

MORPHOLOGICAL FEATURES OF HEMOCIRCULATORY DISORDERS AND CYTOTROPHOBLASTIC INVASION IN TUBAL ABORTION

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Abstract. Tubal abortion represents one of the most frequent clinical variants of tubal pregnancy and is characterized by severe hemocirculatory disturbances leading to detachment and evacuation of embryonic structures from the fallopian tube. The aim of this study was to investigate the morphological features of cytotrophoblastic invasion and hemocirculatory disorders in the fallopian tube wall during tubal abortion and to determine the relationship between invasion depth and vascular damage severity.

Keywords. Tubal abortion, tubal pregnancy; cytotrophoblastic invasion; hemocirculatory disorders; hematosalpinx; vascular thrombosis; fallopian tube pathology; hemorrhagic complications; histopathology; ectopic pregnancy.

Relevance of the Study. Tubal abortion is one of the most common outcomes of tubal pregnancy and occupies an important place in the structure of emergency gynecological conditions. Despite significant advances in modern diagnostics of ectopic pregnancy, the morphological mechanisms of damage to the fallopian tube wall during tubal abortion remain a subject of active research[1,2,3].

It is well known that during tubal pregnancy, implantation and trophoblast invasion occur under conditions not intended for normal pregnancy development. The wall of the fallopian tube differs significantly from the uterine endometrium in structure, vascularization, and ability to undergo vascular remodeling. As a result, a pathological variant of trophoblastic invasion develops, accompanied by pronounced hemocirculatory disorders[4,5,6].

Unlike progressive tubal pregnancy, in which the main damaging factor is

the gradual destruction of tubal tissues by the growing gestational sac, and pregnancy complicated by tubal rupture, where mechanical overstretching of the wall plays the leading role, in tubal abortion the key mechanism of tissue damage is massive hemorrhage. This leads to detachment of embryonic structures, their fragmentation, and subsequent evacuation from the lumen of the tube[7,8,9,10].

Aim of the Study.To investigate the morphological features of cytotrophoblastic invasion and hemocirculatory disorders in the fallopian tube wall during tubal abortion and to determine the relationship between the depth of cytotrophoblastic invasion and the severity of vascular disorders.

Materials and Methods.The study included 35 cases of tubal abortion:

- 31 cases of incomplete tubal abortion,
- 4 cases of complete tubal abortion.

The material for morphological examination consisted of fallopian tubes removed during surgical treatment of tubal pregnancy.

Standard histological examination was performed using hematoxylin and eosin staining. In some cases, additional staining methods were applied to clarify vascular wall structure and detect thrombotic masses.

Results.Morphological analysis showed that the distinguishing feature of tubal abortion is the pronounced character of hemocirculatory disorders. They form a constant morphological background for cytotrophoblastic invasion processes.

At early stages, small focal hemorrhages accompanying cytotrophoblast invasion were detected. As the pathological process progressed, hemorrhagic impregnation of tissues and dissecting hemorrhages in all layers of the tubal wall developed.

In more severe cases, the following were observed:massive hemorrhage into the tubal lumen;formation of total hematosalpinx;pronounced thrombotic vascular changes;areas of ischemic tissue damage.

Extravasated blood formed large hematomas that caused mechanical detachment of embryonic tissues from the fallopian tube wall. Detachment most often occurred along the line of the second zone of cytotrophoblastic invasion

distance.

Later, elements of the gestational sac could shift from the primary implantation site under the influence of: tubal peristalsis; recurrent hemorrhages; increasing intratubal pressure.

Preserved cytotrophoblastic proliferates most often appeared as isolated islands consisting of compactly arranged cells with basophilic cytoplasm and hyperchromic nuclei.

These proliferates were localized:

- between thrombotic masses;
- in endosalpinx folds;
- in the muscular layer of the tube.

In some cases, they were separated from the tubal lumen by a layer of syncytiotrophoblast of uneven thickness.

The intensity of cytotrophoblastic invasion varied widely:

- from isolated migration sites within the endosalpinx;
- to processes involving all layers of the tubal wall.

In cases where hematosalpinx formed after development of the third invasion distance zone, interstitial cytotrophoblast was detected in the tubal wall.

It actively migrated into: the endosalpinx, the muscular layer, the subserosal layer.

In some cases, cytotrophoblastic cells reached the serous membrane.

This indicates high invasive activity of trophoblast even under conditions of severe hemocirculatory disorders.

Hemocirculatory changes included: blood stasis in vessels; thrombosis of varying severity; rupture of vascular walls; perivascular hemorrhages; formation of organizing hematomas.

An important feature was the combination of acute and chronic vascular changes. Some specimens showed both fresh hemorrhages and areas of organization with connective tissue formation.

The main mechanisms of tubal abortion development include Pathological

trophoblastic invasion into the tubal wall. Impaired vascular remodeling. Increased fragility of vascular walls. Formation of intratubal hematomas. Detachment of the gestational sac from the tubal wall.

Unlike normal pregnancy, a полноценная uteroplacental circulation system does not form in tubal pregnancy. This leads to unstable hemodynamics and an increased risk of hemorrhage.

The identified morphological features explain the clinical manifestations of tubal abortion: paroxysmal pain, bloody discharge; signs of intra-abdominal bleeding; hemodynamic instability.

The obtained results can be used to: improve morphological diagnostics; clarify pathogenesis; develop new approaches to prognosis of disease course.

Conclusion. Tubal abortion is characterized by a combination of severe hemocirculatory disorders and variable depth of cytotrophoblastic invasion.

The main morphological features include:

- massive hemorrhages;
- hematosalpinx formation;
- vascular thrombosis;
- focal preservation of cytotrophoblastic proliferates;
- variable depth of trophoblast invasion.

Hemocirculatory disorders play a leading role in damage to the fallopian tube wall and evacuation of embryonic structures.

Further research in this direction will improve understanding of tubal abortion pathogenesis and treatment outcomes in patients with tubal pregnancy.

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