

PERINATAL MORTALITY IN TWINS

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*Department of Obstetrics & Gynae, Baqai Medical University, Karachi***ABSTRACT****Objectives:** To determine the frequency causes and perinatal mortality rate in twins.

To determine that 2nd born twins contribute more to perinatal mortality than 1st born twins.

Study Design: Descriptive, analytical study.**Setting & Duration:** The study was carried out in community based Fatima Hospital, Baqai Medical University, Karachi. The duration of study was from January 2003 to April 2006.**Methodology:** The study included twin pregnancies that resulted in perinatal deaths of both or either twin. The causes of mortalities were described on basis of ICD-9th revision. The mortalities were assessed gestational age, birth weight, fetal presentation and route of delivery. The collected data was analyzed on SPSS-11.**Results:** During the study period there were 1970 total deliveries including 47 twins deliveries. The frequency of twins was 23/1000 births and perinatal mortality rate 308/1000 twin births. Perinatal deaths resulted in 18 twin pregnancies of either twins or both twins. There were 7(38.8%) stillbirths in 2nd born and 4(22.2%) in 1st born twin. Intrapartum anoxia caused 5(27.7%) stillbirths of 2nd twins and 2(11.1%) of 1st twins. Birth asphyxia and respiratory distress syndrome were the main causes of neonatal mortality in 7(38.8%), 2(11.1%) of 1st twins and 5(27.7%), 4(16.6%) of 2nd twins respectively. At term gestation, there were 5(27.7%) stillbirths of 2nd twins and 2(11.1%) 1st twins weight > 2.5kg. Maximum neonatal mortalities were 4(22.2%) between 1.0-1.49kg in 1st born and 5(27.7%) in 2nd born twins between 1.5-1.99kg.

Caesarean section for malpresentation was done in 5(27.7%) stillbirths of 2nd and 2(11.1%) in 1st twins. Fetuses with cephalic and breech presentations delivered by vaginally resulted in neonatal deaths of 5(27.7%), 3(16.6%) 1st twins and 3(16.6%), 4(22.2%) of 2nd twins respectively.

Conclusion: No significant mortality difference was found in 1st and 2nd born twins. However, at term gestation, stillbirths were more in 2nd born twins. While, prematurity complications contributed to equal number of neonatal mortalities in both twins.**KEY WORDS:** Twin Pregnancy, Perinatal Mortality, Stillbirths, Neonatal Deaths**INTRODUCTION**

Multiple births have fascinated mankind since ages. From early pregnancy into childhood higher multiples have much higher rates of mortality, whether from spontaneous abortion, the vanishing twin syndrome, fetal or infant death.¹ Compared with singletons, twins experience perinatal mortality rates 4-10 times higher.² World health organization's (WHO) I.C.D.-10 criteria for Perinatal mortality rate include all stillbirths from

twenty two weeks of gestation (or birth weight of > 500g) to neonatal deaths within 7 days after birth.³ Since the mid twentieth century stillbirths and early neonatal deaths have often been combined into a single category of "Perinatal" deaths, because of the fact that asphyxia was a common cause of death during labor (intrapartum stillbirths) and shortly after birth. So a study suggested that they should be reported separately.⁴ Perinatal mortality is strongly associated with birth weight, and in the absence of congenital malformations the increased risk are driven chiefly by early delivery and fetal growth restriction. Several studies have shown that, compared with first born twins, those delivered second carry increased risks of perinatal mortality. In fact, the increased perinatal mortality in second born compared with first born twins was evident at every 500gm birth weight category. There are several hypotheses to explain increased mortality in second twin compared with first twin. These are 1) Risk of oxygen defici-

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ency in second born twin due to premature separation of placenta after delivery of first twin; 2) Reduced placental circulation; 3) Increased interval between delivery of the two fetuses and therefore increased oxygen deficiency; 4) A tendency of macerated fetuses to be delivered after the birth of a live born twin; and 5) More frequent breech delivery among second born twins.^{5,6} Our objectives of the study were: 1) To determine the prevalence and perinatal mortality rate in twins. 2) To evaluate that 2nd born twins contribute to more perinatal mortality than 1st born twins.

METHODOLOGY

This descriptive analysis was carried out in the obstetric department of Fatima hospital, Baqai Medical University, Karachi. The study period was from January 2003 to April 2006.

The inclusion criteria were twin pregnancies resulted in perinatal mortality:

1. At or above 28 weeks of gestation.
2. Retained second twin after home delivery of 1st twin.

Perinatal deaths in twin pregnancy due to congenital malformations, non-immune hydrops (ICD 9 code 778.0) and before 28 weeks of gestation were excluded. The perinatal mortality rate was calculated as no. of perinatal deaths (Stillbirths + Neonatal deaths) /1000 total twin births. The 1st and 2nd born twins mortality was analyzed in two groups (Stillbirths and Neonatal deaths). The mortality comparison also based on the International Classification of Diseases (ICD), ninth revision.⁷ Birth asphyxia was defined as Apgar scores of 3 or less at 5 minutes. Respiratory Distress syndrome was described as moderate to severe based on clinical and radiological parameters.⁸ Perinatal mortality was assessed for gestational age (in completed weeks), as well as birth weight (in 500 gm intervals) of 1st and 2nd born twins. Gestational age was predominantly based on the last menstrual period, or on clinical estimate

or by first ultrasound report.⁹ Term was defined as at or >36 weeks gestation for twin pregnancies.¹⁰ Fetal presentation, route of delivery and booking status were also studied as variables.

A detailed history was recorded and general physical and systemic examination was carried out. In case of retained second twin, lie was ascertained and the presence or absence of fetal heart sounds was documented. The paediatrician was present at the time of delivery to note the Apgar score for diagnosis of birth asphyxia. The gestational age, birth weight was taken into account.

Early neonatal deaths in a period from birth to first 7 days of life spent in pediatric nursery were included for the evaluation of perinatal mortality in twins. The collected data was computerized for analysis by SPSS-11. The qualitative response variables like gestational age, fetal presentation, and route of delivery, weight of newborn, causes and outcome were presented by frequencies and percentages. Chi-square test was applied to evaluate that 2nd born twins contribute more to perinatal mortality than 1st born twins.

RESULTS

The total numbers of deliveries were 1,970, with 47 twin deliveries during the study period. The prevalence of twins was 23/1000 births (2.3%). Perinatal deaths resulted in 18 twin pregnancies of either twins or both twins. The perinatal mortality rate was 308/1000 total twin births. Out of 18 affected twin sets, only 3(16.6%) were booked cases and 15(83.3%) were unbooked.

Table I shows that there is no significant difference between mortality of 1st and 2nd born twins. However, stillbirths were 7(38.8%) in 2nd born than 1st born twin 4(22.2%). The neonatal mortality was equal. Out of 18 affected twin sets only 2(11.1%) of 2nd born twins and 5(27.7%) of 1st born twins were alive.

Table II showed that intrapartum anoxia caused more stillbirths in 2nd twins 5(27.7%) resulted from retained 2nd twin. Malpresentation of 1st twins caused intrapar-

Table I. Perinatal outcome in 18 affected twin sets

Perinatal outcome	1st Twin		2nd Twin	
	N (18)	%	N (18)	%
Stillbirth	4	22.2	7	38.8
Early neonatal deaths	9	50.0	9	50.0
Alive	5	27.7	2	11.1
p-value = Non-significant				

Causes	1st Twin		2nd Twin	
	N (13)	%	N (16)	%
A) Stillbirth				
Preterm infant (ICD-765.1)	2	11.1	2	11.1
Intrapertum anoxia (ICD-768)	2	11.1	5	27.7
B) Neonatal mortality				
1) Complications of preterm labor (ICD-765.1)				
Abruptio placentae (ICD-762.1)	1	5.5	1	5.5
Birth asphyxia (ICD-768)	5	27.7	3	16.6
RDS (ICD-769)	2	11.1	3	16.6
2) Complications of term neonates				
RDS (ICD-769)	-	--	1	5.5
Prolapsed cord (ICD-762.4) (with malpresentation of 1st twin)	1	5.5	1	5.5

Table II. Causes of Stillbirth & Neonatal deaths in 18 affected twin sets according to ICD 9th Revision classification

tum anoxia in 2(15.3%) fetuses at term. While, prematurity contributed to equal number of stillbirths in both twins. The obstetrical events, abruptio placentae and

prolapsed cord caused birth asphyxia in both twins. So overall, birth asphyxia caused neonatal mortality in 7(38.8%), 5(27.7%) of 1st twins and 2nd twins respecti-

Table III. Gestational age and Weight related Stillbirths & Neonatal deaths

Gestational Age (Weeks)	Stillbirths				Neonatal deaths			
	1st		2nd		1st		2nd	
	N (4)	%	N (7)	%	N (9)	%	N (9)	%
28 - 29	2	11.1	2	11.1	2	11.1	2	11.1
30 - 31	-	--	-	--	3	16.6	3	16.6
32 - 33	-	--	-	--	1	5.50	1	5.50
34 < 36	-	--	-	--	1	5.50	1	5.50
> 36	2	11.1	5	27.7	2	11.1	2	11.1
Weight (Kg)								
0.5 - 0.9	2	11.1	2	11.1	1	5.50	1	5.50
1.0 - 1.49	-	--	-	--	4	22.2	1	5.50
1.5 - 1.99	-	--	-	--	2	11.1	5	27.7
2.0 - 2.49	-	--	-	--	2	11.1	1	5.50
2.5 - 2.99	1	5.50	3	16.6	-	--	1	5.50
> 3.0	1	5.50	2	11.1	-	--	-	--

	Stillbirths				Neonatal deaths			
	1st		2nd		1st		2nd	
	N	%	N	%	N	%	N	%
Fetal Presentation								
Cephalic	2	11.1	2	11.1	5	27.7	4	22.2
Breech	1	5.5	-	--	3	16.6	5	27.7
Transverse	1	5.5	5	27.7	1	5.5	-	--
Route of Delivery								
1) Vaginal route:								
Vertex delivery	2	11.1	2	11.1	5	27.7	3	16.6
ABD*	-	--	-	--	3	16.6	4	22.2
2) Abdominal route:								
C/S*	2	11.1	5	27.7	1	5.5	2	11.1

Table IV. Fetal Presentation and Route of Delivery

vely. Respiratory distress syndrome developed in 2(11.1%) of 1st twins and 4(16.6%) of 2nd twins responsible for neonatal mortality.

This table showed that 2(11.1%) stillbirths of 1st twin and 2(11.1%) of 2nd twin occurred between the gestational ages of 28-29 weeks. At term, stillbirths of 2nd born twins were 5(27.7%) than 1st twin 2(11.1%). At all gestational ages, neonatal mortalities were equal in both twins with maximum number of mortalities between 30-31 weeks of gestation.

Regarding weight of newborns the above table showed, that > 2.5kg weight 5(27.7%) stillbirths were in 2nd twin and 2(11.1%) in 1st twin. Between 0.5-0.9kg, 2(11.1%) stillbirths were in 1st born twins and 2 (11.1%) in 2nd twins. Weight distribution showed that maximum mortalities in 1st born twins 4(22.2%) were between 1.0-1.49kg and 5(27.7%) in 2nd born twins, between 1.5-1.99kg. While no neonatal mortality occurred in both twins > 3kg weight.

Above table showed that stillbirths of 2nd born twins with transverse lie delivered by abdominal route were 5(27.7%). While, caesarean section was done in 2(11.1%) stillbirths of 1st twin due to malpresentation (breech and transverse). Stillbirths with cephalic presentation were delivered by vaginal route.

However, 1st twins with cephalic and breech presentation delivered by vaginal route were 5(27.7%) and 3(16.6%) that resulted in neonatal mortalities. Caesarean section was done in 1(5.5%) 1st twin for transverse lie that

ended up in neonatal mortality. Out of 4(22.2%) 2nd twins with cephalic presentation, 3(16.6%) delivered by vaginal route and 1(5.5%) abdominally. While, breech presentations were 5(27.7%), assisted breech delivery was done in 4(22.2%) and caesarean section in 1(5.5%).

DISCUSSION

Multiple gestations are high risk pregnancies, which may be complicated by pre-maturity, low birth weight infants intrauterine growth restriction, neonatal morbidity and high perinatal, neonatal and infant mortality. The current study showed the frequency of twins was 23/1000 births in contrast to Thailand study (8.6/1000).¹¹ However, the results of this study were similar to a Nigerian study (28/1000).¹² The perinatal mortality rate was 308/1000 total twin births in comparison to a study of Pakistan (108/1000) and a recent study of Nigeria (91/1000).^{13,14} However, the results of this study were in contrast to Thailand study (45/1000) and similar to Nigerian study (278.4/1000).^{11,12} The findings of present study showed more mortalities associated with unbooked cases (83.3%) comparable to a study of Pakistan (67.7%).¹⁵

Current study evaluated that overall there is no significant difference between mortality of 1st and 2nd born twins. However in 2nd born twins there were (38.8%) stillbirths than (22.2%) of first twins, as in study of Sheay.⁷ These results reflected that stillbirths at term in 2nd born twins were due to retained second twin 5(27.7%) in comparison to other studies showing

results of 28% and 47%.^{16,17} This study stated that prolonged inter delivery interval caused 2.5 times more stillbirths in 2nd twins at term due to oxygen deprivation leading to intrapartum anoxia supported by other studies.^{4,8,18} Similar to this study, Scotland study also stated that intrapartum anoxia was responsible for 75% of perinatal deaths in 2nd twins, and most of these resulted from mechanical problems after vaginal delivery of first born twin.⁶

However, in the present study the pattern of neonatal mortality was similar in both twins as in another study.⁷ Spontaneous preterm births leading to prematurity complications contributed largely for neonatal mortalities similar to a study.¹⁹ The causes according to ICD 9th revision in the present study concluded that birth asphyxia was responsible for more neonatal mortalities in twins especially 1st born twins, similar to another study.²⁰ While, neonatal mortalities in 2nd born twins were mainly due to respiratory distress syndrome comparable to a study which stated that at < 36 weeks gestation, twins did not show accelerated maturation.²¹ In the present study, 2nd twins were at developed respiratory distress syndrome at all gestational ages similar to other studies.^{22,23} Although the pathophysiologic mechanism for the 2nd twin's increased vulnerability to respiratory distress is unknown, lack of exposure to the salutary effects of labor, the effects of acute uteroplacental insufficiency after delivery of 1st twin, and impairment of surfactant production have been postulated.¹⁰ In this study, birth order had no effect on the risk of survival among prematurely born twins resulted in stillbirths or neonatal deaths. This is because premature twins have an extremely high mortality risk during delivery, which made it statistically unlikely that birth order would stand out as a major cause of death, as shown in another study.²⁴ However, this study reflected that gestational age at delivery is an important factor as (55.5%) of preterm births contributed to perinatal mortality, similar to other studies.^{13,14,25} The risk of death at term is low and a small absolute risk of complications will result in a much greater relative risk of death than at preterm gestations, where the background risk of death is high for both.⁶

The findings of present study showed that in term 1st and 2nd born twins, stillbirths occurred at > 2.5kg weight, so it is unlikely that fetal growth restriction contributed to increased stillbirths similar to a study.⁷ However, < 2kg weight contributed to equal number of stillbirths and neonatal deaths in comparison to another study.²⁶

The results of this study showed that at term, stillbirths occurred in 2nd twins due to delivery complications

associated with malpresentation, delivered by caesarean section following vaginal deliveries of 1st twins in comparison to other studies.^{5,6} This study showed that malpresentation of 2nd twin given trial of labor for vaginal delivery by Traditional Birth Attendants caused stillbirths by intrapartum anoxia as also shown in another study.¹⁸ So the effect of route of delivery for stillbirths at term cannot be interpreted in this study as caesarean sections were done on emergency bases in both twins with referral by Traditional Birth Attendants after trial of labor, similar to a study of Pakistan.¹⁵ The present study suggested that planned cesarean deliveries at term would improve survival of twins especially 2nd twins as suggested in other studies.^{6,18}

This study stated that preterm gestations perinatal deaths were not related to fetal presentation and mode of delivery as high neonatal mortalities were with cephalic and breech presentations delivered vaginally similar to another study.²⁶ Therefore the major factor was the degree of prematurity which clearly was same for both twins as observed in another study.¹⁸

On the whole, we can reduce the perinatal mortality in twins by creating awareness for antenatal care so early diagnosis and detection of complications can be made. Therefore perinatal mortalities due to preterm labor can be avoided. Women with twins should be counseled about the prematurity complications and risk to 2nd twin at term and the theoretical possibility of a protective effect of planned caesarean section when considering mode of delivery.

However neonatal facilities should also be improved to improve the outcome of premature neonates. The undiagnosed twins impose unnecessary risk. It is common in communities like our rural areas where antenatal care is poor. Traditional Birth Attendants should be trained to diagnose twin pregnancies and malpresentations at term for timely referrals to health care centre to avoid stillbirths.

The limitations of study include small sample size; secondly assigning a cause of death based on ICD coding may be subject to errors. The analysis does not take into account several of the known or suspected risk factors like placental chorionicity for the outcomes examined.

Statistically there was no difference in perinatal mortality of both twins. But increased stillbirths in 2nd twins compared to 1st born twins may be an artifact of mortality comparisons. Future studies should provide separate analysis of ante-partum from intra-partum stillbirths as also proposed in previous studies.^{4,7}

CONCLUSION

The study concluded that stillbirths at term contributed to increase in perinatal mortality of 2nd born twins than 1st born twins. Overall, no significant difference was found in perinatal mortality as neonatal mortalities due to pumaturity complications were equal in both twins.

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