*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 6 Ser.2 (June. 2020), PP 27-30*
*www.iosrjournals.org*

# Histological Features of Placenta in Early and Full Term of Pregnancy

[1.] Dr.Ch.Sudhakarbabu, [2.]Dr.M.indira
[1]*MD Associate professor of ANATOMY*
[2]*Designated Professor of Biochemistry*
*Guntur Medical College Guntur Andhra Pradesh*

***Abstract:*** *The human placenta plays a key role in metabolic secretary and excretory functions to support the growing foetus . The purpose of this study is to examine the features of the cells and vasculogenesis of chorionic villus in the early weeks of normal gestation and to collect the basic data for comparison with placentas of mothers of full term pregnancy . Before implantation nutrition of the mammalian conceptus is essentially histiotrophic. After implantation maternal blood flows through the developing placenta and establishes hemotrophic pathways for nutrients from mother to the foetus. For the present study placental tissues were collected from twenty five mothers under going legal termination of pregnancy between 8-16 weeks of gestation, from Gynae & Obstetric section of Narayana Medicl college Nellore and S.V Medical college Tirupathi The samples were fixed in 10% formol saline followed by routine tissue processing and embedding . 6 micron thick paraffin sections were cut and stained with Haematoxyline and Eosin , Aniline Blue, Massons Trichrome, PAS , MSB and Reticulin method and examined under light microscope . The margin of chorionic villi showed two cell types . Syncytiotrophoblasts (ST ) forming the outer layer were darkly stained . The free surface of syncytium showed surface projections like microvilli. Cytotrophoblasts (CT) were seen as inner pale discrete cells , resting upon a basal lamina. Sprouts ( syncytial buds ) containing cytotrophoblast cells were seen to form new villi. Core of the villi showed large mesenchymal cells with cytoplasmic processes . Capillaries were scarce at 6-8 weeks of gestation but with advancing age of foetus more number of capillaries were seen at 16 weeks of gestation and nucleated RBC were seen . Multinucleated giant cells were noted in the decidual part .*

***Key Words:*** *Early placenta , Syncytiotrophoblast ,Cytotrophoblast, Langhans cell hyperplasia(X cells)*

---

Date of Submission: 20-05-2020 Date of Acceptance: 06-06-2020

---

## I. Introduction:

Placenta plays a key role in metabolic, secretary and excretory functions to support the growing foetus . Information available regarding details of the histological characteristics of early human placenta is scanty . This study is an attempt to visualize the histological changes occurring in the chorionic villi of early placenta . Description regarding the trophoblasts, X-cells ( Khudr, et al 1971), Hofbauer cells ( Enders,et al 1970) are available. Lister , Ursula (1964) observed in her work with early placenta presence of syncytiotrophoblast , cytotrophoblast in the villus and absence of basement membrane of the capillaries. Microvilli on the syncytium were noted by her. Demir , et al (1989) reported that the cells differentiating at day 21 post conception were macrophage like cells and simultaneously mesenchymal cells were transformed into haemangioblastic cell cords which were the forerunners of capilliary endothelium and haematopoietic stem cells . A third population of cells from mesenchymal cells were presumptive pericytes . Burton , et al (2003) highlighted that apoptosis and primary necrosis were shown by villous cytotrophoblast as early as 6-15 weeks of gestation. He opined that the stimulus for both forms of cell death were unknown but probably associated with syncytiotrophoblastic stress .

## II. Materials and Methods

Twenty five placentae of 8-16 weeks of gestation undergoing legal termination of pregnancy were obtained from Gynae O.T. of narayana Medical College Nellore and S.V Medical college Tirupathi. Since only a few mm of placental tissue were obtained the complete placental tissues were processed for histology . 6 micron thick paraffin sections, stained with H/E , Aniline Blue, Massons trichrome, PAS , MSB, and Reticulin ( Gordon and Sweets Reticulin method ) were studied under light microscope.

## III. Observation

The trophoblastic membrane which covers the chorionic villi in early placenta consisted of two layers. A continuous syncytial (ST) layer with numerous small dark nuclei and no intercellular boundaries were present . Microvilli like projections were seen on the free surface of syncytium. On the contrary such microvilli were absent in the full term placentae. A discontinous inner cellular layer also called Langhans layer or cytotrophoblast (CT) consisted of comparatively large pale cells .These cells were scarce after twenty weeks of pregnancy. Mesenchymal core of the villi contained foetal capillaries. Basement membrane of the villous capillaries were absent in young placenta. In immature placenta the cytotrophoblasts were much more conspicuous and unduly prominent and proliferate in plaques of fibrin. They were enmeshed in fibrin . The extravillous cytotrophoblasts were referred to as 'X' cells or intermediate trophoblast non villous trophoblast, interstitial trophoblast, intravascular or intra-arterial trophoblast, . tropocytes or spongiotrophoblast were found to have single nucleus,

Hypoxia was an important cause for proliferation of cytotrophoblasts which are referred to as "X' cells and were first described by Scipiades and Burg (Khudr, G. 1971). It was found in the early weeks of placenta as early as 8 weeks in our study.

Hofbauer cells, are derived from mesenchymal elements which was first described by Hofbauer in 1905 and generally bear that eponym. They appeared as early as $4^{th}$ week of pregnancy (Wynn, Ralph. 1967). The vacuoles of the Hofbauer cells play a role in the reduction of foetal serum proteins in stroma of the villus. This view is in agreement with the fact that placenta lacks the lymphatic system to return proteins from the interstitial space to the blood vascular system (Enders, et al. 1970)

The foetal erythropoietic system released, immature R.B.C. into the peripheral blood and nucleated RBC were commonly noted in early placenta which was a response to hypoxia. It gradually decreased after 9 weeks of gestation.

Fibrin and fibrinoid material which are the non-cellular components were found as early as $2^{nd}$ week of gestation in human placenta. Fibrin was thought to be derived from fibrinogen. According to some fibrinoid is old fibrin and according to some fibrinoid was due to degeneration of trophoblastic cytoplasm. Fibrinoid was probably barrier to transplantation antigen (Wynn Ralph 1969), Fibrinoid material are of 2 types (1) Fibrin type fibrinoid where we do not find X-cells. eg. in Rohr's stria (2) Matrix type fibrinoid. They have extravillous trophoblast (X- cells) found in cell islands, cell septa and basal plate and in intervillous region.

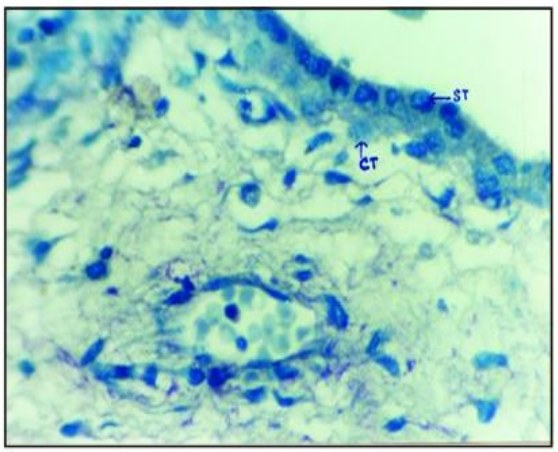


**Fig. 1:** A part of chorionic villous of early placenta showing Syncytiotrophoblast (ST), Cytotrophoblast (CT) and a capillary in the villous core.
Aniline Blue Stain x 400

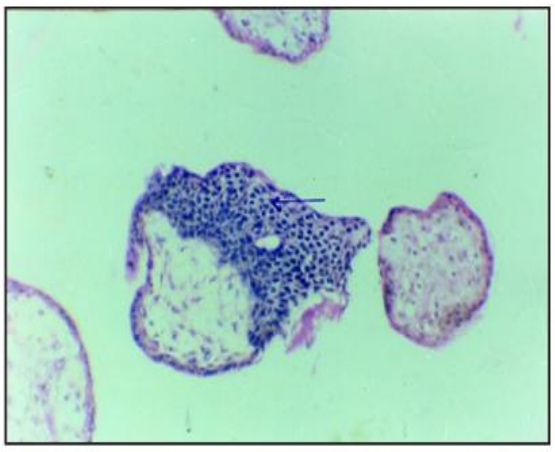

**Fig. 2:** Chorionic villous of early placenta (8 weeks) showing a syncytial bud (arrowed) with a capillary core.
H& E stain x100

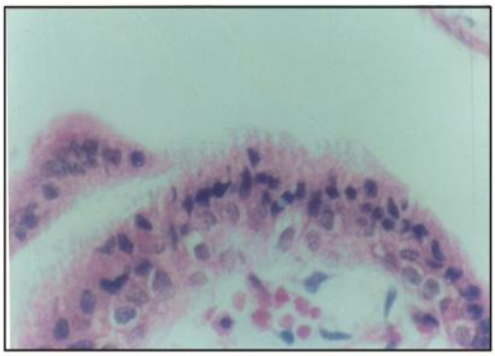

**Fig.3:** Margin of chorionic villous of early placenta with brush border.
H& E stain x400

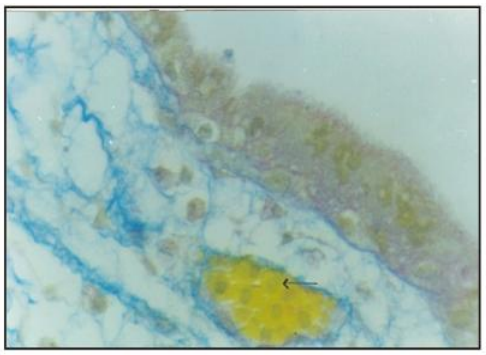

**Fig. 4:** Part of chorionic villous showing RBC in capillaries ( coloured yellow ) arrowed with brush border.
M.S.B x 400

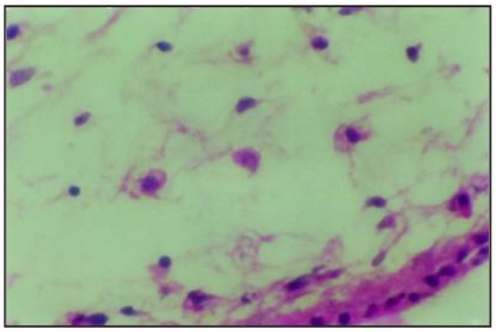

**Fig. 5:** Hofbauer cells in the mesenchyme of chorionic villous.
H & E x 400

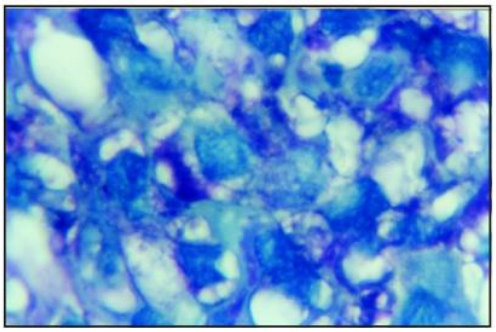

**Fig. 6:** Photomicrograph of 'clear cells' of young trophoblasts which were PAS positive.
PAS stain x1000

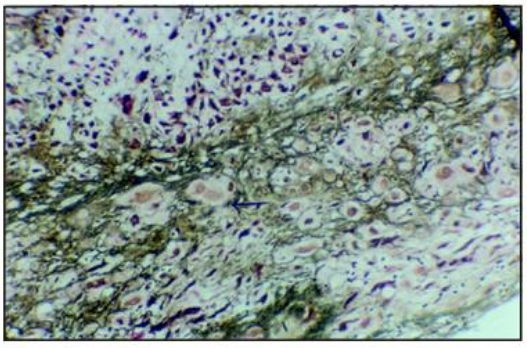

**Fig. 7:** Photomicrograph of decidual cells (arrowed) encircled by reticulin fibers Gorden & Sweets
Reticulin stain x 400.

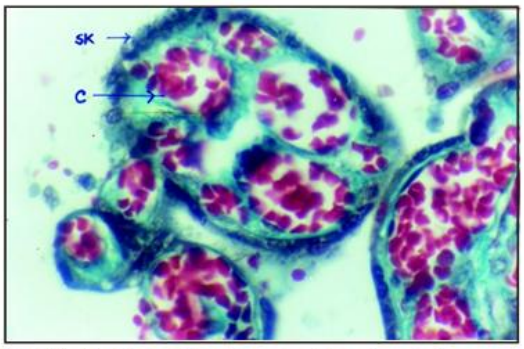


**Fig. 8(a):** Chorionic villous of a mature term placenta showing syncytial knot (SK) & capillaries (c)
Massons Trichrome x 400

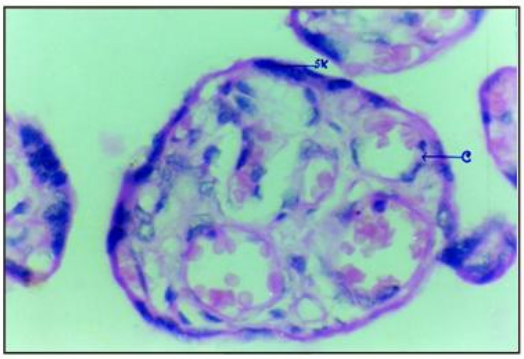


**Fig. 8(b):** Chorionic villous of a mature term placenta showing syncytial knot (SK) & capillaries (c)
H & E stain x 400

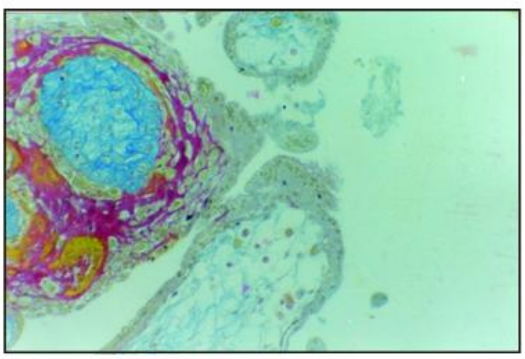

**Fig. 9:** Chorionic villous of early placenta showing perivillous fibrin deposit (red coloured).
M.S.B x 400

## References


[1]. Boyd J.D. : Observations on human chorionic villi using the electron microscope Journal of Anatomy (1954): 88; (3), 356-362.
[2]. Boyd, J.D. : Electron microscopic observations of the cytotrophoblast contribution to the syncytium in the human placenta. J. Anat. (1966): 100 (3), 535-548.
[3]. Boyd, J.D. : The surface of the syncytium of the human chorionic villus. J. Anat. (1968): 102; (3) 553-563.
[4]. Burton, G.J., Skepper, J.N., Haepstock J., Cindrova, T., Jones, C.J.P., and Jauniaux, E.: Areppraisal of the contrasting morphological appearances of villous Cytotrophoblast cells both apoptosis and primary necrosis. Placenta. (2003); 24: 297-305.
[5]. during early human pregnancy; evidence for both apoptosis and primary necrosis. Placenta. (2003); 24: 297-305.
[6]. Demir, R., Kaufman, P., Castellucci, M., Erbengi, T., Kotowski, A.: Foetal vasculogenesis and angiogenesis in Human Placental Villi. Acta Anat. (1989); 136: 190-203.
[7]. Enders, Allen C. and King, Barry, F.: The cytology of Hofbauer cells. Aatomical record. (1970): 167; 231-236.
[8]. Hellweg, G. Dallenbach. and Nette G: Morphological and histochemical observations on trophoblast and decidua of the basal plate of the human placenta at term. Am. J. Anat. (1964) 115, 309-326.
[9]. Khudr G., Soma H. and Benirschke , K. : Trophoblastic origin of the X cell and the placental site giant cell. ( 1971). Am.J. Obst Gynecol., 115,4, 530-533.
[10]. Lister , Ursula M, : Ultrastructure of the early human placenta .J. Obstet Gyaec British Cwlth (1964): 71; 21-32.
[11]. Moll, W., : Invited Commentary : Absence of intervillious blood flow in the first trimester of human pregnancy. Placenta (1995); 16: 333-334.
[12]. Wynn , Ralph M. : Derivation and ultrastructure of the so-called, Hofbauer cell . Am. J. Obst And Gynae (1967): 97; 2, 235-248.


Dr.Ch.Sudhakarbabu, et. al. "Histological Features of Placenta in Early and Full Term of Pregnancy." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(6), 2020, pp. 27-30.