

Endotheliocytes of Placenta at Primary Hypothyreosis and its Subclinical Form

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ABSTRACT. Endothelium of placenta at primary hypothyreosis has been studied by the method of light and electron microscopy, 10 cases altogether. It was revealed that endothelial cells were mostly broken. Their forms are often changed, the slots between cells through which fibrocytes penetrate into deeper layers of placenta appear. Erythrocytes' forms are changed, "sharp angles" appear in them. The structure of endotheliocytes changes, hemorrhage nuclei grow, mitochondria are mostly broken and capillary endoplasmic reticulum dominates. © 2009 Bull. Georg. Natl. Acad. Sci.

Key words: hypothyreosis, placenta.

According to classical definition of histologists endothelium presents the layer of flat cells, lining the inner surface of the vascular wall. It originates from mesenchima and carries important functions [1]: regulation of local processes of homeostasis, proliferation, migration, vascular tones, transcapillary permeability, scaffolding functions, etc. Endothelium excretes nitrogen oxide, thus relaxing the tone of smooth muscles. It takes part in vasodilatation and in vasoconstriction. Hence endothelium can be presented as tissue structure which is responsible for security of many processes in the organism. According to Y.Chin, et al [2] acknowledgement of the fact gave the start to the molecular basis of pathogenesis of different diseases including gynaecological.

Clinical material comprises 10 cases of placenta studies (patients with primary hypothyreosis). The method of light and electron microscopy was used. For the light microscopy the material was fixed in 96° alcohol, and for electron microscopy – in 1% osmium on buffer. After fixation the material was poured into paraffin and epon, cut on microtomes of different types and

looked through in Photomicroscope-III, Opton (Germany), also on BS-500, Tesla (Czech) at accelerating voltage 80 kV.

As the observations connected with the studies of placenta in patients suffering with primary hypothyreosis show, the wall of the capillary is contoured too much. Heterochromatine prevails in the endothelial nuclei. The form of the cells is changed. There are many destroyed mitochondria. Endoplasmic reticulum is presented mostly with its agranular part. Golgi complex has not large canals and single cisterns. Thickness of basal membrane makes 120 ± 1 nm. The surface of endotheliocytes is also nonhomogeneous, it is of rough and sinuous character (Fig.1).

Dense contacts, connecting endothelial cells, destroy. Endothelial cells become round instead of being elongated, which changes the permeability of the vascular wall. Capillary lumen often loses its round form and becomes multiformed. Contacts between endothelial cells gain nonhomogeneous osmiofilicity and become uneven and sinuous. Erythrocytes, often revealed in capillaries, have multiformity, the edges are often "sharp". Sharp

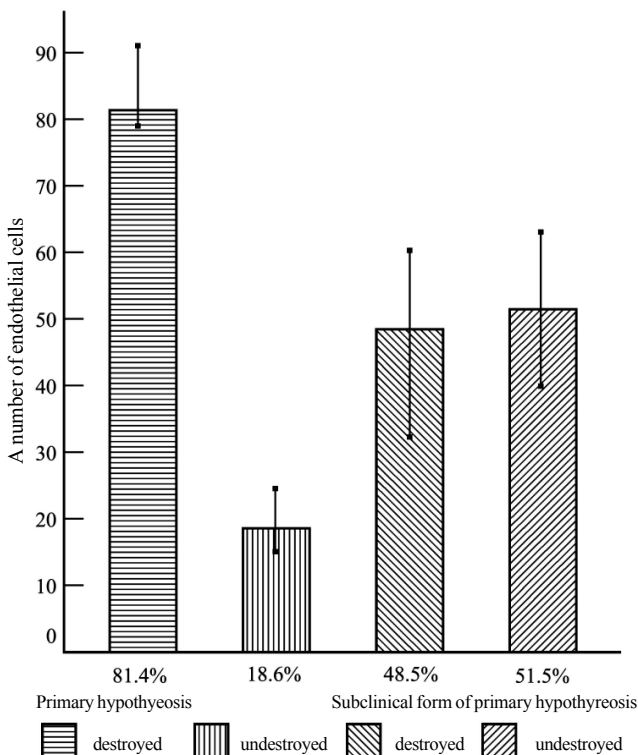


Fig. 1. A number of destroyed endothelial cells against the background of primary hypothyroidism and its subclinical form.

parts of the edge of the erythrocytes are directed to the contacts between endothelial cells, which are mostly destroyed. Statistic processing of material is $P < 0.1$.

In the present study the influence is shown, at first sight, of the “little important” cell (endothelium) on the series of significant functional processes in the organism leading to heavy pathology (Fig.1).

Through destroyed interendothelial contacts there occurs permeability of erythrocytes and other blood corpuscles into deeper layers of uterus. Coming out of blood channel, erythrocytes are often fractioned, the diameter

of central not stained places on their surface grows. The noted fact points to adsorption growth. Erythrocytes near the body of endotheliocytes are revealed. Such erythrocytes gain elongated form, their edges are well contoured.

The form of erythrocyte changes, “sharp” angles appear on its surface and their direction to the destroyed dense contacts change, which points to the redistribution of the value of the charge on the surface of erythrocyte membrane, also to the change of the sign on the surface of interendothelial contacts. In the region of the “sharp” angles of erythrocytes according to the laws of physics, the value of charge grows (Fig.2).

As to the destroyed interendothelial contacts where erythrocytes stream, the charge must be higher and carry opposite sign existing on the surface of erythrocyte. Endothelial cells being structure functional basis of uterus, play an important role in support of the charge [3]. According to the author these cells carry negative charge. The increase of the capillary walls permeability in the villi of placenta is connected with the increase of the value of negative charge on the surface of dense contacts of endothelium. High index of charge in interendothelial contacts must be connected with the presence of nonspecific antigen in dense contacts and is defined by the presence of cytopathogenic effect in endothelial cells.

The presence in endotheliocytes of a large area, occupied by heterochromatin, attracts attention. The edge of the nucleus is sinuous, matrix of cytoplasm is light, which points to high cyclosis, a large perinuclear halo is noted, the form of endotheliocytes is changed, agranular endoplasmic reticulum grows, great number of lisosomes is noted, basal membrane is hardened. The obtained data show that capillaries of placenta at primary hypothyroidism are mostly destroyed.

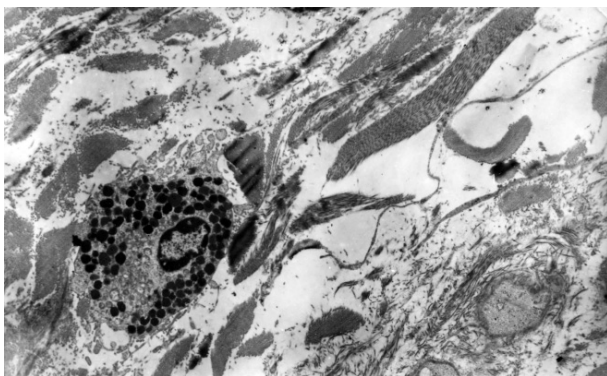


Fig. 2. Endothelial cell is destroyed, the form is changed, stasis. The form of erythrocyte is drop-shaped (the edge is pointed in the direction of interendothelial contact). The form of nucleus is changed. Electron diffraction pattern 30000x

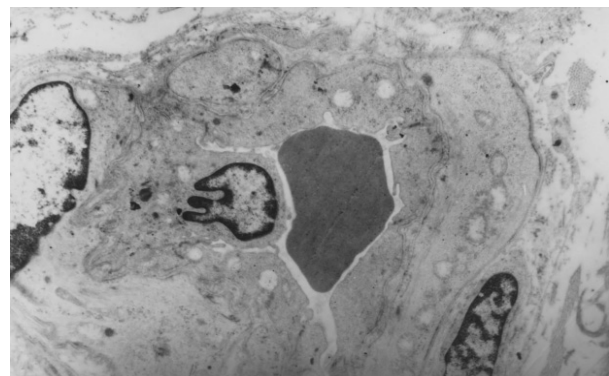


Fig. 3. Placenta. The Langerhans cells are well seen. The form of nucleus is changed. Electron diffraction pattern 35000x

სამედიცინო მეცნიერებანი

პლაცენტის ენდოთელიოციტები პირველადი ჰიპოთირეოზის და მისი სუბკლინიკური ფორმის დროს

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ნაშრომში პლაცენტის ენდოთელიუმში პირველადი ჰიპოთირეოზის დროს შესწავლილია მორფოლოგიური მეთოდებით, სულ 10 შემთხვევა.

ნაჩვენებია, რომ ენდოთელიუმის უჯრედები ძირითადად დანგრეულია, მათი ფორმა შეცვლილია. უჯრედებს შორის აღინიშნება ნაპრალები. ამ ნაპრალებში მიმდინარეობს ერითროციტების განვლადობა. ერითროციტები მიედინებიან უფრო ღრმა ნაწილებში. იცვლება ერითროციტების ფორმა, ისინი კარგავენ “ნორმალურ” მრგვალ ფორმას და ძირითადად ღებულობენ “წვეტიან” ფორმას. ენდოთელიუმის სტრუქტურა იცვლება, მათულობს ჰეტეროქრომატინი ბირთვებში, მიტოქონდრიები დანგრეულია, ძირითადად აღინიშნება აგრანულარული ენდოპლაზმური ბადე. პირველადი ჰიპოთირეოზის დროს აღინიშნება პლაცენტას პათოლოგია.

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