



HISTOLOGICAL CHANGES IN PLACENTA OF DIABETIC MOTHER

Anatomy

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ABSTRACT

Human placenta is a structure where maternal and foetal tissues come in direct contact for transfer of nutrients and oxygen from mother to foetus and excretion of waste products from foetus to mother. Gestational Diabetes Mellitus is the onset of abnormal glucose tolerance test in pregnancy. Diabetes in pregnancy is associated with adverse foetal outcome. Diabetes in pregnancy causes morphological and histological placental villous changes. Abnormal placenta affect the foetal outcome. Histological comparison between abnormal placenta from diabetic pregnant women with normal placenta has immense importance in medical field as it provides valuable information regarding adverse foetal outcome. Aims and Objectives: To study the histological variations in human placenta of diabetic pregnant women and to compare the findings with normal placenta. Materials and Methods: After taking institutional ethical clearance, this study was done over a period of 1 year in KPCMCH. Microscopic features of 30 placentae of diabetic pregnant women were compared with 30 placentae of normal pregnant mothers. Results: In our study we found 9 cases of fibrin deposition, 7 cases of syncytial knots, 4 cases of infarction, 8 cases of villous obstruction and 2 cases of villous stromal fibrosis in the placenta of diabetic mothers. Conclusion: The present study is undertaken to provide a comprehensive understanding of variant histology of human placenta in diabetic pregnancies that could assist the clinicians and surgeons in planning and performing surgical intervention.

KEYWORDS

Placenta, Diabetes, Histology, Pregnancy.

INTRODUCTION

Diabetes mellitus is a condition in which the body cannot use the sugars and starches. The body either makes no insulin or very little insulin or cannot use the insulin due to lack of presence of receptors. Consequences will be same in this two conditions where blood sugar level will be higher than normal. Apart from the type 1 and type 2 diabetes another type of diabetes is very well known now a days which is gestational diabetes. This type of diabetes that is seen in a pregnant woman who was not diabetic previously. After pregnancy they acquired diabetes and most of the time it goes away after baby born but the risk of future type 2 diabetes is increased.

In India prevalence rate of gestational diabetes is estimated to be 10 to 14.3 % which is much higher than in the western countries. (park) The placenta is a membranous vascular organ of female mammals except monotremes and marsupials. It develops in pregnancy from the chorion of the embryo and decidua basalis of the maternal uterus and connects the foetus with the maternal uterine wall(Sadler 2010).

The placenta usually remains attached to the upper part of the posterior wall of the uterus. It has a rough , shaggy looking maternal surface, which is mapped out into 15 to 20 cotyledons separated by intervillous septae and a smooth, shiny foetal surface covered by chorion and amnion. The site of insertion of umbilical cord either centrally, marginally or eccentrically (Cunningham, 2010).

In diabetes, the placenta undergoes a variety of structural and functional changes. Their nature and extent depend on a range of variables and the quality of glycemic control achieved during the critical period in placental development.

How diabetes can cause a detrimental effect over the foetus truly reflected on structural changes of placenta. So The present study with an aim to increase the knowledge about histological changes of placenta in diabetic mothers in west Bengal population has an immense importance.

Aims And Objectives:

1. To study the histological variations in human placenta of diabetic pregnant women.
2. To compare the findings with normal placenta.

MATERIALS AND METHODS:

After taking approval from institutional ethical committee, the study was conducted in the KPC Medical College and Hospital over 1 year period (1st November, 2021- 31st October, 2022) of time. Detailed history was taken from the pregnant women admitted in department of Gynaecology and Obstetrics of KPCMCH for delivery.

After child birth, specimens from human placenta were collected immediately in formalin containing jar. Specimen was brought to the Anatomy department and tissue sections were prepared for microscopic examination through a multistep process. Haematoxylin and Eosin stains were done in the department of Anatomy. Findings of microscopic examination were tabulated.

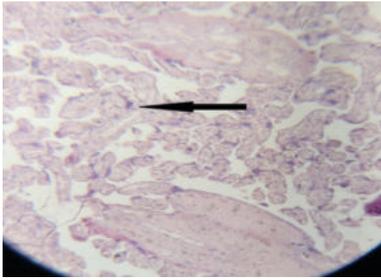
RESULTS:

For the discussion of syncytial knots found in histological study of placentae, we divided the findings into three Gradings which will make the results more clear to us. Grade I was described as (+) that means <5 syncytial knots/villi. The Grade II was (++) indicated 5-10 knots/villi where as Grade III was (+++), >10 knots/villi. We found in normal placentae all cases showing syncytial knots are Grade I type where in the diabetic placentae 90% are Grade II type, 10% are Grade III type.

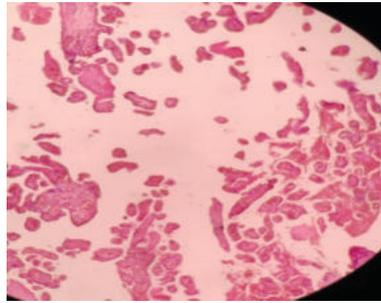
In our study, the villous stromal fibrosis was observed in both types of placentae and we found normal pattern in all normal placentae but in diabetic cases only 40% were normal pattern and rest 60% showed increased fibrosis.

Fibrin deposition findings are graded into Grade I (normal), Grade II (mild) and Grade III (moderate to severe). We noticed in our histology slides there were Grade I fibrin deposition in 94% of normal placentae and 6% were Grade II. In diabetic cases 76% were Grade II and 24% were Grade III.

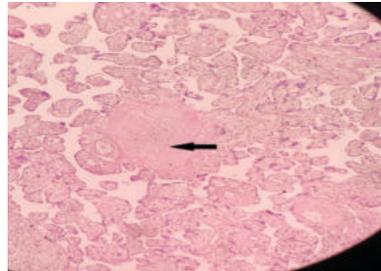
We did not find any increased calcium deposition in normal as well as diabetic placentae.



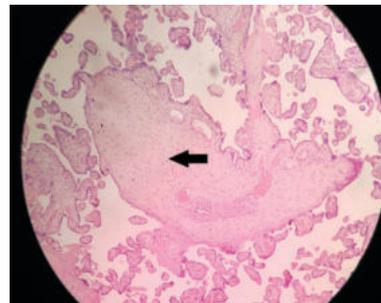
Syncytial Knots



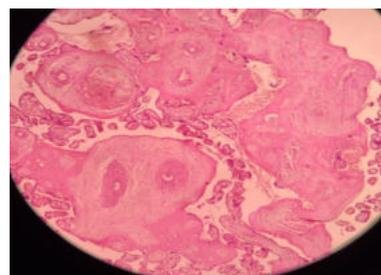
Villous Obstruction



Infarction



Villous Stromal Fibrosis



Fibrin Deposition

DISCUSSION:

Okail et al found in his study that histological features of placenta from gestational diabetic women and overt diabetic women were different from normal pregnant women.¹ Marked villous oedema of chorionic frondosum and marked fibrin thrombi in syncytiotrophoblast were found. Tewari et al did a similar study and found increased syncytial knots, fibrinoid necrosis, villous oedema and fibrin deposition on histological examination. Gheorman et al included 19 placentae of

diabetic pregnant women in his histological study and found abnormal villous development.³ In the study of El Sawy et al, placentae of GDM group showed significant increased number of villi with larger blood vessels in the center.⁴ Saha S et al found following histological features in his study- hyalinisation of villi appeared as an acellular, avascular, homogenous area within villi.⁵

Fibrinoid necrosis was detected more frequently in diabetic mother by Estabraq et al⁶. In our study we also found similar finding. Memon S et al found in their study similar histological findings like fibrinoid necrosis, thrombosis and infarction in placentae of diabetic mothers.⁷

CONCLUSION:

The present study is undertaken to provide a comprehensive understanding of variant histology of human placenta in diabetic pregnancies that could assist the clinicians and surgeons in planning and performing surgical intervention. It also helps anatomists in gaining a meticulous knowledge on histology of human placenta.

REFERENCES:

1. AL-OKAIL MS, AL-ATTAS OS. Histological changes in placental syncytiotrophoblasts of poorly controlled gestational diabetic patients. *Endocrine journal*. 1994;41(4):355-60.
2. Tewari V, Tewari A, Bhardwaj N. Histological and histochemical changes in placenta of diabetic pregnant females and its comparison with normal placenta. *Asian Pacific Journal of Tropical Disease*. 2011 Mar 1;1(1):1-4.
3. Gheorman L, Pleșea IE, Gheorman V. Histopathological considerations of placenta in pregnancy with diabetes. *Rom J Morphol Embryol*. 2012 Jan 1;53(2):329-36.
4. El Sawy NA, Iqbal MS, Alkushi AG, EL SAWY NA, IQBAL M, ALKUSHI A. Histomorphological study of placenta in gestational diabetes mellitus. *Int. J. Morphol*. 2018 Jun 1;36(2):687-92.
5. Saha S, Biswas S, Mitra D, Adhikari A, Saha C. Histologic and morphometric study of human placenta in gestational diabetes mellitus. *Histologic and morphometric study of human placenta in gestational diabetes mellitus*. 2014:1-9.
6. Mahmoud EA, Al-Bakri NA, Qasim BJ. Histopathological changes of placenta in pregnant women complicated with pregestational diabetes. *Journal of Pharmaceutical Sciences and Research*. 2018 Nov 1;10(11):2952-9.
7. Memon S, Goswami P, Lata H. Gross and histological alteration in the placenta of mothers suffering from gestational diabetes. *J Liaquat Uni Med Health Sci*. 2015;14(01):16-20.