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Original Research Article

Study of maternal and perinatal outcome among twin pregnancies with one twin demise

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ABSTRACT

Background: To study the incidence, management and to determine maternal and perinatal outcome in cases of twin pregnancy with one twin demise in the second half of the pregnancy.

Methods: This retrospective study was carried out at Cheluvamba Hospital, a tertiary care hospital attached to Mysore medical college and research institute between September 2009 and 2014. 19 twin pregnancies complicated by single intrauterine fetal demise (IUFD) after 20 weeks of gestation were identified from the hospital records. Data collected included maternal age, parity, antenatal complications, cause of IUFD, gestational age at diagnosis, time interval between diagnosis of IUFD and delivery, mode of delivery, birth details, type of placentation and neonatal complications.

Results: The incidence of twin with one twin demise was 2.056%. Mean gestational age at presentation was 33.86 weeks. Most common cause of death was growth discordance in 7 cases followed by placental insufficiency in 4 cases. 57.89% of cases had monochorionic placentation. Neonatal course was most commonly complicated by prematurity. Maternal course was uneventful in majority (63.15%) of cases with two maternal deaths due to intravascular coagulopathy sequelae.

Conclusions: Single fetal death occurs more often in monochorionic twins. The main problem for the surviving twin is prematurity. It is very important to identify the chorionicity by ultrasound examination in early pregnancy and implement specific surveillance of monochorial pregnancies.

Keywords: Chorionicity, DIC, IUFD, Preeclampsia, Twin, TTTS

INTRODUCTION

Fetal loss of a twin during the first trimester is not an uncommon event.¹ However, fetal death occurring in the second or third trimester is rare with a reported incidence ranging from 0.5% to 6.8%.¹ Management of such cases is challenging to the obstetrician especially in cases of preterm single death, where the risk of fetal prematurity complications must be weighed against the possible intrauterine complications in the surviving fetus. The risk of mortality and morbidity in the surviving twin is

considerable and depends on the cause, time of the death and also on the type of placentation. There is increased risk of IUGR, preterm labor, preeclampsia, survival with cerebral impairment and perinatal mortality.² The causes of fetal death vary and include twin-twin transfusion, placental insufficiency, intrauterine growth retardation related to preeclampsia, velamentous insertion of the cord, cord stricture, cord around the neck, and congenital abnormalities.² In general, chorionicity rather than zygosity determines the risk of mortality and the morbidity with increased prevalence in monochorionic

twins.^{3,4} The perinatal mortality of monochorionic twin pregnancies is double that of dichorionic twin pregnancies.² Hence, determining the type of placentation by ultrasonography can help in predicting the outcome. Amongst the maternal complications, coagulopathy is the most feared one following twin demise but appears to be uncommon. However, coagulopathy has been reported to occur in about 3-5 weeks following fetal demise. Therefore, when fetal demise occurs in multiple gestations after the first trimester, an initial maternal clotting profile with reassessment in 2-3 weeks is done. A multidisciplinary approach, counselling, emotional support and intensive fetal surveillance are needed. This study was done to evaluate the fetomaternal outcome in such cases.

METHODS

This five year retrospective study was carried out at Cheluvamba Hospital between September 2009 and September 2014. 19 twin pregnancies complicated by single IUFD after 20 weeks of gestation were identified from the hospital records. Data collected included maternal age, parity, antenatal complications, cause of IUFD, gestational age at diagnosis, time interval between diagnosis of IUFD and delivery, mode of delivery, birth details, type of placentation and neonatal complications. Data collected was analysed using descriptive statistics namely mean, standard deviation, frequency and percentage wherever applicable.

Inclusion criteria

- All the pregnant women of reproductive age group with twin pregnancy with one fetal demise after 20 weeks of gestational age.

Exclusion criteria

- Multiple pregnancies other than twin, all those twin pregnancies, less than 20 weeks of gestation.

RESULTS

Total number of deliveries in the study period of 5 years was 71,704 out of which total number of twin deliveries was 924. 19 twin pregnancies complicated by single IUFD after 20 weeks of gestation were identified. Incidence of twin deliveries with one twin demise was 2.056%.

Majority (56.2%) of patients were primigravidas (Table 1) and were diagnosed in the third trimester between 32-35 weeks of gestation (10 cases) with only 1 case presenting in second trimester (Table 2).

Table 1: Gravidity.

Gravidity	Percentage
Primigravida	52.6
Gravida 2	36.2
Gravida 3	10.5

Table 2: Gestational age at diagnosis.

Gestational age	Number
<28 weeks	1
28-31 weeks	3
32-35 weeks	10
36-40 weeks	5
>40 weeks	0

Table 3: Presentation on admission.

Case	Gestational age at diagnosis	Gestational age at delivery	Diagnosis to delivery interval	Adverse effect
1	37+1	37+1	3 hours	Anomaly
2	32	32+1	1 day	Coagulation profile-abnormal
3	33+3	33+4	1 day	Nil
4	40+4	41	3 day	Nil
5	26+3	27+3	7 day	Nil

On admission, 14 cases were found to be in labour and delivered within 48hours (Table 3). Among the cases not in labour, induction of labour was done for 2 cases at term and one preterm case with abnormal coagulation profile. Conservative management was followed for the rest, but all of them delivered within the next one week. Maternal co morbidities included anemia and preeclampsia in 26.3% cases, Rh incompatibility in 5.2% cases. There was no identifiable abnormality in 36.84%

cases. Monochorial type of placentation was seen in majority of cases (57.89%) cases (Table 4). Fetal complications consisted mostly of growth discordance in 52.63% cases, others being anomalies and twin to twin transfusion syndrome (TTTS) in 5.2% cases (Table 5). The probable etiology of one twin demise was due to maternal co morbidities in majority of our cases (73.68%), TTTS and anomaly in 5.2% cases. No identifiable cause in 15.7% cases. 14 cases went into spontaneous labour

and delivered vaginally, 2 cases were induced as mentioned above and 3 cases delivered by caesarean section due to maternal indications. There were 13 neonatal intensive care unit admissions mostly due to prematurity, respiratory distress and fetal anomaly (Table 6).

Table 4: Placentation.

Type	Number	Percentage
DCDA	9	42.1
MCDA	8	47.3
MCMA	2	10.5

Table 5: Fetal complications.

Complication	Number	Percentage
Growth discordance	10	52.63%
Anomaly	1	5.2%
TTTS	1	5.2%
Nil	7	36.84%

Table 6: Neonatal course.

NICU admissions (number)	Uneventful (number)
Prematurity (11)	(6)
Fetal distress (1)	
Anomaly (1)	

Perinatal mortality rate was 21.05%. Maternal mortality rate was 10.5% (2 cases) (Table 7). Two maternal deaths in this study were due to severe preeclampsia (PE) with grade 3 abruption with disseminated intravascular coagulation (DIC) and cerebrovascular accident with severe Preeclampsia with HELLP syndrome and DIC.

Table 7: Maternal and prenatal morbidity and mortality rate.

	Number	Rate
Maternal morbidity	11	57.89%
Maternal mortality	2	10.5
Perinatal morbidity	13	68.42
Perinatal mortality	4	21.05

DISCUSSION

The incidence of IUFD in one twin before delivery is an uncommon but significant event. Our study showed an incidence of 2.56% which is similar to other similar studies and literature which shows a range of 0.5 to 6.8% of pregnancies.^{1,5,6}

Intrauterine death can occur during any gestation. However, the consequences to the surviving co-twin can be profound when it occurs during second and third trimesters. In our study, the mean gestational age at

presentation was 33.5 weeks which was similar to studies by Mesbah et al, and Gaucherand P et al.^{5,7}

In general, chorionicity rather than zygosity determines the risk of mortality and the morbidity. Hence, it is important to determine the type of placentation by ultrasonography. The perinatal mortality of monochorionic twin pregnancies is double that of dichorionic twin pregnancies.⁸ The prevalence of monochorionicity in single intrauterine death in twins is 50% to 70%.^{9,10} in this study 57.8% (11/19) cases were monochorionic and one had definite evidence of twin-twin transfusion. Similar findings were found in other similar studies.^{7,8}

The causes of death of a twin can be classified as maternal or fetal. Maternal co morbidities like severe preeclampsia, severe anaemia and diabetes as seen in our study in 31% of cases and in similar studies.^{7,11} Fetal factors like anomaly, TTTS, growth discordance cause IUFD in a twin pregnancy as seen in 52.68% of our cases and other studies.^{2,5,8}

Amongst the maternal complications, coagulopathy is the most feared one following twin demise. Coagulopathy has been reported to occur in about 3-5 weeks following fetal demise. Death of one fetus can lead to ischemic brain damage of the other twin by causing sudden hypotension and hampering the blood supply to other twin. Rarely, single fetal demise causes release of fibrin and tissue thromboplastins in circulation causing DIC. Therefore, when fetal demise occurs in multiple gestations after the first trimester, an initial maternal clotting profile with reassessment in 2-3 weeks is done. In 1989, Landy and Weingold, did a prospective study on death unifetal of twins and reported the occurrence of DIC in 25% of cases.⁹ In our study, we had 2 cases of DIC associated with severe preeclampsia and abruption, both leading to maternal and fetal demise.

The other concern for the monitoring of these pregnancies is the complications in the second twin. Benirschke was the first to point out in 1961, among other abnormalities, the occurrence of neurological sequelae in the surviving fetus.¹⁰ The process would trigger with the emergence of thromboplastic factors arising from the dead fetus which, through vascular anastomosis of monochorionic placentation develop multiple infarcts affecting organs such as the central nervous system and kidneys and associated with neurological damage in the survivor.¹² The observed survival difference between dichorionic and monochorionic twins has been attributed to placental vascular anastomosis, which is seen in 85% to 98% of monochorionic twins and rarely seen in dichorionic placentas.⁸ In monochorionic twin pregnancies, the co-twin may exsanguinate into the dead twin through placental vascular anastomoses when the blood pressure falls at the time of intrauterine death.⁸ The degree of twin-twin transfusion depends on the number, size, and

type of placental vascular anastomoses. Such abrupt and severe haemodynamic changes at the time of one intrauterine death may result in ischaemic damage to the brain and lead to cyst formation in the surviving twin. In the present study, we noted 4 cases in which the second twin presented neurological change characterized by hypoxic ischemic encephalopathy. Antenatal ultrasonography could not be done in our study as most of the cases were in labour.

Thus antenatal death of one fetus in the late second or third trimester of a twin pregnancy poses an important management dilemma in obstetrics. The risks of leaving the surviving twin in the hostile intrauterine environment that may have caused the death of the co-twin must be balanced against the problems associated with preterm delivery.

Various studies comparing conservative management versus termination of pregnancy have been done. D'Alton et al, delivered 14 out of 15 such patients by caesarean section.¹³ The rationale was that the hostile intrauterine environment had led to the death of one twin; provided that the second twin was not grossly immature, delivery was indicated to prevent further damage. Such an aggressive approach however did not prove to have a better outcome, as substantiated by other studies.^{9,14} True prevention of brain damage is possible only by inducing delivery before the vulnerable twin dies in utero. Even this strategy does not guarantee that brain damage has not occurred in the presence of placental anastomoses.¹⁵

Labour may be precipitated in such cases.¹³ Approximately 90% of twin pregnancies complicated with single intrauterine death deliver within 3 weeks of the time of diagnosis which is similar to our study where 14 out of 19 cases (73.68%) presented to us in labour. The prognosis then depends on the maturity of the surviving twin.

It has been suggested that after 37 weeks gestation, the surviving twin should be delivered once intrauterine death of the co-twin has been diagnosed as done in our study where labour induction was done in 2 cases.⁴ Before this period of gestation, immediate delivery should be directed by obstetric indications. In the 19 cases of this study, 14 presented in labour and had immediate delivery after the diagnosis. Of the remaining five cases, two were induced and the rest which were managed conservatively with maternal and fetal monitoring, but pregnancy could only be prolonged to a maximum of 7 days.

The rate of caesarean section has varied considerably (19%-92%) among the reported studies.^{4,12,13} Single intrauterine death per se in twin pregnancy is not an indication for caesarean section unless there is evidence that the twins are monoamniotic with a 25% risk of cord entanglement or knotting. In our study, caesarean section

rate was 15.8%, done in view of monoamniotic pregnancy.

It is recommended that all twin pregnancies with one dead foetus should be managed in tertiary referral hospital due to various perinatal complications like prematurity, fetal distress, hypoxic ischemic encephalopathy requiring neonatal admissions. In our study, we saw neonatal morbidity in 68.42% and neonatal mortality in 21.05% of cases, main cause being prematurity. This is comparable to other studies.^{5,7}

Thus a management plan should be individualised. Intensive foetal surveillance is required and the determination of chorionicity, particularly in the first trimester, is crucial. Subsequent ultrasound scans serve to detect foetal anomalies and assess foetal growth and liquor volume. These measurements are complemented by regular non-stress testing, biophysical profiling, and Doppler ultrasonographic studies. Despite close surveillance however, pitfalls remain. A thorough neonatal evaluation is indicated for the surviving twin to detect central nervous system, renal, circulatory, and cutaneous defects. Long-term follow up is mandatory.⁴

CONCLUSION

The sequelae of a single foetal death in a twin pregnancy depend on the gestation and placentation, occurring more often in monochorionic twins. Death in the late second or third trimester is associated with significant morbidity and mortality in the surviving twin. The main problem for the surviving twin is prematurity. The risk of keeping the surviving twin in a hostile intrauterine environment must be weighed against the risk of preterm delivery. With good fetomaternal surveillance, conservative management can be followed and the live fetus can be salvaged. A multidisciplinary approach and adequate counselling, psychological support, and long-term follow up are mandatory.

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