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Fund “Nauka” Project № 19008 Resume – Competition-Based Session 2019:

“Correlation between ultrasound diagnosis and immunohistochemistry in early and late miscarriage”

Project leader: Prof. Emil Georgiev Kovachev, MD, PhD, DSc

The aim of the project is to study the correlation between ultrasound diagnosis and immunohistochemistry in early and late miscarriages. The scientific problem under consideration – miscarriages – can be defined as relevant and socially significant worldwide. So far, such a study has not been conducted in our country, which provokes our scientific interest.

The tasks of the research are:

- Doppler velocimetry of the uterine arteries in spontaneous abortions and abortions at will up to 12 g.w.
- Immunohistochemical analysis of decidual NK cells (uNK) and proliferative marker Ki-67 in miscarriages and optional abortions up to 12 g.w.
- Correlation study in Doppler velocimetry of the uterine arteries and immunohistochemical analysis of uNK cells and proliferative marker Ki-67 in abortions up to 12 g.w.
- Doppler velocimetry of the uterine arteries and immunohistochemical analysis of uNK cells and proliferative marker Ki-67 in abortions up to 20 g.w.
- Analysis and evaluation of the obtained results

Materials and methods:

Patients eligible for inclusion in the study are provided with informed consent declarations for participation in research and personal data protection (passed through the Research Ethics Commission). Conducting ultrasound examination and Doppler velocimetry on a 3D-Affiniti 70 Philips device. Biological materials for scientific research are collected after termination of pregnancy. Tissue blocks are formed and preparations for standard histological and immunohistochemical staining are prepared.

Expected results:

From the results of the research we expect to prove the role of decidual NK cells, proliferative marker Ki-67 and Doppler velocimetry of the uterine arteries as predictive markers for early and late miscarriages. When correlation is demonstrated, they will be proposed as future screening methods with high prognostic value.

Achieved results:

The aim of the present project was to find a correlation between uterine artery Doppler velocimetry and the amount of dNK cells and the proliferative marker Ki-67, examined in placental tissue material by immunohistochemical analysis, in early and late spontaneous and induced abortions.

The dissertation was developed on the basis of the results of the clinical study of 81 pregnant patients with data on spontaneous abortion or abortion on demand.

For the first time in Bulgaria, abortion material was examined by immunohistochemistry with the proliferative marker Ki67 and CD56+ in the first and second trimester of pregnancy. A cohort of patients with spontaneous abortions was studied and analyzed by a combination of immunohistochemistry and Doppler velocimetry.

The results of the study confirmed that an increased Ri of the uterine arteries was found in the miscarriages compared to the controls. Our immunohistochemistry data are consistent with the notion that spontaneous abortions have elevated CD56+ values compared to elective abortions. The opinion that the number of dNK cells decreases with advancing gestational age has been confirmed.

Moderate expression of the proliferative marker Ki67 between 10-50% was associated with preserved trophoblast proliferation. For abortions after 13 years of age we do not find cases with high Ki67 values above 50%. The absence of large numbers of cytotrophoblast cells in late abortions correlates with impaired trophoblast invasion.

An original sample screening algorithm for pregnant women with threatened abortion was developed.