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MORPHOLOGICAL AND MORPHOMETRIC CHARACTERISTICS OF THE PLACENTA IN NORMAL PREGNANCY

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Summary

The purpose of this study was to supplement the data on morphometric and morphological changes in the placenta in normal pregnancy, as well as to study the morphological and morphometric parameters of the female placenta in 17 cases of normal pregnancy.

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Purpose. In this study, in order to compare the morphological changes that develop in primary and secondary placental insufficiency, the morphological and morphometric parameters of female placentas with 17 previous pregnancies were studied. The aim was to assess nonspecific involutinal changes in the satellite, compensatory changes in the satellite.

Materials and methods. Morphological and morphometric parameters of female placentas with pregnancies of 17 norms were studied.

Hematoxylin and eosin stain of general morphology, Van-Gizon method, Weigert method, SHIK-reaction and semi-thin sections were stained with toluidine blue. For general morphology, 3 pieces from each satellite, ie 1.5x1.5 cm from the center, middle and peripheral parts were cut and solidified in 10% neutralized formalin. After washing in running water for 2–4 h, it was dehydrated in concentrated alcohols and chloroform, then paraffin was poured and the blocks were prepared.

Incisions of 5-8 microns were made from paraffin blocks and stained with hematoxylin and eosin, Van-Gizon, Weigert, SHIK-reaction method. Semi-thin incisions 1 µm thick were obtained from Epon bricks on Leykaultramicrotomy. Histological preparations were studied under 10, 20, 40 lenses of a light microscope and the required areas were photographed.

Inspection results Anatomical, histological, and histometric features of the normal placenta.

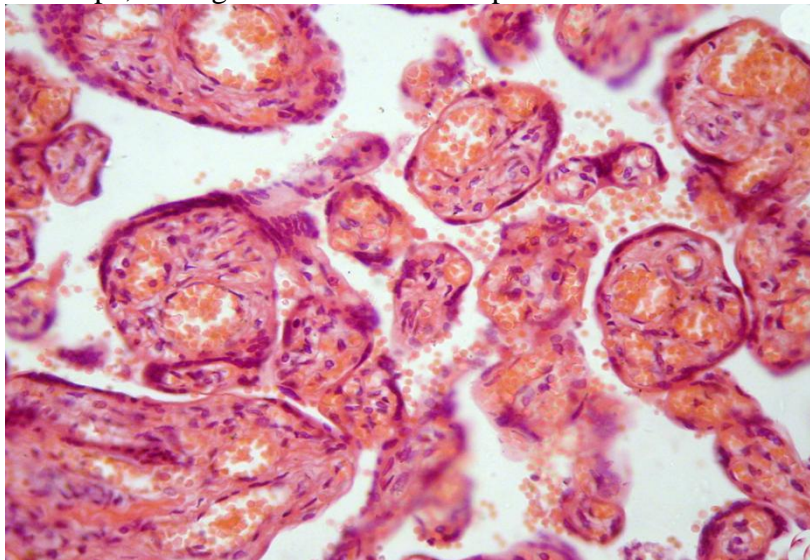
The degree of maturity of the placenta in the structural structures of the placenta from the pregnant women included in the control group was determined as follows. The shape of the placenta is mainly round, with an average diameter of 22.3 cm, weight average 612.6 g, thickness 1.8 cm at the periphery,

up to 4.6 cm in the middle, average 3.6 cm, the maternal surface is composed of fragments of almost the same size. The average area is $390.4 \pm 24.6 \text{ cm}^2$, the texture is soft-elastic consistency, often light red in color. The average weight of newborns was $3286 \pm 85 \text{ gr.}$, And the placental / fetal index was 0.186, i.e., 0.186 g of placental tissue per 1 g of infant weight (Table 1 and picture 1).

Quantitative indicators of satellite and baby in the norm

Indicators	Quantity
Babyweight, gr.	3534 ± 65
Satelliteweight, gr.	$612,6 \pm 21,4$
Fetalsatellitecoefficient	$5,76 \pm 0,18$
Satellite / babyindex	1/5,7
Satellitediameter, cm	$22,3 \pm 2,4$
Maternalsurfacearea, cm^2	$390,4 \pm 27,6$
The average thickness of the satellite, cm	$3,6 \pm 0,5$

Microscopic examination of the satellite showed that the terminal suckers were numerous, relatively densely rounded, oval, oblong-shaped, some of which were interconnected structures. The density of the stroma is almost the same thickness in all suckers, consisting of randomly located connective tissue cells and sparse fibrous structures (Fig. 1). The nuclei of connective tissue cells are relatively small, round, and elongated in shape, among which are satellite-specific Kashenko-Gofbauer macrophages.



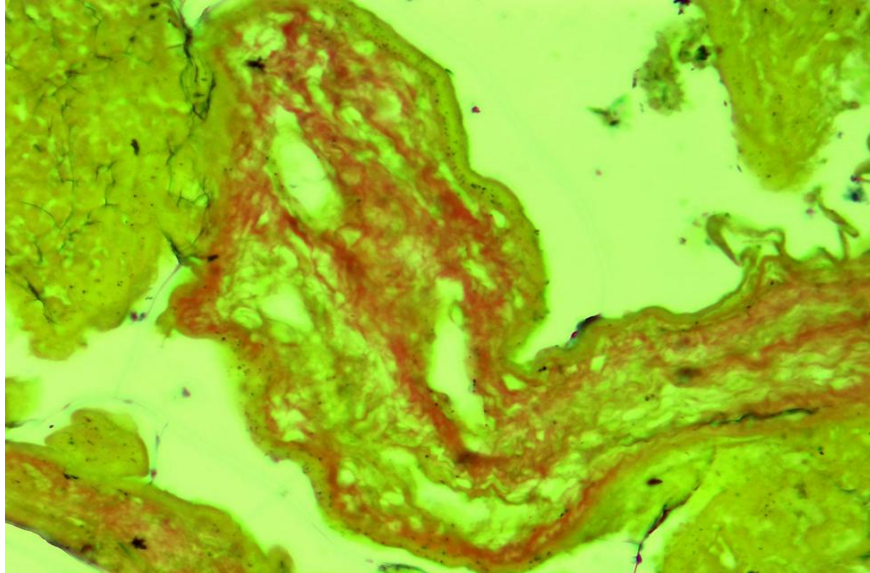
Picture 1. A flattened terminal sucker consists of stromal connective tissue cells and fibers. Dye: hematoxylin-eosin. 10x40

When placental tissue is stained with picrofuxin by the Van Gizon method, the presence of thick, circular, yellowish-red stained collagen fibers (Fig. 2) and fibrous structures consisting of individual tufts around the capillaries is observed in the walls of large vessels within the nucleus accumbens.

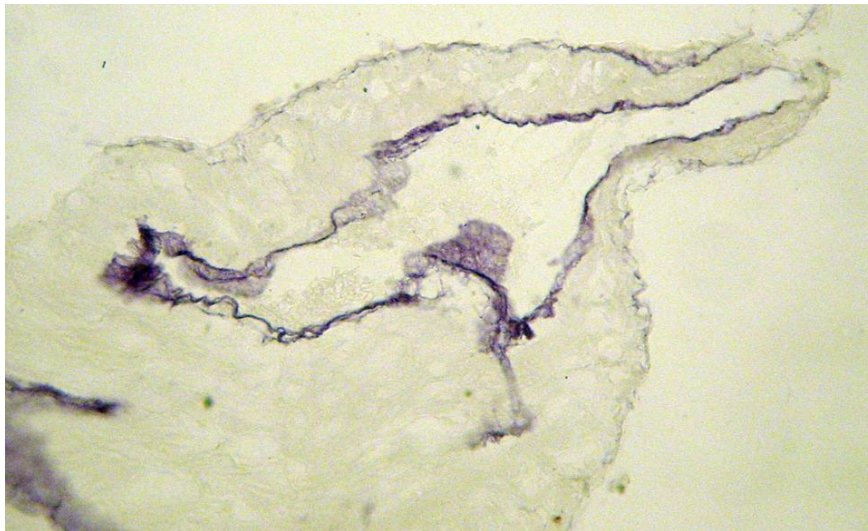
When histochemical Weigert staining of the connective tissue in the vascular wall and stroma to determine the content of fibrous proteins, blue-colored elastic fibers are located in the inner layer of the vascular wall of the base network, i.e. around the basement membrane (pic. 3). forming a peculiar network, it was observed that the terminal suckers are located at the periphery, i.e. in the form of a relatively thick tuft of trophoblasts in the basement membrane.

Hence, it was confirmed that the basal membrane in the vascular wall of the satellite suckers and the subtrophoblast basal membrane of the terminal suckers, as well as the stroma, consist of a diffuse reticular fibrous protein network.

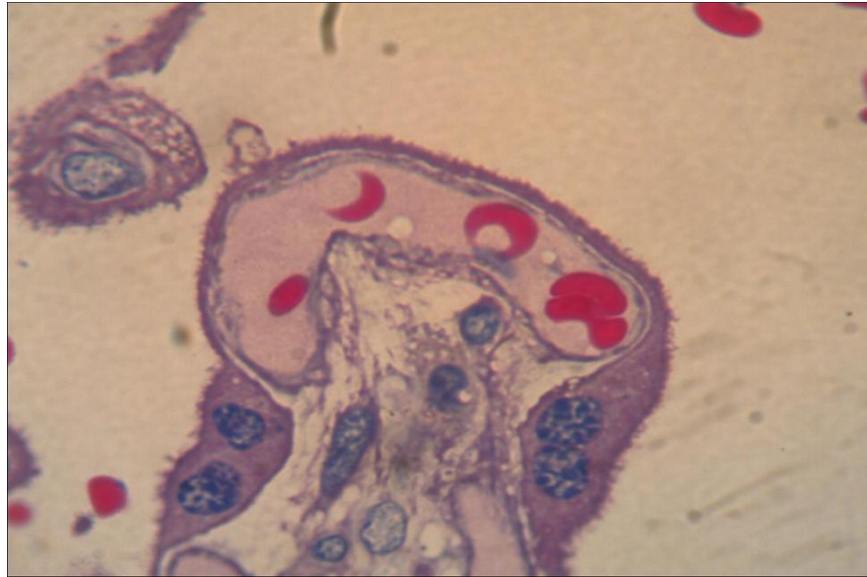
The satellite's terminal suckers are rich in small, thin-walled capillaries and venules. Pic.4). Terminal suckers are covered on the outer surface mainly with single-layered trophoblast cells, which are mostly prism-shaped, and in some areas slightly flattened, the nuclei are relatively dark, oval, some oblong, stained with hematoxylin (Fig. 7). Due to the presence of cytotrophoblasts in the ranks of trophoblast cells, it is determined that there are double layers, as well as the formation of multinucleated syncytiotrophoblasts from the fusion of cells.



Picture 2. The walls of the coronary arteries are surrounded by collagen fibers. Dye: Van-Gizon method. X: 10x40.



Picture 3. Elastic fibers in the inner layer of the vascular wall of the nucleus accumbens. Dye: Weigert method. X:10x40.



Picture 4. Appearance of the hemato-trophoblast boundary in a semi-thin section. Dye: toluidine blue.
X: 10x40.

Evaluation of nonspecific involutional changes of the satellite. In the assessment of nonspecific involutional changes in placental tissue over time, attention should be paid to fibrinoids, calcinosis, sclerosis, possible intravascular thrombosis, infarct foci in placental tissue, which appear in the stroma and vascular wall of the placenta. In addition, immunomorphological reactions develop in the placental tissue, and the stroma and vascular wall may be infiltrated by lymphocytes, macrophages, plasma cells, and leukocytes. In microscopically studied normal placental tissue, fibrinoid edema, a process of stroma-vascular protein dystrophy, was observed to occur initially and in most cases in the stroma of the central mammary glands and in the vascular wall in them. When the composition of such foci was studied by staining by the histochemical method - SHIK reaction, it was found that they accumulated dark purple-stained sour glycosaminoglycans and coarse protein fibrinoids. In the stroma of some terminal suckers, fibrinoids were observed to be very rare in the stroma, i.e., only in the area of the basement membrane, the fibrous structures underwent small-focal fibrinoid swelling.

Evaluation of satellite compensatory changes. Compensatory changes in placental tissue develop in two different types, namely in the form of compensatory changes in blood vessels and cells. In our study of our own material, we identified compensatory changes that developed in relation to the following vessels: an increase in the number of terminal suckers and the number of capillaries in them, the appearance of hyperemia, and an increase in hemotrophoblast barrier areas. At the same time, there was an increase in the number of capillaries holding 5 or more capillaries between the terminal suckers, the fullness of the vessels, especially the dilation of the vessels, which creates a hemotrophoblast barrier.

Conclusion. Satellite morphometry and morphology were studied in 17 cases after normal delivery. Anatomical, histological, and histometric signs of the normal placenta, and quantitative indicators of the normal placenta and infant were studied. Microscopic examination of the satellite showed that the terminal suckers were numerous, relatively densely rounded, oval, oblong-shaped, some of which were interconnected structures.

Nonspecific involutional and compensatory changes of the satellite were analyzed. Quantitative indicators of the species depending on the number of blood vessels in the placenta and morphometric indicators of the structural structures of the placenta were determined. The results of morphometric calculations showed that the area occupied by the structural units in the satellite in the control group had the following characteristics. Core suckers accounted for an average of 16.0% of the total satellite area, while terminal suckers accounted for the largest area, 50.8%. Secondary invasive changes in satellite

composition averaged 11.4%. The gap between the satellite suckers was 21.8% of the norm.

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