

## Effect of Single Fetal Demise on Surviving Twin: A Retrospective Study

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### Abstract

**Introduction:** Intrauterine demise of one twin is a relatively frequent complication in multi fetal gestation. The incidence is higher in monochorionic twins compared to dichorionic twins. Mortality and morbidity of surviving twin is significantly increased in such cases. **Aims:** 1. To evaluate the effect of single fetal demise on surviving twin. 2. Perinatal and maternal outcome in such cases. 3. To review management of twin pregnancies with single intrauterine fetal demise. **Materials and Methods:** This retrospective study was conducted at RL Jalappa hospital and research centre, Sri Devaraj Urs Medical College, Kolar. Twin pregnancies with single fetal demise were identified from parturition register and perinatal case records. Antenatal records, USG reports and neonatal summaries were analyzed. Data on maternal characteristics like age, parity, gestational age at diagnosis, antenatal, intrapartum and post natal complications were analyzed. Fetal parameters such as gestational age at single fetal demise, chorionicity, fetal biometry, biophysical profile, doppler study and other USG details were noted. The time interval between single fetal demise and the delivery of the surviving twin and its perinatal outcome were analyzed. **Results:** We studied 145 twin pregnancies over a period of two years retrospectively. 17 cases were complicated with single fetal demise in 2<sup>nd</sup>/3<sup>rd</sup> trimester with incidence of 11.7%.

Mean gestational age of single fetal demise in twins was 33 weeks and maximum duration of prolongation of pregnancy was 10 weeks. 14 cases delivered between 32-36 weeks contributing to preterm birth rate of 85% and 3 cases delivered at term. 12 out of 17 had same sex. 12 fetuses (76.47%) had live birth with good neonatal outcome and 5 out of 17 surviving were died in neonatal period. Cause of death being prematurity, severe growth discordancy with TTTS in 2 cases, severe growth discordancy in 3 cases and birth asphyxia, sepsis with pulmonary hemorrhage in one neonate. Prematurity was the common factor in all cases. We found that 5 mothers had preeclampsia, 7 had anemia of moderate to severe degree and one case was complicated with deranged coagulation profile. **Conclusion:** Single fetal demise is more common in monochorionic twin gestations. Perinatal outcome of the surviving twin depends on the gestational age at delivery and chorionicity. Intensive fetal surveillance is needed for optimal management of such cases. The risk of conservative management should be weighed against the risk of preterm birth and its sequelae.

**Keywords:** Single Intrauterine death; Twins; Monochorionicity; TTTS.

### Introduction

Intrauterine demise of one twin occurs in approximately 0.5-6.8% of all multiple gestations [1,2]. The incidence is relatively higher in monochorionic twins. The mortality and morbidity of surviving twin is significantly increased. The death can occur at any time of pregnancy. The etiology of single fetal demise in twin gestation could be either similar to that of singleton pregnancies or unique to the twinning

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process. The SIUFD might be due to genetic causes, anatomical abnormalities, placental abruption, chronic placental insufficiency, discordant growth restriction, TTTS, cord abnormalities, infections or may be due to maternal factors like pre eclampsia, hypertension and diabetes. The prognosis of surviving twin depends on the chorionicity, gestational age at diagnosis and the time interval of the delivery after the diagnosis.

The consequences of single fetal demise on surviving co twin may include growth restriction, preterm labour with its sequelae, neurological morbidity secondary to ischaemic damage and death of co twin also. It may trigger the coagulation defects in mother however, there may be transient DIC (so called dead fetus syndrome) will resolve spontaneously. Single fetal demise can initiate preterm labour, PROM and chorio amniotitis with their sequelae.

#### *Aims*

1. To evaluate the effect of single fetal demise on surviving twin.
2. Perinatal and maternal outcome in such cases.
3. To review the management of twin pregnancies with single intrauterine fetal demise.

#### **Materials and Methods**

##### *Data Source*

This is a retrospective study of twin pregnancies with single fetal demise from January 2013 to January 2015 (2 years), conducted at RL Jalappa hospital attached to Sri Devaraj Urs medical college and research centre which is located in the rural part of Karnataka, a tertiary referral centre.

The twin pregnancies complicated by a single fetal demise were identified by medical records. Mothers who underwent abortion, twins with both IUD, twins with selective fetal reduction following ART were excluded from the study.

Twin gestation with single intrauterine fetal demise were identified from the delivery, neonatal and perinatal case records. The mothers antenatal details, USG reports, neonatal charts and neonatal discharge summaries were retrieved. Information related to a range of antenatal, intrapartum and neonatal complications were also retrieved.

Data on maternal complications such as pre eclampsia, diabetes, anaemia, preterm labour, PROM, DIC and PPH were obtained. Ultrasound

scan data in relation to gestational age, chorionicity, fetal biometry, liquor volume, diagnosis of single fetal death, IUGR, discordancy of growth, BPP and Doppler study if done were collected. USG record details showing the serial monitoring of the survival co twin were documented.

The approximate time interval between the death of one twin, timing delivery of the surviving twin and indication for emergency LSCS / termination of pregnancy were calculated from the information recorded in the case files.

After the delivery of surviving co-twin the information regarding APGAR score, birth weight, neonatal examination, immediate neonatal outcome were obtained. Examination of dead twin, any congenital anomalies, birth weight, polycythaemia, fetal papyraceous were noted. Any postmortum reports/records if done were also documented.

A detailed examination of placenta (histo pathological) examination of types of placenta, chorionicity were obtained by the delivery notes

Clinical analysis of all newborn from the study group were done. The neonatal parameters such as hypoxia, neonatal anaemia, hyperbilirubinaemia, birthweight, IUGR, RDS, prematurity, IVH, NEC, Retinopathy of prematurity, neonatal sepsis, congenital anomalies, NICU stay and gross neurological abnormalities and neonatal outcome at the time of discharge were evaluated.

Maternal parameters such as pre eclampsia, diabetes, gestational age, infection, PROM, pre term labour, polyhydramnios, chorioamnionitis, and DIC were retrieved from the record sheets are analysed.

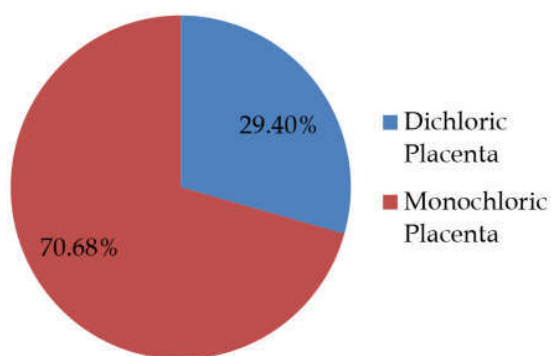
#### **Results**

Over a period of about two years (Jan 2013 - Jan 2015) 602 deliveries were conducted in RL JALAPPA HOSPITAL KOLAR, out of which there were 145 twin deliveries. Most of these women were unbooked, came in late 2<sup>nd</sup> / 3<sup>rd</sup> trimester. The mean maternal age was 25 (20-28 years). 17 cases were complicated with single fetal demise contributing to 11.7%. Out of 17 cases 3 had SIUD at around 22-26 wks, one had fetus papyraceus and two had major congenital anomalies. Mean gestation age of fetal demise was 33-34 weeks.

In our study 29.4% had dichorionic placenta and 70.58% had monochorionic placenta indicating an increasing risk of SIUD in monochorionic placentation.

**Table 1:** Showing gestational age of twins with SIUD

Gestational Age	Number of Cases	Percentage
24 -28 wks	4	23.52%
29 -32 wks	3	17.64%
33-36 wks	7	41.17%
37 -40wks	3	17.64%

**Graph 1:** Chart showing Chorionicity of Placenta

The median interval between diagnosis of SIUD and delivery of surviving twin was 33.4 weeks. The maximum duration of prolonging the pregnancy after single fetal demise was 10 weeks. 13 patients had set into spontaneous onset of labour. Emergency cesarean section was performed in 7 (41.1%) cases and 10 (58.8%) patients had vaginal delivery. Indications for cesarean section were fetal distress of surviving twin in the form of NRNST, IUGR, oligohydramnios, noncephalic presentation, and

maternal complications like severe pre eclamsia, previous lscs etc.

14 patients were delivered between 32-36 weeks of gestation contributing preterm birth rate of 85% and 3 patients had delivered between 37-39 weeks (15%), 12 cases out of 17 the twin of the same sex. 13 fetuses had live birth, with good neonatal outcome except one fetus which needed single volume exchange transfusion. All neonates were discharged between 7-10 days.

There were 5 out of 17 surviving co twin were lost in the neonatal period. The cause of death being prematurity, severe growth discordancy with TTTS in 2 cases, 4 neonatal sepsis with pulmonary haemorrhage in 1 cases which died on day 5. There were NICU admission in 11 neonatals for preterm (LBW) IUGR out of which 4 babies had poor APGAR SCORE needed ventilator support. There were growth discordancy for surviving twin in 15-25% in 7 cases. Clinical examination of the dead fetus after birth revealed macerated skin peeling in 14 cases two had multiple congenital anomalies and one had showed fetus papyraceous.

**Table 2:** Showing Birth Weight

Weight	Dead Twin	CO-Twin
<500gms	2	0
0.5-1.0kgs	4	1
1 -1.5kgs	3	3
1.5-2kgs	5	9
2-2.5kgs	3	1
>2.5kgs	0	3

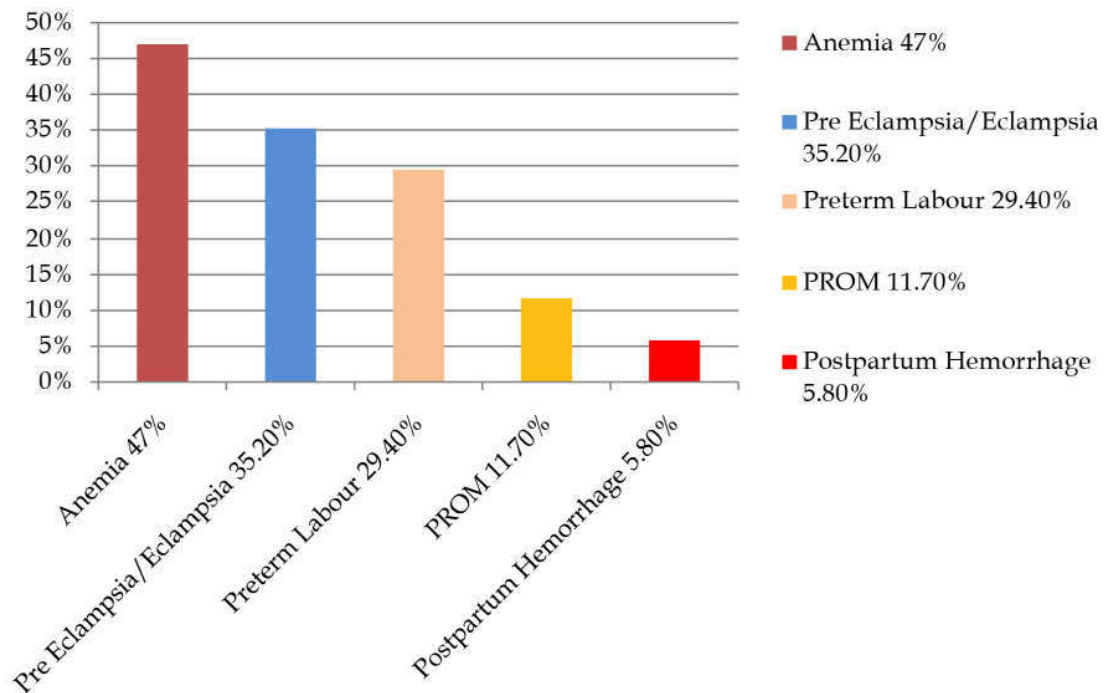
**Table 3:** Cause of death in co-twin

	GA at delivery	Birth wt	Cause of death	Chorionicity
1	33wk 5days	1.64kgs	Prematurity	MC
2	35wks	1.67kgs	Prematurity, Severe Birth Asphyxia	DC
3	27wks	700grs	TTTS, Prematurity	MC
4	39wk 3days	2.1kg	TTTS	MC
5	32wk 3days	1.38kg	Prematurity, Secondary Apnea, Pulmonary Hemorrhage	DC

**Table 4:** Showing Summary of Siud in Twin Gestation

No	Sex	Birth Weight of IUD (in KGs)	Birth Weight of Co-twin (in KGs)	GA at Diagnosis (in Weeks)	GA at Delivery	Time interval (in weeks and Days)	Antepartum Complication	Mode of Delivery	Chorionicity	Outcome of the Co-Twin
1	M/M	1.62	1.64	33+5	33+5	6 hours	PROM	Vaginal Delivery	DAMC	NND 2 hrs afterbirth
2	M/M	1.7	1.6	30+2	34+5	3 w 5 d	IUGR with Oligo	Emergency LSCS	DAMC	Alive + (NICU care)
3	F/F	2.2	1.93	34+5	35+1	3 d	Mild PE (anemia)	Emergency LSCS	DADC	Alive
4	M/F	2.0	1.67	35	35+1	1d	Intrapartum Eclampsia (severe Anemia in Failure)	Assisted Breach Delivery	DADC	FSB
5	F/M	1.0	1.9	36	36	1hour	Nil	Emergency LSCS	DAMC	Alive
6	M/M	1.8	1.6	35	35	12 hours	Severe Anemia	Vaginal Delivery	DADC	Alive
7	M/M	50 gms	2.6	24	39	15w	Rh -ve	Vaginal Delivery	MAMC	Alive
8	F/F	900 gms	2.5	37	37	8 hours	Moderate Anemia	Forceps Delivery	DAMC	Alive
9	F/M	800 gms	1.3	33	33+3	3d	Severe PE Obstructed Labor	Emergency LSCS	DADC	Alive
10	M/M	400 gms	700 gms	21+6	27	5w 1d	Nil	Vaginal Delivery	DAMC	NND 2 hrs after birth
11	F/F	1.9	2.8	30	35+4	5w 4d	Nil	Emergency LSCS	DAMC	TTIS Alive
12	M/M	2.4	1.84	37	37	1 hour	Prev. LSCS	Emergency LSCS	DAMC	Alive (baby had TTIS and received exchange transfusion)
13	F/F	2.4	2.1	39+3	39+3	10 hours	Nil	Vaginal Delivery	MAMC	Dead (IUD of co-twin)
14	M/F	700 gms	1.69	25	35+1	10w	PPROM	Vaginal Delivery	MAMC	Alive
15	M/M	1.0	1.74	33+5	39	5w 2d	Mild PE	Emergency LSCS	DAMC	Alive (TTIS + IUGR)
16	F/F	1.2	1.42	26	34+3	8w 3d	LDH increased	Vaginal Delivery	DAMC	Alive
17	F/M	1.5	1.38	32+2	32+3	1d	Mild PE, Pre-term Labor	Vaginal Delivery	DADC	NND 5days after birth

The chorionicity of placental examination revealed has 15 cases were DAMC (88 %) and two had MAMC.



Graph 2: Showing maternal complications

## Discussion

Single intrauterine fetal death in twin pregnancy is not an uncommon problem. The incidence is rising because of ART/induction protocols. In our study incidence is 11.7%, a much higher incidence was found in Beijing et al showing prevalence of 13.1% [3]. This phenomenon can occur at any gestational age in multiple gestations. In our study it varied between 24-39 weeks with mean gestation age of 33.4 weeks. Lee et al. [4] found a nearly 4 fold increase in IUFD in monochorionic twin than dichorionic pregnancies, which is correlates in our study with 88% of monochorionicity. Vascular anastomoses is more common with monochorionic placenta, leading to TTTS affecting the co twin adversely. In vanishing twin phenomena the prognosis of surviving twin is generally good. There might be first trimester vaginal bleeding in such cases Fetus papyraceus occurred in one case which didn't affect the surviving co-twin. The degree of compression depends on the time span between the fetal death and delivery, the larger the fetus, the more difficult to become fetus papyraceus (benirschke). According to HHN WOO et al. [1] death in late second and third trimester is associated with significant mortality and morbidity in surviving twin which correlated with our study.

The common causes of single fetal death include TTTS, IUGR, major congenital anomalies, placental anomalies related to preeclampsia, cord accidents affecting the other twin adversely. Vascular anastomoses are more common in monochorionic placenta that can lead to TTTS, growth discordancy and death of the co-twin. In our study 11 cases out of 17 had monochorionicity and two of them had TTTS syndrome, with one twin requiring single volume transfusion during early neonatal period. Another study by Rekha bajoria et al [5] reported that the perinatal mortality was higher in group with superficial A-A/ V-V channels than those only with multiple bidirectional A-V anastomosis. Single fetal demise can lead to ischemic brain damage of the other twin. Two mechanisms proposed are hemodynamic fluctuations and transchorionic embolisation and rarely release of fibrin and tissue thromboplastin leading to maternal DIC that can be fatal to both mother and co-twin. Begar et al. [6] in 1989 demonstrated that in twins necrosis of the cerebral white matter leading to cavitory lesions, brain atrophy and gliosis may occur with an incidence of 13.8%. the percentage risk of intracranial lesions at birth was greater in monochorionic placentation. However, we did not find any neurological morbidity in our study. To date the types of structural abnormalities observed in surviving twin are neural tube defects multicystic

encephalomalacia, microcephaly, hydrocephalous, bilateral renal hydrocorticonecrosis, gastroschises and so on.

In our study neonatal mortality was 29.4% with prematurity (80%) being the main factor which correlated with the study by Hilal Aslan et al. [7] where the neonatal mortality of 31.3%. Glinianaia et al. [8] in 2002 found 8.4% of infant mortality in which 6 of 11 cases were TTTS. TTTS itself or extreme prematurity is responsible for mortality and morbidity in pregnancies complicated with SIUD is a challenging question. It is difficult to quantify the impact of TTTS on neonatal mortality in extreme prematurity. We found TTTS in 700 Gms fetus and other neonate requiring single exchange transfusion as its HB% was 6.0gm%. Prompeller et al. [9] stated that after the 2<sup>ND</sup> trimester SIUD associated with increased risk of IUGR, premature labour and perinatal mortality (13%). In case of severe prematurity with stable intrauterine environment the expectant management may be advisable until the fetal lung maturity ensures. In a study by Aslan et al. [7] reported the median interval between SIUD and delivery was 11 days. But in our study pregnancy was continued upto 10 weeks with serial monitoring.

Maternal coagulopathy may be a rare complication following SIUD, which has been reported to occur in about 3-5 weeks after the fetal demise. Therefore initial maternal coagulation profile with reassessment weekly is reasonable. We could find one case with altered coagulation values which subsided on its own. We did not encounter any symptomatic DIC contrary to a study by Romero et al. [10] who found 25%. In our study there were 5 cases of pre eclampsia, may a consequence of twin gestation itself. Prevalence of anemia was also significantly high in these cases indicating poor antenatal care.

### Conclusion

Perinatal outcome of surviving twin with single fetal demise depends gestational age and chorionicity. Complications are more with monochorionic twins. Management should be individualized. Therefore such pregnancies should

be managed in tertiary centres with good neonatal support. The risk of conservative management should be weighed against the risk of preterm birth and its sequelae. Adequate counselling and long term neonatal follow up are required.

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