

Pathological Changes of Placenta in Intrauterine Fetal Death

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ABSTRACT

Background: Examination of placenta is one of the most common investigations undertaken after a stillbirth and is one of the most valuable. Examination of placenta can yield information that may be important in the immediate and later management of the mother and infant. The present study aims to evaluate the pathological changes in placenta in intrauterine fetal deaths.

Subjects and Method: It is a cross sectional comparative study conducted in Jorhat Medical College and Hospital, Jorhat for a period of one year from July 2020 to June 2021. Total 144 placenta were collected that comprised of 72 cases of intra uterine fetal death and 72 controls were taken. The cases and controls were selected by systematic random sampling. Statistical correlation was carried out by using Student T test with SPSS software or statistical significance p value of less than 0.05 was considered.

Results: Placental weight, diameter and umbilical cord length and diameter were found to be significantly decreased in fetal deaths ($p < 0.05$). Intervillous fibrinoid, peri villous fibrinoid, calcification, syncytial knots, infarction were found to be significantly associated with intrauterine fetal deaths in this study ($p < 0.05$).

Conclusion: The present study shows that significant information can be gathered by placental examination in adverse fetal outcome and can be used to know the cause of death and further management and prevention in future.

Keywords: intrauterine death, syncytial knots, calcification, intervillous fibrin, peri villous fibrin

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BACKGROUND

Placenta is the only life maintaining supportive organ for the developing fetus so any pathology affecting the placenta has got the potential to adversely affect the fetus and fetal outcome and subsequent life outside mother. Intrauterine fetal death or still birth is a severe and difficult and sometimes devastating events for the parents and the society. Globally 3 million babies suffer

from intrauterine fetal death with vast majority in developing countries (Stanton et al., 2006).

Placental pathology is an underutilized, undertaught and inadequately handled surgical subspecialty but now the requests for placental pathology are soaring due to demands from obstetricians and to the litigious environment in which they practice and to improved obstetrical care leading to

pregnancies in medically challenging situations. Information from placental pathology can be critical in early neonatal care and in reproductive planning for the family and it can provide risk assessment for neurologic outcome of the infant. A comfortable interaction among the obstetric staff, mothers and pathologists often obviates the need for legal intervention in unexpected pregnancy outcome (Arch Patho Lab Med, 2008).

Examination of placenta is one of the most common investigations undertaken after a stillbirth and is one of the most valuable (Heazell et al., 2011). Many stillbirth cases are not investigated for many reasons including lack of consent for fetal autopsy. Placental examination is a non-invasive means, by which much information can be gained about adverse pregnancy outcomes including stillbirth. Complete gross and histologic examination of the placenta can both point out and exclude multiple potential causes for stillbirth, understanding of causes and recognition of risk factors is essential for preventive measures, counselling of parents, surveillance of health care and comparison both nationally and internationally.

Examination of placenta can yield information that maybe important in the immediate and later management of the mother and infant. Universal examination of the placenta in the delivery room with documentation of findings and submission of tissue for pathologic evaluation based on abnormal appearance or certain clinical indications is a standard medical practice. The present study is an attempt to evaluate various lesions of placenta in IUD cases.

SUBJECTS AND METHOD

1. Study Design

It is a cross sectional comparative study conducted in Jorhat Medical College and Hospital, Jorhat for a period of one year

from July 2020 to June 2021.

2. Population and Sample

Total 144 placenta were collected that comprised of 72 cases of intra uterine fetal death and 72 controls were taken. The cases and controls were selected by systematic random sampling.

3. Study Variables

The dependent variables were maternal age and parity. The independent variable was fetal death.

4. Operational Definition of Variables
IUD-Fetal death before onset of labor or fetus with no signs of life in utero after 20 weeks of gestation.

Maternal age women in reproductive age group 15-45 years.

5. Study Instruments

Surgical scalpel, rotary microtome, L block, hot air oven, water bath, stains, slides, cover slip etc.

6. Data analysis

All the data was calculated using student T test. For statistical significance p value of less than 0.05 was considered.

7. Research Ethics

Ethical clearance was obtained from the Institutional Ethics Committee(H) of Jorhat Medical College and Hospital prior to the commencement of the study.

RESULTS

1. Sample Characteristics

In this study, a total of 144 pregnant mothers at term (72 cases and 72 controls) were studied for a period of one year (from July 2020 to June 2021) in the department of Pathology, Jorhat Medical College and Hospital, Jorhat. The results and observations were as follows:

Table 1 show that the mean age of cases was 26.22 and SD=4.79 years and of controls was 22.61 and SD=3.28 years. The difference was statistically highly significant ($p < 0.001$). The mean gestational age of

cases was 36.00 and SD= 4.48 weeks and of controls was 39.50 and SD= 0.56 weeks. The difference was highly significant ($p < 0.001$). The mean birth weight of babies of cases was 2060.80 and SD= 622.74 g and of controls 2717.38 and SD= 463.22 g. The difference was highly significant ($p < 0.001$).

Table 2 show that, out of 72 cases of intra uterine fetal deaths, maximum numbers of mothers are of age group of 21-30 years (74%) while both age groups of 11-20 years and 31-40 years have 14% and 12% occurrence respectively while in controls, 47 cases were in age group 21-30 years (65%),

24 cases of 11-20 years (33%) and only 1 case of 31-40 years (2%).

Table 3 show that, the mean placental weight, mean placental diameter, umbilical cord length and umbilical cord diameter between cases and controls is statistically significant while mean placental thickness and mean number of cotyledons between cases and controls is statistically not significant.

Table 4 shows that intervillous fibrinoid, perivillous fibrinoid, calcification, syncytial knot, infarction was more in cases than in controls i.e. statistically significant.

Table 1. Mean, Standard Deviation and significance of maternal age, gestational age and birth weight of babies among cases and control group

Variables	Case	Number	Mean	SD	p
Maternal Age (years)	Case	72	26.22	4.79	<0.001
	Control	72	22.61	3.28	
Gestational Age (weeks)	Case	72	36.00	4.47	<0.001
	Control	72	39.50	0.55	
Birth weight of baby(gram)	Case	72	2060.80	622.73	<0.001
	Control	72	2717.37	463.22	

Table 2. Maternal age distribution

Age group	Case group		Control group	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
11-20	9	12.5	24	33.33
21-30	53	73.61	47	65.28
31-40	10	13.89	01	1.39
41-50	00	00	00	00
Total	72	100	72	100

Table 3. Different macroscopic findings in placentae

Variables	Study group	Number	Mean	SD	p
Placental weight (g)	Case	72	463.82	24.28	<0.001
	Control	72	476.80	12.73	
Placental diameter (cm)	Case	72	20.25	1.46	<0.001
	Control	72	21.43	1.28	
Placental thickness (cm)	Case	72	2.38	0.14	0.204
	Control	72	2.46	0.13	
Number of cotyledons	Case	72	21.79	1.90	0.377
	Control	72	22.17	3.04	
Umbilical Cord Length (cm)	Case	72	42.70	4.28	0.004
	Control	72	45.18	3.86	
Umbilical cord diameter (cm)	Case	72	1.20	0.16	0.022
	Control	72	1.28	0.12	

Table 4. Distribution of intervillous fibrinoid

Intervillous fibrinoid	Cases (%)	Controls (%)
Intervillous fibrinoid		
Normal	75	72
Mildly increased	23.61	0
Markedly increased	1.39	0
Perivillus fibrinoid		
Normal	76.39	72
Mildly increased	18.06	0
Markedly increased	5.56	0
Syncytial knots		
Up to 5/villous	70.83	100
5-10/villous	19.44	0
>10/villous	9.72	0
Calcification		
No/focal	80.56	100
Marked increased	19.44	0
Infarction		
Absent	87.5	100
Present	12.5	0
Total	100	100

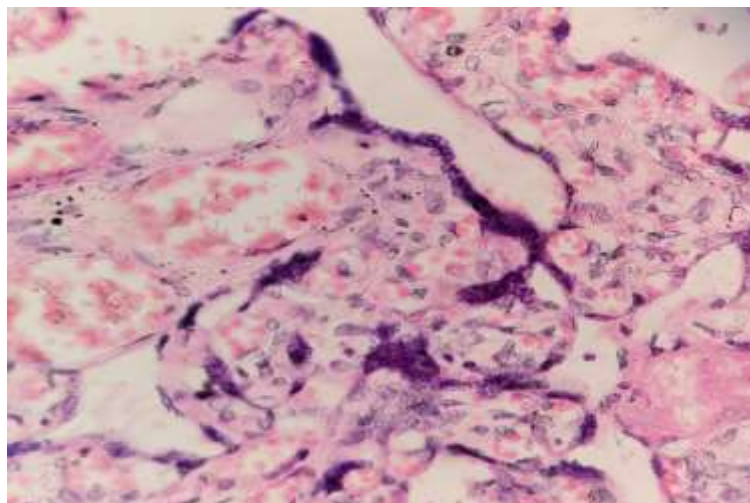


Figure 1. Syncytial knot count in high power field

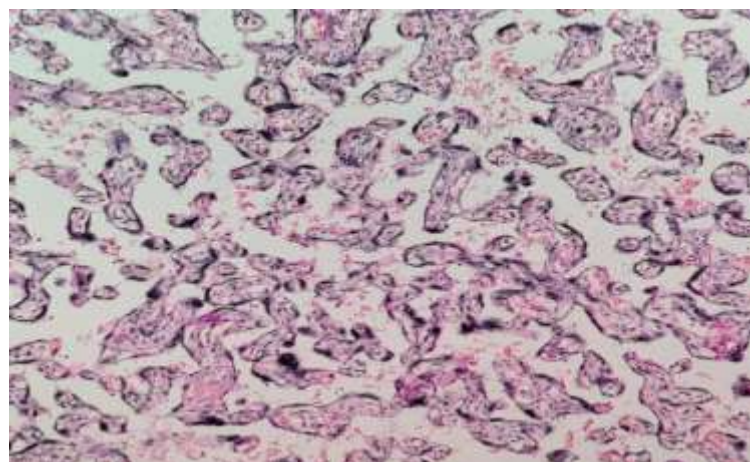


Figure 2. Calcification in low power field

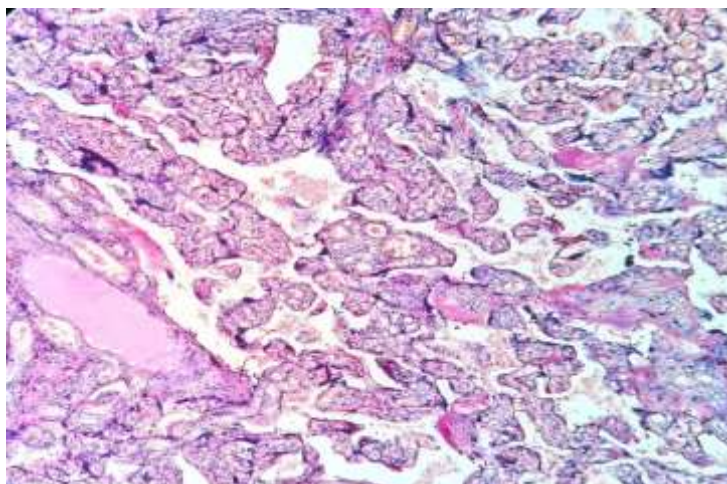


Figure 3. Perivillous fibrin deposit

DISCUSSION

A total of 72 placentae from intrauterine fetal death cases and another 72 placentae from live birth through normal vaginal delivery were studied in the department of pathology in collaboration with department of obstetrics and gynecology of Jorhat medical college and hospital during the period from July 2020 to June 2021.

The mean age of mothers in this study was 24.42 years. Mothers in the case group were slightly older than the control group. The difference was highly significant in the mean age between case and control population. Tanmarkar and Chawla (2012) noted that mothers of stillbirth group were slightly higher in age. Huang DY et al. (2000) found advanced maternal age to be independently associated with fetal death. Froen et al. (2002) commented that high maternal age is associated with sudden intrauterine unexplained death (SIUD) however Shaaban et al. (2006) could not find any such association. Chibber (2004) found maternal age 18 years or less also to be a risk factor.

It is observed from multiple studies that placentae of hypertensive mothers and antepartum hemorrhage shows features of growth lagging behind than normal. These placentae are frequently less in weight and

other dimensions leading to placental insufficiency. Miwa et al. (2014) concluded that thick placenta maybe a useful predictor for adverse pregnancy outcomes.

Schmid et al. (2013) found association of intrauterine growth restriction with excessively long umbilical cord. Georgiadis et al. (2014) found that Gestational diabetes and previous miscarriages were associated with longer cords while female gender and placental abruption were associated with shorter cords.

A study by Hegadottir et al. (2009) found two thirds of all still births were associated with placental pathology. According to Szymanowski et al. (2007) increased calcification is seen not only in maternal smoking and other hypoxic conditions but also in mothers not taking vitamin supplements.

AUTHOR CONTRIBUTION

Sanchita Paul and Abhijit Kalita collaborated to conceptualization, data collection and analysis, typing and editing

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CONFLICT OF INTEREST

None.

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