IMMUNOHISTOCHEMICAL ANALYSIS OF FALLOPIAN TUBE REACTIVITY IN TUBAL ECTOPIC PREGNANCY

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Abstract
An immunohistochemical study assessing the expression of the proliferative marker Ki-67 revealed a wide range of proliferative changes in the fallopian tubes of patients with tubal ectopic pregnancy, reflecting pronounced reactive processes in response to inflammatory damage of the organ. An increase in the level of proliferative activity with an increase in the number of immunopositive cells was established.

Keywords: fallopian tubes, tubal ectopic pregnancy, immunohistochemistry, Ki-67 marker.

An ectopic pregnancy (EP) is the abnormal implantation of a fertilized egg outside the uterine cavity. This condition remains a life-threatening complication of early gestational pregnancy and is considered one of the most severe gynecological pathologies. One of the leading complications of EP is intra-abdominal (intraperitoneal) bleeding, which continues to significantly contribute to maternal mortality in developed countries. [2,7-8].

Recent global studies indicate that the incidence of ectopic pregnancy ranges from 0.5% to 6% [6]. A global analysis of the incidence of EP revealed a 10.2% decrease between 1990 and 2019. These epidemiological trends can be explained by the effective implementation of strategies to prevent reproductive system infections [9]. Much attention is paid to the study of the molecular biological marker characterizing proliferation – the Ki-67 protein, which is the most informative and adequate diagnostic indicator [1,5]. The study of cell proliferation in various tissues is one of the fundamental tasks of morphology. Due to significant advances in molecular biology, morphologists now have the opportunity to immunohistochemically label cells at different phases of the cell cycle [4].

To evaluate the characteristics of the proliferative activity of cellular elements of the fallopian tube in women of reproductive age during tubal pregnancy by immunohistochemical analysis of the expression of the Ki-67 marker.11 reproductive-age women (18-45 years) with tubal ectopic pregnancies were examined. All patients underwent surgery at the clinical sites of the departments of Obstetrics and Gynecology №1 and №2 of SEI Avicenna Tajik State Medical University. Serial histological sections of 3 μm thickness were prepared for immunohistochemical (IHC) analysis. The study protocol included standard preanalytical preparation steps: deparaffinization, rehydration, and high-temperature antigen retrieval. In order to assess the proliferative activity of tissues, incubation with polyclonal antibodies to the Ki-67 marker was carried out. The Ki-67-immunopositive cell index was determined as the ratio of the number of positively stained nuclei to the total number of cells (as a percentage per 100 counted cells) [3]. The laboratory stage of the work was carried out on the basis of the biotechnology laboratory of the Republican Oncology research center of the Ministry of health and social protection of population of the Republic of Tajikistan (RORC MHSPP RT).

Results of the study and their discussion. During an immunohistochemical study of fallopian tube fragments during tubal pregnancy, the expression level of the Ki-67 marker and the proliferation index in various fallopian tube structures were assessed.

The results showed that proliferative activity (Ki-67 index) was pronounced in both the epithelium and stroma of the fallopian tube (FT). Morphological analysis revealed that the Ki-67 marker localizes in cell nuclei with varying intensity and is distributed between the karyoplasm and nucleolus, corresponding to different phases of the cell cycle. Proliferative activity in the stroma during tubal pregnancy (TP) was 45-50%, while in women in the control group, the proliferation levels remained consistently low, did not exceed 10-12%. A study of the expression of the Ki-67 marker in the fallopian tube during tubal pregnancy revealed differences in the level of cell proliferation. This indicator indicates cell cycle activation, which is characteristic of reactive changes and inflammatory processes accompanying EP (Figures 1 and 2).

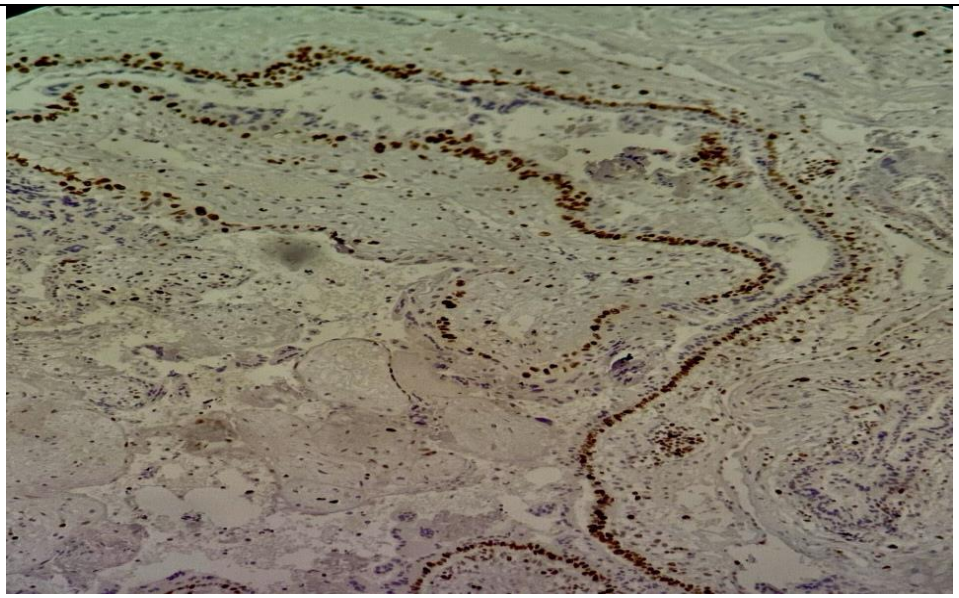

Figure 1. – The level of Ki-67 expression and proliferative activity of the fallopian tube mucosa. In the embryo implantation zone. Staining: DAB-hematoxylin. Magnification 80.

Figure 2. – The level of Ki-67 expression and proliferative activity of the fallopian tube mucosa in the area of fertilized egg implantation. Staining: DAB-hematoxylin. Magnification 80.

Thus, the different subcellular localization of Ki-67 confirms its ability to label cells at different stages of proliferation and mitotic activity.

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