth between 36 and 38 weeks gestation [15]. Our study not noted any stillbirth between 36 to 38 weeks.

Artificial reproductive techniques and neonatal outcome

Artificial reproductive techniques were used in 15.09% patients. Similar neonatal outcome noted in spontaneously conceived and those conceived with artificial reproductive techniques. Neonatal outcome was better in 1st twin as compared to 2nd in spontaneous conception as compared to conception by artificial reproductive techniques group. Baxi and Kaushal [24] in his study newborns in the assisted group had more complications than the spontaneous group. Our study also noted no evidence of a higher risk for adverse perinatal outcome in twins conceived with artificial reproductive techniques.

Chorionicity and neonatal outcome

Most studies confirmed higher risks for monochorionic twins compared with dichorionic twins in relation to perinatal outcomes [3].

In our study neonatal outcome was better in dichorionic pregnancies 8% v/s 66.67% in monochorionic pregnancies. Neonatal outcome of 2nd twin was better in dichorionic pregnancies 11% v/s 16.67% in monochorionic pregnancies. Statistically results were not significant ($p>0.05$). Our study supports better neonatal outcome dichorionic pregnancies. Neonatal outcome of 2nd twin is also better in dichorionic pregnancies.

Conclusion

High neonatal mortality and morbidity is encountered with preterm twin delivery so its prevention, diagnosis and treatment are must. Special consideration should be given for antenatal glucocorticoids every weekly in high risk twin delivery. Twin vaginal delivery is safe in first cephalic presenting twin pregnancy. Caution should taken while delivering babies <1500 gm, birth discordancy > 20% , gestational age < 34 weeks, as vaginal delivery in these

conditions is associated with increased early neonatal morbidity and neonatal mortality.

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