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EPIDEMIOLOGICAL AND ETIOLOGICAL PROFILE OF IUFD: A PROSPECTIVE STUDY AT TERTIARY CARE CENTRE

Gynaecology

Dr. Deepali Jain* Senior Resident, GMC Shivpuri (M.P.) India. *Corresponding Author

Dr. Uma Jain Designated Professor, GMC associated With DHS Shivpuri (M.P.) India.

Dr. Japhia David PG Third year, Department of Obstetrics and Gynecology, GRMC, Gwalior (M.P.) India.

ABSTRACT

Introduction:- IUFD occurrence without warning in a previously normal pregnancy is really a challenge to obstetrician and distressing situation for parents. It becomes crucial to identify specific probable cause of fetal death, to prevent the re-occurance and get the corrective measures. Prenatal mortality is still of one of the top most health indicators in measuring the quality and impact of health services in developing countries Still birth is a useful index to measure the values of antenatal and intranatal care. To decrease the fetal mortality rate, evaluation, documentation and audit of the etiology and the associated risk factors for stillbirth is required.

Material and method :- The present study aims at studying the various causes related to IUFD. Prospective observational study conducted on 112 patients at Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R. Medical College and J.A. Group of Hospitals, Gwalior (M.P.) for 18 months. All those cases who were diagnosed as intrauterine dead fetus at the time of admission with gestational age >24 weeks pregnancy were included in the study. All those investigation available at the centre of mother and father were noted and details were taken. Epidemiological evaluation of causes of fetal death was done. Record of the method of induction and mode of delivery taken.

RESULTS :-Total 112 cases found during the study period were included . We found maximum cases unbooked - 71.43%, which were mainly emergency admissions. Majority of the IUFD cases- 77.67% were found to lie in the age group of 20-30 yrs, most of them were primigravida 62.5%., maximum cases of IUFD were of the gestational age 31-35 weeks- 47.32%. Hypertensive disorder of pregnancy- 23.3 % cases were found to be the major associated cause followed by Antepartum Haemorrhage 11.5%, Severe anaemia 15.1%, diabetes- 14.2% jaundice - 9.8%. congenital anomaly- 9.8%. Oligohydromnios- 8.9% and IUGR were also found to be associated with IUFD, forming an indirect reason. 39.29% cases were unexplained. 86.6% cases delivered vaginally. 10.7% cases had to undergo LSCS and only 2.68% cases underwent laparotomy for rupture uterus. 11.61% cases were of macerated IUFD baby indicating long term neglected IUFD. 39.78% and 38.39% IUFD were of 2.0-2.5 kg and 1.5-2.0 kg. This show strong corelation with LBW and IUGR.

CONCLUSION:- Unexplained cases, hypertensive disorder, anemia and diabetes were the major causes for IUFD. In spite of advances in diagnostic and therapeutic modalities a major cause of fetal death remain unexplained because of poverty, illiteracy, unawareness and inaccessibility of a health centre. Undoubtedly, continued surveillance of stillbirth rates is wanted for both high- and low-risk pregnancies at a state and national level.

KEYWORDS

IUFD, IUGR, Hypertension disorder, Unexplained, Still Birth.

INTRODUCTION :-

"When you are pregnant, you are either talking to your baby constantly in your mind or thinking of things relating to your baby. That is why it is like falling through a trap door if they die. One moment you are in this avid dialogue, the next moment silence. I think it may be the loneliest feeling in the world." –**Zor Clark.**

IUFD occurrence without warning in a previously normal pregnancy is really a challenge to obstetrician and distressing situation for parents. It becomes crucial to identify specific probable cause of fetal death, to prevent the re-occurance and get the corrective measures.

The successful outcome of a pregnancy is a healthy baby and healthy mother. Intrauterine fetal demise is a devastating situation for expectant parents at any stage of pregnancy. IUFD is a distressing situation for both mother and obstetrician.

The loss of a fetus at any stage is a fetal demise. Fetal death definition was originally given by WHO in 1950 and revised by working group formed by AAP (American Academy of Pediatrics) and ACOG in 1988. According to WHO (Mac Dorman 2015).[1] Intra uterine fetal death (IUFD) is defined as, "Death prior to expulsion or extraction of a product of human conception from its mother, irrespective of duration of pregnancy and which is not an induced termination of pregnancy, death indicated by fact that after such separation fetus does not show any evidence of life such as beating of heart, pulsation of cord, or definite movement of voluntary muscles. Heartbeats are to be distinguished from transient cardiac contraction; respirations are to be distinguished from fleeting respiratory effort or gasps".

Prenatal mortality is still of one of the top most health indicators in measuring the quality and impact of health services in developing countries Still birth is a useful index to measure the values of antenatal and intranatal care. In 2009, the estimated global number of stillbirths was 2.64 million (uncertainty range, 2.14-3.82 million).[2]The still birth rates in India is 9 per thousand births, (9:1000 births in rural India and 8 in 1000 births urban India), according to the Indian census of 2006.[3]

According to census 2010 the estimate of still birth rate for the year 2010, at the National level is 7 per 1000.

Health care providers are responsible for providing support to parents and their families and for investigating the cause of fetal death.

Fetal loss directly reflects the obstetrician's vigilance over that pregnancy. IUFD is diagnosed & confirmed by USG most of the times.[4,5]

Although many risk factors have been identified, unfortunately the cause of death remains unexplained in about two-thirds of cases.

Risk factors for IUFD can be categorized as general and specific. General include socio-demographic factors such as level of education, occupation, standard of living, care during pregnancy, etc. Specific factors include maternal, fetal, placental & umbilical cord factors, etc.

MATERNAL RISK FACTOR's are- Obesity (>30kg/m2), maternal age, Smoking, alcohol, drug abuse, Infections (malaria, hepatitis, influenza, syphilis), Medical ds (DM,HT, Thyroid Diseases, Anaemia, Epilepsy), Autoimmune Disorders (APS, SLE), Rh incompatibility, Hyperpyrexia, Thrombophilias, Cholestasis of pregnancy, Abruption,PPROM, multifetal gestation, Labour related (preterm, dystocia, uterine rupture.

FETAL CAUSES are - Fetal chromosomal and genetic abnormalities (Down's syndrome, Turner's syndrome, Edward's syndrome, and Patau's syndrome). These are associated with 5% to 13% of late fetal losses. Congenital anomalies, Infections, Hydrops (immune & non-immune), Multiple gestation, IUGR and Postadism are other causes.[4,5,6]

PLACENTAL CAUSES are- Abruption,Cord accidents, Placental insufficiency, Placenta previa, TTTS, Chorioamnionitis, PROM, Feto-maternal hemorrhage.

Idiophetic or unexplained stillbirth can occur in 20-30% cases.

Iatrogenic cause may be there- extarnal cephalic verion drugs like quinine (large dose's) may cause IUFD. **(Table 1)**

Table 1 : Causes of 512 Still births in the still birth Collaborative Research Network Study [7]

Causes	Percnet	Examples
Obstetrical complications	29	Abruption, multifetal gestation, rupted membranes at 20-24 weeks
Placental abnormalities	24	Uteroplacental insufficiency, maternal vascular disorders
Fetal malformations	14	Major structural abnormalities and/or genetic abnormalities
Infection	13	Involving the fetus or placenta
Umbilical cord abnormalities	10	Prolapse, stricture, thrombosis
Hypertensive disorders	9	Preeclampsia, chronic hypertension
Medical complications	8	Diabetes, antiphospholipid antibody syndrome
Undetermined	24	Not applicable

Investigations used to diagnose a case of IUFD are- Ultrasound (the gold standerd to diagnosed the IUFD).

Metarnal investigaitons are- CBC, Blood Group & antibody screen, HB A1c , Kleihauer Batke test, Serological screening for Rubella CMV, Toxoplasmosis, Syphilis, Herpes & Parvovirus, Karyotyping of both parents, Hb electrophoresis, Antiplatelet antibodies , Thrombophilia screening (anti thrombin III Protein C& S deficiency, factor V leiden, Factor II mutation, Lupus Anticonagulant, anticardolipin antibodies), DIC.

Gross Examination of demised fetus, examination of Umbilical cord, placenta, Amniotic fluid should be done.

Fetal autopsy & Karyotyping are needed for diagnosis.[4,5]

After diagnosing IUFD, there is need of induction for **termination of pregnancy** as-soon-as possibile. The method and timing of delivery after a fetal death depends on the gestational age at which the death occurred, on the maternal history of a previous uterine scar and maternal preference.

Various methods used for induction are- Tablet Misoprostol, dinoprostone gel, I/C Foley's induction, oxytocin infusion. Majority of patients landed up in spontaneous labor.

Cesarean delivary for IUFD should be avoided. It should be done only when normal vaginal delivary is not possible since it adds to potential metarnal morbidity.

Most common **complication** associated with IUFD are psychological stress , sepsis due to infection, Disseminated intravascular Coagulation (DIC), Acute renal Failure, Uterine inertia and postpartum haemorrhage. [4]

AIM OF STUDY:

The present study aims at studying the various causes related to IUFD.

MATERIAL AND METHODS

Prospective observational study was conducted on 112 patients at Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R. Medical College and J.A. Group of Hospitals, Gwalior (M.P.) for 18 months.

All those cases who were diagnosed as intrauterine dead fetus at the time of admission with gestational age >24 weeks pregnancy were included in the study. All those cases who were diagnosed as intrauterine fetus death at the time of admission with gestational age <24 weeks pregnancy and all cases of intrapartum IUFD were excluded from the study.

METHOD:

Investigation of mother and father were noted and details were taken and Record of the method of induction and mode of delivery taken.

Parents characteristics (Characteristics of father and mother as well - age, social status, income, occupation, residence, educational status), gestational age at the time of diagnosis, parity, medical history, surgical history, personal habit were noted.

Investigations:-

Blood Group, CBC- Hb, TLC, Platelets counts, Blood Sugar- FBS, PPBS, RBS, Hb_{A1c}, LFT- S. Bilirubin, SGOT, SGPT, RFT- Blood Urea, S. Creatinine, Viral Markers- HIV, HbsAg, VDRL, HCV, CRP, ESR, Coagulation Profile- BT, CT, PT, aPTT, INR, Fibrinogen, Thyroid profile- TSH, Urine Routine and Microscopy, Urine Culture and Sensitivity, Vaginal Swabs, USG were done.

Method of delivery, duration of interval between diagnosis and delivery of IUFD baby, post delivery recovery, stay in the hospital, lactation suppression, all were noted.

All the data was analyzed using IBM SPSS Ver.20 software. Cross tabulation and frequency distribution was used to prepare tables. Data is expressed as numbers and percentage.

RESULTS:

Total 112 cases found during the study period were included .

Table 2 : Distribution of IUFD cases according to booking status

Booking status	Number	Percentage
Unbooked cases	80	71.43
Booked cases	32	28.57
Total	112	100

(Table 2) In our study, we found maximum cases to be unbooked - 80 cases i.e. 71.43%, which were mainly emergency admissions.

Table 3 : Distribution of IUFD cases according to age

Age	Number	Percentage
<20 years	3	2.68
20-30 years	87	77.67
31-40 years	21	18.75
>40 years	1	0.89
Total	112	100

(Table 3) Majority of the IUFD cases- 77.67% (87 cases) were found to lie in the age group of 20-30 yrs. 18.75% cases were of 31-40 yrs age, 2.68% cases were less than 20 yrs and only 1 case i.e. 0.89% was more 40 yrs of age.

Table 4 : Distribution of IUFD cases according to parity

Parity	Number	Percentage
Primigravida	70	62.50
Multigravida	42	37.50
Total	112	100

(Table 4) In our study majority of cases were primigravida 62.50%.

Table 5: Distribution of IUFD cases according to Residence

Residence	Number	Percentage
Rural	93	83.04
Urban	19	16.96
Total	**112**	**100**

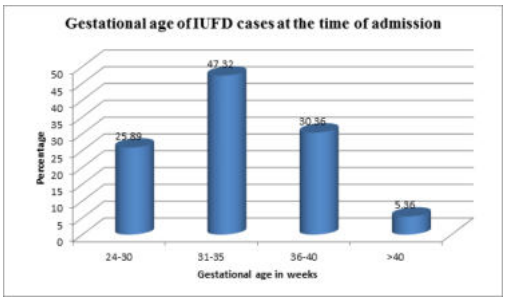
(Table 5) Our study had maximum cases belonging to rural area 83.04% i.e. 93 cases.

Table 6: Distribution of IUFD cases according to Socioeconomic status

Socioeconomic status	Number	Percentage
Upper	9	8.03
Middle	54	48.2
Lower	49	43.7
Total	112	100

(Table 6) In our study maximum number of cases belong to middles class 48.2%, followed by lower class 43.7%. Only 8.03% cases were of upper class.

Graph 1: Gestational age of IUFD cases at the time of admission



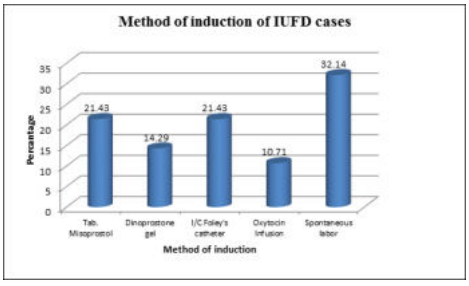
(Graph 1) We observed that in our study majority of IUFD cases were of the gestational age 31-35 weeks- 47.32% followed by 30.36% cases of term gestation i.e. 36-40 weeks. 25.89% cases were of gestational age 24-30 weeks and only 5.36% cases were postdated i.e. of gestational age more than 40 weeks.

Table 7 :Conditions associated with IUFD cases

Maternal and obstetric conditions	Number	Percentage
Hypertensive disorders of pregnancy		
Gestational hypertension	8	7.14
Pre-eclampsia	11	9.82
Eclampsia	6	5.36
Antepartum hemorrhage		
Placenta previa	5	4.46
Abruptio placenta	8	7.14
Obstetric conditions		
Obstructed labor	2	1.79
Rupture uterus	3	2.68
Maternal and medical conditions		
Diabetes	16	14.29
Postmaturity	2	1.79
Jaundice	11	9.82
Infection	1	0.89
Severe anemia	17	15.18
Hypothyroidism	4	3.57
Coagulation disorder	1	0.89
Fetal conditions and cord conditions		
Congenital malformations	**11**	**9.82**
Oligohydramnios	10	8.93
Polyhydramnios	4	3.57
IUGR	5	4.46
Rh negative pregnancy	5	4.46
Twin pregnancy with fetus papyraceus	2	1.79
True knot	1	0.89
Loops of cord around neck	2	1.79
Two vessel cord	2	1.79
Unexplained	**44**	39.29

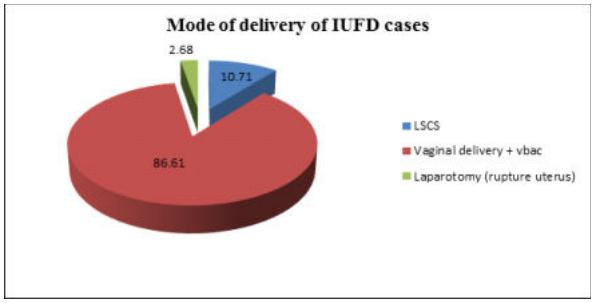
(Table 7) Some cases had multilple associated conditions. 39.29% cases were unexplained i.e. no major associated risk factor or cause, maternal, fetal, obstetric or medical could be identified. Hypertensive disorder of pregnancy- 23.3 % cases were found to be the major associated cause followed by Antepartum Haemorrhage 11.5%. Severe anaemia, diabetes and jaundice were found to be the major medical conditions associated with IUFD, 15.1%, 14.2% and 9.8% respectively. Another important reason for IUFD seen in our study is congenital anomaly- 9.8%. Oligohydromnios- 8.9% and IUGR were also found to be associated with IUFD, forming an indirect reason.

Graph 2: Method of induction of IUFD cases



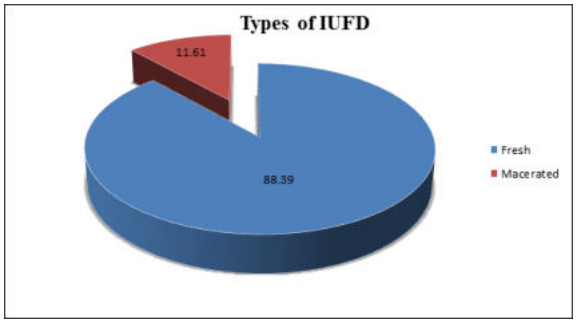
(Graph 2) Maximum cases of IUFD were induced with tab. Misoprostol or I/C foley'scatheter 21.4% each. 14.29% cases were induced with dinoprostone gel and 10.71% with oxytocin infusion. Rest were all who went into spontaneous labor i.e. 41.07%.

Graph 3: Mode of delivery of IUFD cases



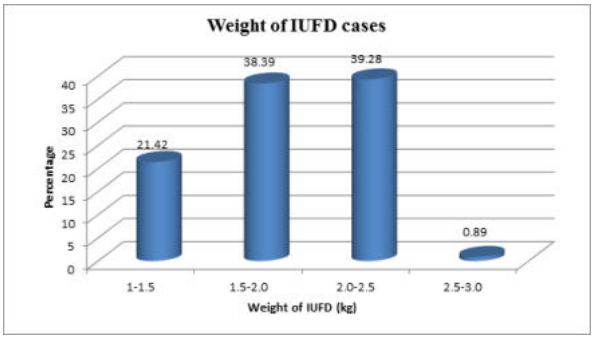
(Graph 3) In our study, 97 cases- 86.61% delivered vaginally including vertex, breech and VBAC deliveries, which should be the mainstay for IUFD cases management. 10.71% cases had to undergo LSCS and only 2.68% cases i.e. 3 cases underwent laparotomy for rupture uterus.

Graph 4: Types of IUFD cases



(Graph 4) Our study had 11.61% - 13 cases macerated IUFD baby indicating long term neglected IUFD.

Graph 5: Weight of IUFD cases



(Graph 5) In our study maximum IUFD babies were found to lie in the weight group of 2-2.5 kg 39.38% (44 Cases) followed by weight group of 1.5- 2.0 kg 38.39% (43 cases). All these cases denote that either the baby was low birth weight (LBW) or IUGR.

DISCUSSION

This study has an incidence of IUFD as 46 per 1000 live birth, which is similar to the study done by Dave A et al[8] and Patel S et al[9], the reason thought for high incidence being our centre as tertiary institute.

We recorded case of IUFD to be 165 in our study, out of which 24 were lost to follow up and couldn't gather much information about them. 19 cases of IUFD were intrapartum IUFD which we have not included in our study, the reason being cord accidents, hand prolapse, MSL and shoulder dystocia.

In our study, 80 cases (71.43%) were presented in emergency as unbooked cases. Only 32 were booked cases. This is in accordance with the study done by GargS et al[10] -88.75% unregistered cases, Dave

A et al[8]- 86.5% unbooked cases, Patel S et al[9]- 70% unbooked cases, Jamal S et al[11]- 66% unbooked cases.The main reason being poor health education, irregular antenatal visits and less vigilant attitude.

We observed maximum female of the age group 20-30 years- 87 (77.67%). Some were in the age group 31-40 years- 21 (18.75%), increased maternal age being the risk factor in itself. Only 1 (0.89%) being > 40 years and 3 (2.68%) being < 20 years, extremes of age was a rare occurrence in our study. Similar results were found in the study by Dave A et al[8]- 65.5% cases of age group 21-30 years and Patel S et al [9] and Garg S et al[10]-76.25% cases of 21-30 years.

In our study, maximum patients- 70 (62.5%) were primigravida, 42 (37.5%) were multigravida. These findings were similar to study done by Dave A et al[8]- 44.5% primi, Jamal S et al[11] -35.7% maximum primi cases, Sharma S et al[12].

In our study we found that 29 cases(25.89%) were of gestational age between 24-30 weeks. Prematurity and IUGR are found to be risk factors for IUFD in study done by Patel S et al [9]. 43 cases(38.39%) were of gestational age between 31-35 weeks. 34 cases (30.36%) of patients were of term gestational age- between 36-40 weeks and 6 cases (5.36%) were postdated (> 40 weeks). These results were found similar to Patel S et al [9], Dave A et al [8] and Garg S et al [10].

Maximum IUFD cases reported in our study were found to be associated with hypertensive disorder of pregnancy i.e. 25 cases [preelampsia, antepartum eclampsia and gestational hypertension were 8 (7.14%), 11 (9.82%) and 6 (5.36%) respectively]. 8 (7.14%) cases were found to be associated with abruption placentae and 5 (4.46%) cases with Placenta previa. Hypertensive disorders of pregnancy and antepartum hemorrhage contributing to maximum obstetric conditions associated with IUFD. Patel S. et al[9] & Garg S et al[10] also attributed the leading cause of IUFD to be APH and Hypertensive disorders as our study.

Diabetes- 16 (14.29%) cases, Anaemia-17 (15.18%) cases and jaundice 11 (9.82%) cases were the prominent medical conditions to be associated with IUFD which may not be the direct cause but definitely have strong association with these cases and needs to be considered as a risk factor always. This can be corrected by iron folic acid supplementation, insulin or anti diabetic drug and regular supervised antenatal care. Some patients were found to be associated with hypothyroidism- 4 (3.57%) cases, infection – 1 (0.89%) case and coagulation disorder – 1 (0.89%) case which should be looked for and managed in antenatal cases to avoid the recurrence.

Congenital anomalies was also a strong reason identified for IUFD in our study- 11 cases (9.82%) similar to studies by Dave A et al [8], Patel S et al[9] and Jamal S et al[11].

Other reasons found to be associated with IUFD are Oligohydromnios, Polyhydromnios, IUGR, Rh negative pregnancy, twin pregnancy, true knot and cord accidents.

(Figure 1)
Figure:1 Different causes of IUFD.

In our study 39% cases of IUFD remained of unknown etiology. No specific risk factor could be identified in these cases.

In our study we induced maximum cases with misoprostol tablets and I/C Foley's catheter i.e. 24 cases each constituting 21.43%. 16 cases i.e, 14.29% were induced with dinoprostone gel and 12 cases i.e, 10.71% were induced with oxytocin infusion. 36 cases (32.14%) i.e, majority cases presented us with spontaneous onset of labor. This made us conclude that misoprostol are and I/C Foley's are effective methods of induction for IUFD. Similar methods of induction were used in study by Dave A et al[8].

In our study 86.6% cases i.e, 97 cases delivered vaginally including vertex deliveries, breech deliveries, instrumental deliveries and VBAC deliveries which should be the mainstay of mode of delivery in IUFD cases. 12 cases delivered i.e, 10.71 % by LSCS for unavoidable indications. 3 cases i.e, 2.68% underwent laparotomy for ruptured uterus. Similar results were found in study done by Garg S et al[10].

In our study we found 13 cases i.e, 11.61% of macerated IUFD indicating long term IUFD neglected and unattended.

Vaginal swabs were sent of the patients to look for any infection but none of the reports were positive. Vaginal swabs were inconclusive. This investigation wasn't helpful in finding out any associated risk factor.

CONCLUSION

In our study we concluded that, not all IUFDs were preventable and many were not found to have any reason or cause associated. In spite of advances in diagnostic and therapeutic modalities, a major cause of fetal death remain unexplained because of poverty, illiteracy, unawareness and inaccessibility of a health centre.

Main focus of the study was to find out the various risk factors and causes of IUFD so that the preventable reasons can be paid attention and recurrence can be reduced.

Use of folic acid and preconception counselling can be helpful in preventing some of the congenital anomalies and congenital malformation can be detected early by timely USG and other investigations (Karyotyping, Double Marker, Triple Marker and Quadraple test, etc).

Therefore early booking, identification of risk factors and high risk cases, timely intervention and referral and proper health education are helpful in reducing IUFD.

Psychological trauma is immense. That's why after diagnosing, timely induction for termination of pregnancy is necessary.

Fetal death is an under-recognized and under-researched public health problem. Health care providers are responsible for providing support to parents and their families and for investigating the cause of fetal death. Close antenatal case surveillance and hospital deliveries should be promoted.

Undoubtedly, continued surveillance of stillbirth rates is wanted for both high- and low-risk pregnancies at a state and national level.

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