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International Journal of Pregnancy & Child Birth

Research Article

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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 24weeksof 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 <20years and >30years (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

Volume 2 Issue 2 - 2017

Jayashree V Kanavi, Shobha G, Kavita G
Department of OBG, St John's Medical College and Hospital, India

Correspondence: Jayashree V Kanavi, Department of OBG, St John's Medical College and Hospital, Bangalore, India, Tel 9845544669, Email jvkanavi@gmail.com

Received: February 05, 2017 | **Published:** March 27, 2017

Abbreviations: IUFD, intrauterine foetal demise; SADS, sudden antenatal death syndrome; SLE, systemic lupus erythematosus; IUGR, intrauterine growth retardation; APLA, antiphospholipid Antibody Syndrome; GDM, Gestational Diabetes Mellitus; CVT,Cortical Venous Thrombosis; AFLP, acute fatty liver of pregnancy; TTTS, twin to twin transfusion syndrome; ATT, anti-tuberculosis therapy; PPROM, preterm premature rupture of membrane; DCDA, di chorionic di amniotic

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.[1]

Definition

Intra uterine foetal death (IUFD) is defined as foetal death after 20weeks of gestation.[2] 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 24weeks.[2]

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 Collis in 2000.[3]

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.[4] 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.[5] 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.[6] 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 24weeks 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 79cases 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 20years (3.8%) and 11 in more than 30years (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 34were primigravida (43%) and 45 were multigravida (57%). 93.7% of them had non-consanguineous marriage

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
	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	Boy	41	51.9
	Girl	39	48.75
Signs of Maceration	Absent	40	50.6
	Present	39	49.4
Mode of Delivery	Vaginal	75	94.9
	Caesarean delivery	4	5.1

When gestational age was observed, 19 of the IUFDs were less than 28weeks(24.1%) of gestation. 34were between 28-34weeks(43.0 %), 16 were between 34-37weeks(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 girl babies. 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 (Table1).

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 28weeks, 52.8/1000 live births. At 28-34weeks 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 2 Maternal age

Maternal age in years	No. of live birth	No. of iud	IUD per 1000 live birth	P value
<20	150	3	20	0.26
20-30	1947	65	33.4	
30-40	554	11	19.9	

P-value not statistically significant using by Fisher's exact test

Table 3 Gestational age

Gestational age in weeks	No. of live birth	No. of IUD	IUD per 1000 live birth	P value
<28	36	19	52.8	<0.001
28-34	233	34	14.6	
34-37	336	16	4.7	
>37	2036	10	0.5	

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

Table 4 Comparison between Parity

		Live birth	IUD	Total live	p-value	OR	95% CI
Parity	Primi	1425 (98%)	34 (2%)	1459	0.036*	1.6	1.02 to 2.54
	Multi	1167 (96%)	45(4%)	1212			
	Total	2592 (97%)	79(3%)	2671			

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

Citation: Kanavi JV, Shobha G, Kavita G. Incidence and risk factors for intrauterine foetal demise: a retrospective study in a tertiary care centre in India. *Int J Pregn & Chi Birth.* 2017;2(2):33–36. DOI: 10.15406/ipcb.2017.02.00013

Diagram shows possible associated risk factors involved in IUFD. Many of the risk factors were overlapping where causes of IUFD could not be assigned to one particular risk factor. There were 38(48.1%) cases with severe pre-eclampsia along with abruption, HELLP syndrome, ante partum eclampsia and severe Intrauterine growth retardation (IUGR). 16 of them(20.4%) were anaemic, out of them 5(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 H1N1 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).

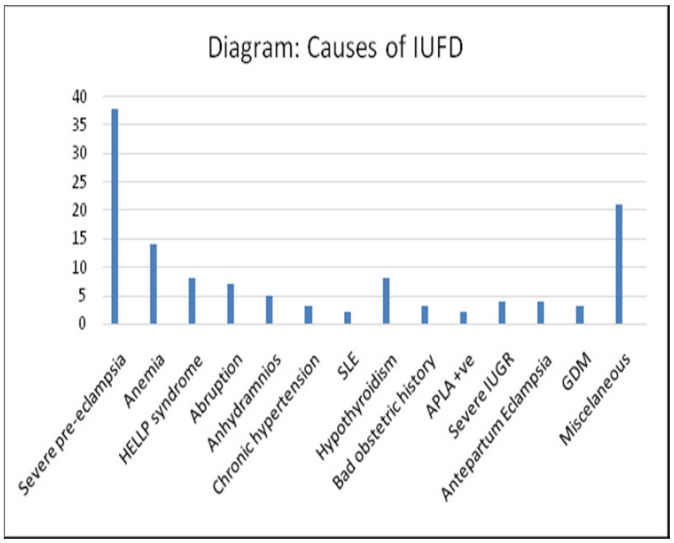

Figure 1 Causes of IUFD.

Discussion

The incidence of IUFD reported from western countries ranges from 4.7% to 12.0%[7] and incidence of IUFD in India, reported from various centres ranges between 24.4-41.9%.[8,9] However, the incidence rate of IUFD in our study is 39/1000 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.[10] 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.[11]

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 abruption 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 needing blood transfusion. Mild anaemia was seen in 2.5% and moderate anaemia was seen in 11.4% of cases. SLE (2.5%), APLA positive (2.5%), anhydramnios (6.3%) were the other risk factors for IUFD noted in our study. IUFD because of GDM was 3.8% in our study, which was lower when compared with the study from Iran.[5] Other Indian studies showed 1.25% IUFD were because of GDM.[1]

10.1% of the cases had associated hypothyroidism. No studies earlier have related hypothyroidism to IUFD. When foetal parameters were studied, 51.2% of babies were male and 48.8% were females which was almost similar to Singh et al study.[7]

Out of the 80 babies, 40 had signs of maceration, which was comparatively higher.[7] None of the foetus had any anomalies. 21.25% of babies had cord around the neck. Two babies had true knot on the cord. When obstetric history was analysed 34.17% of the cases had history of previous abortion. Out of them 22.5% had one abortion, 8.8% had two abortions, 2.5% had three abortions previously. 10% had history of one previous IUFD and 1.3% had two previous IUFD.

In our centre the obstetric care is divided into high risk and low risk prenatal care. In low risk group, all the pregnant women will be called once in 4weeks till 28weeks, once in 2weeks between 28weeks to 37weeks. Every visit weight gain and blood pressure is recorded, will be also provided with calcium, folic acid and oral iron supplements. Every pregnant woman will be screened for GDM between 24 to 28weeks. Screening for anaemia is done at first visit, 32weeks, and 36weeks. Regular nuchal translucency scan at 13weeks and anomaly scan is done between 20-22weeks of gestation. After 37weeks they are followed every week with ultrasound evaluation of amniotic fluid evaluation and Non-stress test. Beyond 40 weeks of gestation, if there are no signs of onset of labour, they will be admitted and induction of labour will be initiated.

In high risk pregnancies, more frequent visits are advised with an intense monitoring of growth of the foetus with ultrasound and Doppler. Multi department approach is offered to pregnant women with other associated systemic diseases.

Most of the causes of IUFD in our study were preventable. When a pregnant lady is detected to have pre-eclampsia, which is the most common cause in our study, she should be treated aggressively with adequate control of blood pressure and close monitoring of other parameters like foetal growth, liver, and renal function tests along with coagulation profile. This makes it more pertinent to smaller centres in India to identify pre-eclampsia in its early stages and keep the threshold lower to refer to an appropriate centre. Timely decision for delivery should be taken to avoid the associated complications in general and specifically IUFD.

Nearly one-fifth (20.4%) of our study group had anaemia, indicating that proper precautions should be taken to prevent and also treat anaemia early in the pregnancy. This will avoid complications associated with anaemia especially pre-eclampsia, morbidity and mortality associated with anaemia and pregnancy.

To summarise the results which can have implications on preventing IUFD in India, in rural and peripheral centres where antenatal care

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, preeclampsia, 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

None.

Conflict of interest

Author declares that there is no conflict of interest.

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