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Original Research Article

Intrauterine fetal demise: unravelling an obstetric enigma

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ABSTRACT

Background: Intrauterine fetal demise (IUFD) is an obstetric catastrophe which is immensely distressing to the pregnant women. Intrauterine fetal death refers to babies with no signs of life in utero. It is a significant indicator of maternal and perinatal health of the population. This study aims at assessing the incidence and possible maternal, fetal and placental factors predisposing to Intrauterine fetal death.
Methods: This is a retrospective observational study conducted on pregnant women with Intrauterine fetal demise during study period of 1 year from June 1st 2023 to June 1st 2024 at MMCRI, Mysore. The data was collected from previous records of 170 IUFD cases from 6944 births. The parameters assessed were age, parity, gestational age and the probable etiology.
Results: The most common maternal cause of IUFD was Hypertensive disorders (31.7%) followed by Diabetes (15.2%) and idiopathic category (15.2%). The most common fetal cause was IUGR (8.2%) and most common placental cause was placenta previa (11.7%).
Conclusion: In our study, the incidence of IUFD was found to be 2.4% and the most common attributed cause was hypertensive disorders of pregnancy, gestational diabetes which were mostly preventable by early referrals, prompt diagnosis and timely interventions.

Keywords: Intrauterine fetal demise, IUFD

INTRODUCTION

Intrauterine foetal death (IUFD) is an incredibly distressing event for both the mother and her family, and it remains a significant challenge for obstetricians. This adverse outcome of pregnancy affects the patient, their family, and the obstetrician, and it can be even more impactful if it happens at full term. Intrauterine fetal demise is a useful index to measure the values of antenatal and intranatal care.

Intrauterine foetal death is defined as the death of the foetus occurring after the 20th week of gestation. According to WHO, IUFD is defined as "Death prior to expulsion or extraction of products of conception from its mother, irrespective of duration of pregnancy and which is not an induced termination of pregnancy, death indicated by fact that such separation of foetus does not show any evidence of life such as beating of heart, cord pulsations or definite movement of voluntary muscles".[1] IUFD is classified into early or late categories: early intrauterine foetal death refers to foetal demise before the 24th week of gestation, while late intrauterine foetal death refers to death occurring after the 28th week of pregnancy.

The number of stillbirths has reduced more slowly than has maternal mortality or mortality in children younger than 5 years, which were explicitly targeted in the millennium development goals. Every Newborn Action Plan has the target of 12 or fewer stillbirths per 1000 births in every country by 2030.[2] Each year, approximately 3.3 million intrauterine foetal deaths occur globally, which is nearly as

many as postnatal deaths, yet they receive less attention.[2] Of these, 97% occur in developing countries The Lancet published "The Ending Preventable Stillbirths Series Study Group," which has helped promote global public health efforts. The initial goal was to reduce the stillbirth rate to less than 15/1000.

This has already been achieved in many industrialized countries however, countries in Asia and Africa still have much higher stillbirth rates, attributed mainly to a lack of access to healthcare providers.[2,3] Even with advances in modern antenatal care and consistent monitoring of pregnant women and their foetuses, the rate of intrauterine foetal death remains high.

Global data on the causes of Intrauterine fetal demise are scarce, primarily because determining the exact cause can be challenging. Unexplained IUFDs accounts for the majority of cases, reported in 76% worldwide. Additionally, half of all stillbirths are associated with complications during labor, and many of these fatalities could potentially be prevented with improved access to skilled healthcare.[3]

The survival of a fetus in the womb relies on various factors which can be categorized into the optimum health of the mother, the precise functioning of the uteroplacental unit, the conditions surrounding the fetus, and the absence of lethal fetal factors. A single negative event or a combination of issues can disrupt these vital factors and result in stillbirth. Supporting and maintaining a pregnancy requires multiple physiological, hormonal, and anatomical adaptations.[1-3]

The information gathered during regular prenatal and perinatal care is crucial for identifying the cause of stillbirth in most cases. This history should encompass details such as age, gravidity, parity, history of hypertension, diabetes, hypercoagulability, autoimmune disease, or cancer; exposure to infection.[1,4]

Even after comprehensive testing and autopsy reports, the causes of intrauterine foetal death often remain unclear in most cases. Investigating the cause of intrauterine foetal death is essential. Identifying the underlying reason is of utmost importance as it allows for the implementation of appropriate screening and treatments to prevent future occurrences.[4]

This study aims to investigate the incidence and associated maternal, foetal, and placental conditions that increase the risk of intrauterine foetal death in term pregnancies. Since effective prevention relies on identifying and analysing risk factors, the study seeks to address the questions.

What was the trends of IUFD during the observed period at our institute. What were the common conditions present in the examined group of pregnant women. What were the fetal and placental characteristics contributing to IUFD in our study group.

METHODS

Study design

This is a retrospective observational study conducted on pregnant women diagnosed with Intrauterine fetal demise during our study period of 1 year starting from June 1st 2023 to June 1st 2024 at MMCRI, Mysore. Our study acknowledges the number of deliveries, live births and in our in utero fetal deaths in our institute and spectrum of maternal, fetal and placental conditions associated with risks of IUFD.

Inclusion criteria

All pregnant women diagnosed with intrauterine fetal demise during examination/hospitalization with gestational age beyond 28 weeks to full term pregnancy included in our study &
All referred cases of pregnant women in whom the diagnosis of IUFD was already established.

Exclusion criteria

Pregnant women with IUFD prior to 28 weeks, fetuses weighing less than 500 grams, pregnancies with documented fetal anomalies, multifetal gestation were excluded.

Statistical analysis

The data was analysed using Microsoft Excel, and the results were presented as frequencies and percentages. For statistical analysis, the statistical package for the social sciences (SPSS) version 25.0 was employed.

RESULTS

During the study period there were 170 cases of Intrauterine fetal demise occurred out of 6944 total births, hence proportion of IUFD in our study (>20 weeks) was 24 per 1000 total births. Out of the 170 IUFD, 138 (81.2%) were premature and 32 (18.8.8%) were mature. Majority of pregnant women with IUFD i.e., 68 cases (40%) belonged to the age group 21-25 years followed by 50 cases (29%) in 26-30 years age group. With respect to extremes of age, 20 cases, 11.75 cases were teenage pregnancies and 11 cases (6.4%) were in the elderly pregnancies group.

Only 15 (8.8%) were booked and supervised deliveries whereas 155 (91.1%) were unbooked. 140 mothers (82%) were immunized with tetanus toxoid and 30 (18%) were unimmunized. In this study, 15.4% of cases belonged to <32 weeks, 65.8% of cases belonged to 32-36 weeks, and 18.8% of cases belonged to >37 weeks. There was a total of about 61 cases (35.8%) of primigravida and the majority of about 109 cases (64.1%) of multigravida. On analysis of the probable pathologies causing intrauterine fetal demise, the most common eitology was found to be

hypertensive disorders of pregnancies (i.e, chronic hypertension, pregnancy-induced or gestational hypertension, preeclampsia superimposed on chronic hypertension, preeclampsia) comprising of about 54 cases which was 31.7% followed by gestational diabetes and idiopathic causes both with a similar occurrence of about 15.2% which is 26 cases each.

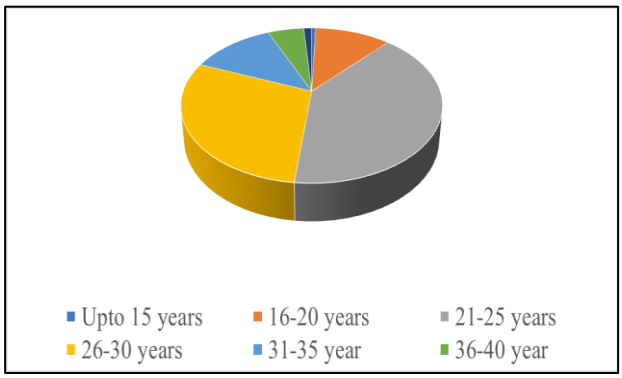

Figure 1: Maternal age and IUFD.

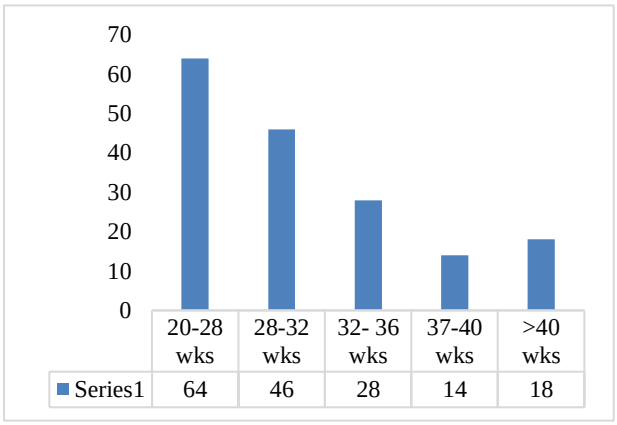

Figure 2: Correlation between gestational age and risk of IUFD.

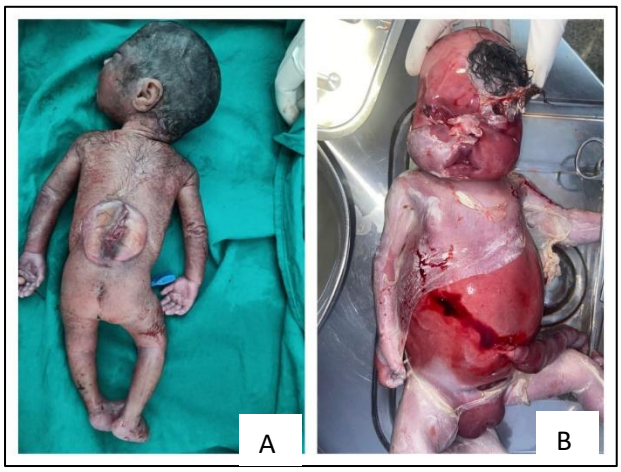

Figure 3: (A) Represents dead fetus of a diabetic mother with myelomeningocoele. (B) represents Immune hydrops fetalis.

When other medical disorders were evaluated, 122 cases (71.7%) were found to be anaemic who were then categorised and 72 individuals (42.3%) had mild anaemia, 30 (17.6%) with moderate anaemia and 20 (11.7%) had severe anaemia. Amongst the placental causes, placenta previa was reported in 1.2% of cases and Abruptio placenta was seen in 11.7% of cases. Intranatally, cord around the neck noted in 3.5% of cases and true knots were appreciated in one case of IUFD.

Among the fetal causes, IUGR was seen in 8.2% cases and congenital anomalies were noted in 11.7% cases. Majority of the babies weighed between 1 to 1.5 kgs which was 31.7% followed by 30.5%, 19.4% and 12.3% in 1.5 to 2 kgs, 2 to 2.5 kgs and 2.5 to 3 kgs fetal weight groups respectively.

Table 1: Maternal age and IUFD.

Maternal age (in years)	Total cases	%
Up to 15	1	0.58
16-20	19	11.17
21-25	68	40
26-30	50	29
31-35	21	12.38
36-40	9	5.2
>40	2	1.2

Table 2: Number of antenatal visits.

Total visits	Number	%
No visit	45	26.4
Single visits	48	28.2
Two visits	34	20
Thress visits	28	16.4
4 and more than 4 visits	15	8.82

Table 3: Birth weight and IUFD.

Birth weight (in kg)	Frequency	%
1-1.5	54	31.7
1.5-2	52	30.5
2-2.5	33	19.4
2.5-3	21	12.3
3-3.5	8	4.7

Table 4: Etiologies of IUFD.

Causes	Total cases	%
Idiopathic	26	15.2
Diabetes	26	15.2
Anomalous fetus	20	11.7
IUGR	14	8.2
Placenta previa	2	1.2
Abruptio placenta	20	11.7
Cord around the neck	6	3.5
Hypertensive disorders	54	31.7
Others	2	1.2

DISCUSSION

Our study reported 170 intrauterine fetal demise out of a total of 6,944 births, resulting in an incidence of approximately 24 stillbirths per 1,000 births which is comparable to similar study by Balu D et al at MS Ramaiah medical college Bangalore with incidence of 29.2 per 1000 livebirths respectively.7 The incidence of intrauterine fetal demise (IUFD) in India ranges from 24.4 to 41.9. Worldwide, fewer than 5 percent of stillbirths are reported.2 The stillbirth rate differs significantly by country, with the lowest rates being 2 per 1,000 births in Finland and Singapore, while the highest rates reach 47 in Pakistan and 42 in Nigeria.[3]

In the scientific literature regarding intrauterine fetal death, maternal age, particularly over 35 years is identified as a significant risk factor across all gestational ages, including term pregnancies. In populations of women over 35, there tends to be a greater prevalence of comorbidities like hypertension and diabetes, along with higher parity, all of which are acknowledged risk factors.[1] Nevertheless, even with these conditions present, maternal age remains an independent risk factor for intrauterine fetal death. In our study, 11 cases (6.4%) were in the elderly pregnancies group whereas study by Jovanovic et al reported 21.6% of cases.9 In the present study, 40% of cases were seen in 21-25 years which was similar to Shravya MK et al (45%). Second highest recording was noted in 26-30 years of age group with 29% which was similar to Gupta S et al (29.4%) and Shravya MK et al (33.3%).[6,19]

In this study, 91% of antenatal cases were un-booked, which was similar to that of Anjali C et al (89.5%) citing the importance of antenatal vigilance to prevent this obstetric disaster.[11]

Parity is frequently cited as a risk factor for intrauterine fetal death at term, but the conclusions on this matter differ. Some studies suggest that primiparous women are at greater risk, while others indicate that the risk may increase after the second delivery. In our study, 64.11% were multiparous women.

In this study, 64 cases (37.6%) were under 28 weeks of gestational age, 46 cases (27%) were between 28 and 32 of gestational age, 28 cases (16.4%) beyond 32 and up to 36 weeks of gestational age, and 14 cases (8.2%) were crossing 37 weeks up to full term. Specifically, 18 cases (10.5%) were categorized for being postdated over 40 weeks which is comparable to other studied by Balu D et al.[7]

In a systematic review, Mondal and colleagues found that the risk of intrauterine fetal death is up to 10% higher in male fetuses than in female fetuses.[20] However, a clear explanation for this notable gender difference has not yet been identified. In our study, we observed a slightly greater number of male fetuses compared to female ones. (59.3% > 40.7%).

Considering the various etiologies leading to intrauterine fetal death, the most common one was found to be the spectrum of hypertensive disorders of pregnancy comprising of 54 cases (31.7%) followed by gestational diabetes in 26 cases (15.2%). These findings were similar to that in Gupta S et al and Meena L, et al.[10,19] Literature signifies that chronic hypertension increases stillbirth risk up to 3 times whereas diabetes increases stillbirth risk up to 5 times. Hypertension during pregnancy, whether chronic or gestational, is known to elevate the risk of issues with uteroplacental circulation and placental abruption. Additionally, diabetes in pregnancy has long been identified as a risk factor for fetal demise. Poor glycaemic control contributes to fetal death by causing metabolic disorders that lead to increased oxidative stress, cardiac complications, and placental vascular issues.

In another 15.2 % of cases, the exact reason for intrauterine fetal demise could not be identified whereas other studies reported idiopathic causes as low as 5.9% by Gupta S et al to 28.9% by Kumar R, et al.[18,19] Placenta previa was seen in 1.2% which was similar to other studies by Patel S, et al (1.96%) and Kumar R et al (5.2%) where as other studies reported higher occurrence of 13% by Kalasau, et al.[11,16,17] Abruptio placenta was tackled in 11.7% cases which was identical to other studies by Kumar R, et al (13.1%) and Meena L, et al (10.5%).[10,18]

Fetal IUGR was noted in 8.2% cases in our study which was concurrent with another study by Shravya MK et al (6.67%).[5] In this study, congenital malformations were found in 11.7% cases which was alike with findings of Anjali et al (11.9%) and Dedhrotiya et al (13%).[11,12] On probing cord as a potential factor, 3.5% of babies had cord around the neck of which one baby had true knot on the cord. Amongst other causes, 2 cases were enrolled. One was due to Immune Hydrops fetalis where as other was fresh still born secondary to rupture uterus in a case of previous LSCS.

For patients with identifiable preventable risk factors, preconception counselling and appropriate treatment are crucial to reducing risks in future pregnancies. Additionally, a thorough investigation and identification of new risk factors for this complex issue are vital for developing strategies to identify foetuses at higher risk and create monitoring protocols for these pregnancies, with the goal of further decreasing the incidence of intrauterine fetal death.

CONCLUSION

Intrauterine fetal demise is a preventable entity with meticulous monitoring of pregnancies and devising right protocols for anticipating this obstetric distress. Thorough understanding of the contributing etiologies of IUFD paves way to early recognition of a complication and its management. Antenatal screening for anaemia, preeclampsia, gestational diabetes mellitus (GDM), history of previous pregnancy loss, in collaboration with

regular and optimum antenatal care plays a key role in reducing the incidence of intrauterine fetal demise.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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