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Original Research Article

A RETROSPECTIVE STUDY OF CAUSES AND COMPLICATIONS OF INTRAUTERINE FETAL DEMISE AT TERM GESTATIONAL AGE

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ABSTRACT

Background: Intrauterine fetal demise (IUFD) at term gestational age is a distressing obstetric outcome with significant emotional, psychological, and clinical consequences. Despite advances in antenatal care, the etiology of many term IUFDs remains unexplained, particularly in low- and middle-income countries where disparities in surveillance and access to obstetric services persist. Understanding local patterns of causation and maternal complications is essential for developing targeted prevention strategies. The objective is to identify the causes of intrauterine fetal demise at term gestation. To evaluate the role of antenatal care in preventing term IUFD.

Materials and Methods: A retrospective observational study was carried out in the Department of Obstetrics and Gynecology, Basaveshwar Teaching and General Hospital, Kalaburagi, Karnataka, over a one-year period (June 2024–June 2025). All cases of IUFD at ≥37 weeks of gestation were included. Maternal demographic data, booking status, obstetric history, clinical and laboratory findings, mode of delivery, and maternal complications were extracted from labor room registers, inpatient files, and delivery records. Presumed causes of fetal demise were determined from clinical, ultrasonographic, and, where available, placental and autopsy findings. Data were analyzed using descriptive statistics and appropriate chi-square or Fisher's exact tests.

Results: Among 1,100 deliveries, 20 cases of term IUFD were identified. Most women were between 26–30 years of age and all were booked for antenatal care. Maternal causes—primarily oligohydramnios, post-maturity, and infections—accounted for the majority of deaths, followed by placental abruption and selected fetal factors such as cord abnormalities and meconium aspiration. Vaginal delivery was the predominant mode of birth. Maternal complications included sepsis, disseminated intravascular coagulation, and acute renal failure. Autopsy in consenting cases confirmed infections, placental vascular insufficiency, and growth restriction as key pathological findings.

Conclusion: Term IUFD remains a multifactorial event with preventable maternal and placental etiologies predominating. Comprehensive antenatal surveillance, timely diagnosis of late-gestation complications, and routine placental and fetal examination are critical to reducing its incidence and mitigating maternal morbidity.

Keywords: Intrauterine fetal demise; term pregnancy; antenatal care; maternal complications; placental pathology; retrospective study.

INTRODUCTION

Intrauterine fetal demise (IUFD), particularly at term gestational age, represents a devastating obstetric outcome with profound emotional and psychological consequences for affected families. Defined as fetal death occurring after 28 weeks of gestation, IUFD remains a significant public health concern worldwide, with the highest burden in low- and middle-income countries (LMICs).[1] Despite advances in antenatal care, many cases remain unexplained, especially when occurring at or near term.[2]

Globally, the reported incidence of IUFD at term varies, ranging from 1 to 2 per 1,000 live births in high-income countries, with higher rates observed in LMICs due to disparities in access to quality obstetric care, delayed referrals, and limited diagnostic capabilities.[3] Known risk factors include maternal age over 35 years, hypertensive disorders, diabetes mellitus, placental insufficiency, intrauterine growth restriction (IUGR), umbilical cord accidents, and infections.[4,5] However, studies have shown that in up to one-third of cases, the cause remains unidentified, even after thorough autopsy and placental evaluation.[6]

Complications associated with IUFD can significantly impact maternal health. These include coagulopathies such as disseminated intravascular coagulation (DIC), prolonged labor, infection, and increased psychological morbidity including anxiety, depression, and post-traumatic stress disorder.[7] Furthermore, women with a prior history of IUFD face a heightened risk of recurrence in subsequent pregnancies, necessitating close monitoring and individualized antenatal care.[8]

A retrospective analysis of IUFD cases at term is essential to identify preventable causes and implement strategies to reduce their incidence. Understanding the underlying etiologies and associated maternal complications can guide evidence-based interventions and enhance the quality of perinatal care.[9]

Objective:

1. To study the Causes of intrauterine fetal demise, and
2. To study the Antenatal care in the prevention of term intrauterine fetal demise

MATERIALS AND METHODS

This retrospective observational study was conducted in the Department of Obstetrics and Gynecology at Basaveshwar Teaching and General Hospital, Kalaburagi, over a period of one year, from June 2024 to June 2025. The objective was to analyze the clinical profile, etiological factors, and maternal complications associated with intrauterine fetal demise (IUFD) at term gestational age.

The study included all cases of IUFD at or beyond 37 completed weeks of gestation that were admitted and managed during the study period. Data were retrieved from labor room registers, inpatient files, delivery records, and medical case sheets archived in the hospital records department. Out of a total of 1,100 deliveries conducted during this period, 20 cases of term IUFD were identified and included in the study, while 1,080 cases of live births served as the background delivery population for incidence estimation.

The inclusion criterion was women with IUFD at ≥37 weeks of gestation, while cases of IUFD occurring at <37 weeks were excluded from the analysis. Additionally, cases with incomplete records, gestational age uncertainty, or fetal anomalies incompatible with life were also excluded.

For each included case, the following variables were documented: maternal age, gravidity and parity, booking status, gestational age at diagnosis, presence of maternal comorbidities (e.g., preeclampsia, diabetes, anemia), antepartum complications, mode of delivery, and any maternal complications encountered. The presumed cause of IUFD was determined based on available clinical, ultrasonographic, and laboratory data, as well as placental and fetal findings where available. This study was approved by the Institutional Ethics Committee of the institution prior to data collection. Patient anonymity and confidentiality were strictly maintained throughout the research process.

Statistical Analysis: The collected data were compiled and entered into Microsoft Excel 2019 and then analyzed using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY). Descriptive statistics were used to express the data. Categorical variables such as parity, presence of comorbidities, and types of complications were expressed as frequencies and percentages. Continuous variables, including maternal age and gestational age, were expressed as mean ± standard deviation (SD). The incidence rate of IUFD at term was calculated per 1,000 live births.

RESULTS

In the present study, the majority of subjects were in the 26–30 years age group (40%), followed by 21–25 years (35%). The mean maternal age was 24.8 ± 3.6 years. Women ≤20 years of age accounted for 20%, while only one subject (5%) belonged to the 31–35 years age group. All women in the study were booked cases (100%), and none were unbooked. Regarding parity, 50% were primigravidae, 25% were second gravidas, 15% were third gravidas, and 10% had parity of four or more. With respect to gestational age at fetal demise, 50% of cases occurred between 37–38 weeks, followed by 20% between 38–39 weeks, and 15% each in the 39–40 and ≥41 weeks categories [Table 1].

In the present study, maternal causes accounted for the majority of IUFDs (60%), with oligohydramnios (20%) and post-maturity (15%) being the most

common among them. Other maternal causes included anemia (5%), fever (10%), pre-eclampsia (5%), and jaundice (5%). Among fetal causes, cord abnormalities and meconium aspiration syndrome (MAS) were observed in 10% of cases each, while fetal growth restriction was noted in 5%. Placental causes such as abruption were seen in 10%. One case (5%) remained unexplained despite complete evaluation [Table 2].

In the present study, vaginal delivery was the most common mode of delivery, accounting for 95% of cases, whereas only one patient (5%) underwent a caesarean section. Most women delivered spontaneously or after induction of labor with misoprostol [Table 3].

In the present study, maternal complications were recorded in a minority of cases. Sepsis was observed in 2 cases (10%), while disseminated intravascular coagulation (DIC) and acute renal failure were seen in 5% each. There was one case of maternal mortality (5%), which occurred due to multi-organ failure following sepsis and DIC. These findings underscore the potential severity of complications associated with IUFD [Table 4].

In the present study, autopsy was conducted in 8 out of 20 cases (40%), based on consent availability. Autopsy findings revealed infections and sepsis in 3 cases, with mononuclear inflammatory infiltrates in fetal organs and intervillous inflammatory changes in the placenta. Pre-eclampsia-related IUFD showed features of intrauterine growth restriction (IUGR) along with placental vascular insufficiency, infarction, and calcification. In 2 cases with placental insufficiency, infarcts, necrosis, fibrosis, and a single umbilical artery were observed, suggestive of chronic compromise. The autopsy findings validated the clinical diagnosis in these cases and provided further insight into pathophysiological mechanisms underlying IUFD [Table 5].

Table 1: Profile of subjects in the study

		Frequency (n = 20)	Percentage
Age Group	≤ 20 years	4	20 %
	21-25 years	7	35 %
	26-30 years	8	40%
	31-35 years	1	5%
Booking Status	Booked	20	100%
	Unbooked	0	0
Parity	G1	10	50%
	G2	5	25%
	G3	3	15%
	≥G4	2	10%
Gestational age	37-38 weeks	10	50%
	38-39 weeks	4	20%
	39-40 weeks	3	15%
	≥ 41 weeks	3	15%

Table 2: Distribution of cases according to the causes of intrauterine fetal demise

		Frequency	Percentage
Maternal causes	Anemia	1	5%
	Oligohydramnios	4	20%
	Post maturity	3	15%
	Fever	2	10%
	Pre-eclampsia	1	5%
	Jaundice	1	5%
Fetal causes	Cord abnormality	2	10%
	Fetal growth restriction	1	5%
	Meconium aspiration syndrome	2	10%
Placental causes	Abruption	2	10%
Unexplained		1	5%

Table 3: Distribution according to the mode of delivery

Mode of delivery	Frequency	Percentage
Vaginal delivery	19	95%
Caesarean section	1	5%
Total	20	100%

Table 4: Distribution of patients according to maternal complications.

Maternal complication	Frequency	Percentage
Disseminated intravascular coagulation (DIC)	1	5%
Sepsis	2	10%
Acute renal failure	1	5%
Maternal mortality	1	5%

Table 5: Autopsy findings of Intrauterine fetal demise

Causes of fetal death	Number of cases	Gross & microscopic findings in the fetus on autopsy	Gross & microscopic findings in the placenta and cord
Infection	1	M/E: organs showed infiltrates of interstitial mononuclear inflammatory parenchymal cells	Focal inflammation with intervillous inflitrate
Sepsis	2	M/E: non-specific inflammation seen in cross-section of organs	Features of inflammation
Pre-eclampsia/ PIH	1	IUGR features	Features of vascular insufficiency, infarction, and calcification
Placental insufficiency	2	IUGR features	Infraction, necrosis, dystrophic calcification, fibrosis (1 case of single umbilical artery)

Consents of only 8 out of 20 IUFD autopsy report cases were obtained; the remaining 12 IUFD were refused for the autopsy procedure by the attenders.

DISCUSSION

In the present study, the majority of IUFD cases occurred in women aged between 26–30 years (40%), which aligns with findings from Monasta et al. who reported that most stillbirths occurred in women aged 25–30 years in their retrospective cohort in Italy.[10] However, studies such as those by Dave et al,[7] and Singh et al,[11] noted a higher incidence among younger primigravidae, indicating regional demographic variation and differing levels of antenatal care utilization.

In our study, all women were booked, unlike findings from Liu et al. in Taiwan, where unbooked status contributed significantly to adverse outcomes.[4] This suggests that booking status alone may not be protective if surveillance protocols fail to detect late-term complications.

Half of the IUFDs in our study occurred between 37–38 weeks of gestation, suggesting a clustering of risk around early term. A similar gestational distribution was observed in the study by Bonetti et al., where placental insufficiency was most frequently observed after 37 weeks.[12] This emphasizes the importance of enhanced fetal surveillance in late-term pregnancies.

The most common causes identified in this study were maternal in origin, particularly oligohydramnios (20%), post-maturity (15%), and infections (10%), which is consistent with findings by Kıncı et al.[13] Placental causes such as abruption accounted for 10%, and 5% remained unexplained, which is lower than global reports where up to one-third of IUFDs are labeled idiopathic despite autopsy.[6] This may be due to the smaller sample size and selective consent for autopsy (40%) in our study, potentially limiting definitive etiological categorization.

Vaginal delivery was the most common mode of delivery (95%), consistent with global trends and reported by Singh et al,[11] and Dave et al,[7] who emphasized that cesarean section is usually reserved for maternal indications. The high rate of spontaneous vaginal deliveries also reflects the standard management approach to IUFDs, especially in stable maternal conditions.

Maternal complications in our study were relatively low but clinically significant. Sepsis (10%), DIC (5%), and acute renal failure (5%) were observed, with one maternal death (5%). This aligns with international data from Sims and Collins, who noted increased morbidity in IUFD cases due to delay in diagnosis or delivery [14]. Our findings reaffirm the need for rapid diagnosis, timely induction, and multidisciplinary management to prevent such adverse maternal outcomes.

Autopsy findings in 8 cases (40%) provided valuable insights into pathological processes such as intrauterine infections, placental infarctions, and IUGR, echoing findings by Manocha et al., who emphasized placental pathology as a vital tool for determining the cause of fetal demise,[9] The reluctance of families to consent to fetal autopsy (60%) remains a challenge, also noted by Boyd et al,[15] highlighting the need for improved counseling and culturally sensitive communication.

CONCLUSION

In this single-center retrospective study of term intrauterine fetal demise, maternal conditions constituted the predominant etiologic category, with placental and fetal factors also contributing, and clinically important maternal complications were observed despite a predominantly vaginal mode of delivery. Autopsy and placental examination, where consented, added diagnostic clarity and corroborated clinical impressions, underscoring their value in perinatal death audits. These findings highlight the need for heightened late-gestation surveillance, standardized induction and monitoring protocols for suspected compromise, timely referral pathways, and structured bereavement-informed counseling to support families and improve future pregnancy planning. The study is limited by its retrospective design, single-center setting, modest sample, and incomplete autopsy uptake, which may constrain generalizability and causal attribution. Future prospective, multicenter studies with uniform classification systems and comprehensive post-mortem evaluation are warranted to refine preventable pathways and inform targeted interventions aimed at reducing term IUFD and improving maternal care quality.

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