Incidence and risk factors for intrauterine foetal demise: a retrospective study in a tertiary care centre in India

Abstract

Objective: To determine the incidence and possible causes of Intrauterine Foetal Demise (IUFD), and to determine preventive measures.

Methods: Retrospective observational study was done from Jan 2015 to Dec 2015 at the tertiary care referral hospital in Bangalore, India. Inclusion criteria were IUFD at or above 24 weeks of gestation. The parameters analysed were maternal age, parity, probable causes for IUFD, booked or unbooked cases, mode of delivery, maternal complications, and placental histopathology. Data were analysed using SPSS version 23.

Results: The incidence of IUFD at our hospital was 39/1000 live births. The IUFD rate was similar in maternal age <20 years and >30 years (p-value 0.26). The incidence of IUFD increased with decreasing gestational age which was statistically significant (p-value 0.001). IUFD incidence was higher in multiparous women compared to primiparous women (p-value 0.036 with OR of 1.6 and 95% CI 1.02 to 2.54). The rate of IUFD was similar when sex of the baby was analysed. 49.4% of foetuses had signs of maceration. The major cause of IUFD was severe preeclampsia (48.1%) which included HELLP syndrome, IUGR, Abruption. Maternal anaemia (20.4%), GDM (3.8%), SLE (2.5%), APLA positive (2.5%), anhydramnios (6.3%) were some of the other important causes of IUFD.

Conclusion: This study was conducted to determine the incidence of IUFD and associated maternal risk factors. By understanding the contributing factors, we can seek ways of avoiding recurrence of IUFD by proper antenatal care and early diagnosis of obstetric complications and its appropriate management.

Keywords: iufd, incidence, preeclampsia, contributing factors

Abbreviations: IUFD, intrauterine foetal demise; SADS, sudden antenatal death syndrome; SLE, systemic lupus erythematosus; IU/GR, intrauterine growth retardation; APLA, antiphospholipid Antibody Syndrome; GDM, Gestational Diabetes Mellitus; CVT, Cerebral Venous Thrombosis; AFLP, acute fatty liver of pregnancy; TTT, twin to twin transfusion syndrome; AIT, anti-tuberculosis therapy; PPROM, preterm premature rupture of membrane; DCDA, dichorionic diamniotic

Introduction

An Intrauterine Foetal Demise (IUFD) is a major obstetrical catastrophe at any gestational age but the emotional pain and distress caused by this event increases in direct relation to the duration of pregnancy. Lot of importance is given for maternal, neonatal and child health all over the world. There is increasing attention and investment in the field of maternal and neonatal health care but still births remain most under studied or documented.

Definition

Intra uterine foetal death (IUFD) is defined as foetal death after 20 weeks of gestation. It can be further classified into early or late IUFD. Early IUFD, if foetal death occurs before 24 weeks of pregnancy and late IUFD, if foetal death after 24 weeks.

Causes

The causes of IUFD, in a large percentage of cases remain unknown, even where extensive testing and autopsy have been performed. A rarely used term to describe this is “sudden antenatal death syndrome” or SADS, a phrase coined by Cacciature and Collins in 2000.

Many still births occur at full term to apparently healthy mother and a post-mortem evaluation reveals a cause of death in only 40% of autopsied cases. It is important to investigate the cause of IUFD. If the cause of an IUFD can be identified, the family will have answers about the possibility of recurrence and can seek appropriate medical treatment to prevent recurrence. Identification of causes of IUFD will be helpful in counselling the parents as well as for formulating preventive measures. Health education to encourage the utilisation of the available antenatal care services, family planning and genetic counselling are being advocated strongly as possible preventive measures. Objectives of this study were to find out the incidence and possible causes of IUFD, and to suggest preventive measures.

Methods

Retrospective observational study was done from Jan 2015-Dec 2015 at the tertiary care referral hospital, Bangalore India. The
parameters for the analysis include maternal age, parity, and probable cause for IUFD, booked case or unbooked case, mode of delivery, maternal complications—early and late IUFD, placental histopathology.

“Booked Case” by definition (WHO) is when the pregnant lady has had a minimum of three visits for antenatal check-up after she was registered and confirmed to be pregnant. All others who had no prior antenatal visits would be unbooked case”.

Inclusion criteria were IUFD at or above 24 weeks of gestation. All the details were thoroughly analysed and entered in a preformed proforma. Data collected was entered in the computer using SPSS version 23. Observed differences were subjected to Chi-square test and Fischer test and incidence was calculated for 1000 live births.

**Results**

There were a total of 2750 deliveries with 79 cases of intrauterine foetal demise (IUFD). The incidence of IUFD was 39/1000 live births in our study. When maternal characteristics were studied (Table 1), 65 of the mothers were between 20-30 years of age (82.3%). 3 were less than 20 years (3.8%) and 11 in more than 30 years (18.9%) of age group. 94.9% (74/79) of the mothers had regular antenatal visits (Booked). Majority of cases were referred from outside (80%) after the diagnosis of IUFD for further management. Out of 79 women, 34 were primigravida (43%) and 45 were multigravida (57%). 93.7% of them had non-consanguineous marriage.

| Maternal characteristics | Frequency | Percent |
|--------------------------|-----------|---------|
| Maternal Age in Years    |           |         |
| <20                      | 3         | 3.8     |
| 20-30                    | 65        | 82.3    |
| >30                      | 11        | 13.9    |
| Antenatal Visits         |           |         |
| Booked                   | 75        | 94.9    |
| Unbooked                 | 4         | 5.1     |
| Parity Group             |           |         |
| Primi                    | 34        | 43      |
| Multi                    | 45        | 57      |
| Consanguinity            |           |         |
| yes                      | 5         | 6.3     |
| no                       | 74        | 93.7    |
| Gestational Age in Weeks |           |         |
| <28 weeks                | 19        | 24.1    |
| 28-34                    | 34        | 43      |
| 34-37                    | 16        | 20.3    |
| >37                      | 10        | 12.7    |
| Baby Sex                 |           |         |
| Girl                     | 39        | 48.75   |
| Boy                      | 41        | 51.9    |
| Signs of Maceration      |           |         |
| Absent                   | 40        | 50.6    |
| Present                  | 39        | 49.4    |
| Vaginal                  | 75        | 94.9    |
| Mode of Delivery         |           |         |
| Caesarean delivery       | 4         | 5.1     |

When gestational age was observed, 19 of the IUFDs were less than 28 weeks (24.1%) of gestation. 34 were between 28-34 weeks (43.0%), 16 were between 34-37 weeks (20.3%), 75 (94.9%) had vaginal delivery and 4 (5.1%) had to undergo Caesarean delivery for other obstetric indication.

When foetal parameters were studied 41 (50.6%) were boys and 39 (49.4%) were girls. Out of them 39 (49.4%) had signs of maceration and two babies had true knot in the cord. Cord around the neck was seen in 21.25% of the babies. Placental histopathology did not reveal much of the information (Table 1).

When the incidence of intrauterine foetal demise was calculated per 1000 live births for the maternal age, there was no difference in the various age groups (P value 0.26) (Table 2). As the gestational age reduced, the incidence of IUFD raised, it was highest at gestation less than 28 weeks, 52.8/1000 live births. At 28-34 weeks the incidence of IUFD was 14.6/1000 live births. All these values were statistically significant (Table 3). There was a significant difference between parity, IUFD was observed more in multigravida compared to primigravida with odds ratio 1.6 with 95% confidence interval of 1.02 to 2.54 (Table 4).

**Table 1 Maternal Characteristics**

| Maternal Characteristics | Frequency | Percent |
|--------------------------|-----------|---------|
| Maternal Age in Years    |           |         |
| <20                      | 3         | 3.8     |
| 20-30                    | 65        | 82.3    |
| >30                      | 11        | 13.9    |
| Antenatal Visits         |           |         |
| Booked                   | 75        | 94.9    |
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| Mode of Delivery         |           |         |
| Caesarean delivery       | 4         | 5.1     |

**Table 2 Maternal age**

| Maternal age in years | No. of live birth | No. of IUD per 1000 live birth | P value |
|-----------------------|-------------------|-----------------------------|---------|
| <20                   | 150               | 3                           | 0.036*  |
| 20-30                 | 1947              | 65                          | 3.4     |
| 30-40                 | 554               | 11                          | 19.9    |

**Table 3 Gestational age**

| Gestational age in weeks | No. of live birth | No. of IUD per 1000 live birth | P value |
|--------------------------|-------------------|--------------------------------|---------|
| <28 weeks                | 36                | 19                            | 52.8    |
| 28-34                    | 233               | 34                            | 14.6    |
| 34-37                    | 336               | 16                            | 4.7     |
| >37                      | 2036              | 10                            | 0.5     |

**Table 4 Comparison between Parity**

| Live birth | IUD | Total live | p-value | OR | 95% CI |
|------------|-----|------------|---------|----|--------|
| Primi      | 1425(98%) | 34 | 2% | 1459 |
| Parity     | Multi | 1167(96%) | 45% | 1212 | 0.036* | 1.6 | 1.02 to 2.54 |
| Total      | 2592(97%) | 79(3%) | 2671 |

*P-value statistically significant at 5% level by using chi-square test
Discussion

The incidence of IUFD reported from western countries ranges from 4.7% to 12.0%
and incidence of IUFD in India, reported from various centres ranges between 24.4-41.9%. However, the incidence rate of IUFD in our study is 39/100 live births. The incidence is higher in our study due to our centre being a tertiary care referral hospital. Most of the cases would be referred from all over the state and also from neighbouring two states. 80% of the cases were referred from outside.

Unlike other studies where the majority were unbooked cases, in our study 94.9% of the cases were booked and 82.3% of them were between 20-30 years of age. The incidence was higher in lesser gestational age group compared to higher gestational age and 93.7% of them had non-consanguineous marriage. In our study 43% of cases were primipara and 57% of cases were multipara, which was unlike study conducted by Singh et al where parity had no association with IUFD.

When the risk factors were analysed severe eclampsia was seen in 48.1% of the cases, 10.1% of these were complicated by HELLP syndrome and Ante partum eclampsia was seen in 5%. Incidence of abortion was 8.9%. Chronic hypertension accounted for 3.8% of IUFD. 20.2% of pregnancies were complicated by anaemia, out of them 6.3% had severe anaemia requiring blood transfusion. Systemic Lupus erythematosus (SLE), Antiphospholipid antibody syndrome (APLA) and Gestational diabetes mellitus (GDM) were the next major cause of IUFD. 8(10.8%) of them had hypothyroidism on regular treatment. Miscellaneous group included cases of Cortical venous thrombosis (CVT) 1(1.3%), Acute Fatty Liver of Pregnancy (AFLP)2(2.5%), thrombocytopenia, acute liver failure 1(1.3%), chronic liver disease 1(1.3%), extra hepatic portal vein obstruction 1(1.3%), ARDS with HINI 1(1.3%), Twin to twin transfusion syndrome (TTTS) with one twin IUFD 1(1.3%), bronchial asthma 1(1.3%), Insulinoma 1(1.3%), Seizure disorder 1(1.3%), disseminated tuberculosis on anti-tuberculosis therapy (ATT) 1(1.3%), polyhydramnios 1(1.3%), Preterm Premature rupture of membrane (PPROM)2 (2.5%), Aplastic anaemia 1(1.3%), foetal hydrops 1(1.3%), sepsis 1(1.3%), decreased foetal movement 1(1.3%), Di chorionic di amniotic (DCDA) twin with one twin IUFD 1(1.3%), cord and hand prolapsed 1(1.3%) (Figure 1).

Figure 1 Causes of IUFD.

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is provided, health care personnel should be trained to identify the pregnancy as high risk or low risk. The proper risk stratification will help to reduce the complications of high risk pregnancy including early detection of pre-eclampsia, anaemia, GDM, previous pregnancy loss. This will aid timely referral to a higher centre.

Conclusion

This study was conducted to determine the incidence of IUFD and associated maternal risk factors. By understanding the contributing factors, we can seek ways of avoiding recurrence by proper antenatal care and early diagnosis of complications and its proper management. Antenatal screening for anaemia, pre eclampsia, GDM, previous pregnancy loss and antenatal supervision can play an important role in decreasing the incidence of IUFD. By determining the cause of IUFD the chances of recurrence can be reduced and further pregnancy complications can be prevented.

Acknowledgements

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Conflict of interest

Author declares that there is no conflict of interest.

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