Morphology of Endometrial Scrapings in Early Spontaneous Abortions

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Abstract

Objective: Study of morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic mechanisms.

Materials and methods: Study material was endometrial scrapings with components of fetoplacental tissue obtained after spontaneous abortions (176 cases) in 9-12 weeks of pregnancy, received at the Republican Pathological Bureau from several City Maternity Hospitals of Bishkek (Kyrgyz Republic). The histological sections were stained with hematoxylin and eosin (H&E), and a mixture of acid fuchsin and picric acid. The Periodic acid–Schiff (PAS) reaction was performed.

Results: Of the 176 cases in 80 cases, by the medical reports, pregnant women had concomitant gynecological infectious pathology in the form of chronic endometritis, chronic salpingoophoritis, chlamydia, colpitis, and adnexitis. Histological examination revealed inflammatory changes in the form of deciduitis (24.5% of cases), endometritis (20.5% of cases), villitis (17.3% of cases) in 70% of cases. Pathological changes in the decidual membrane are determined as foci of leukocyte infiltration in 65% of cases, in 30% - foci of necrosis and in 20% - foci of hemorrhage. In 60% of cases, as their combination.

Conclusion: Histological examination of endometrial scrapings and fetal membranes after spontaneous abortions in 9-12 week pregnant women, with a history of infectious inflammatory pathology, revealed the tissue inflammatory changes of varying severity, with the following additional microscopic characteristics: the compact arrangement of endometrial glands, weak vascularization of villus chorion; sclerotic, dystrophic, and necrotic changes with hemorrhages in the endometrium and decidual membrane.

Keywords: *Spontaneous abortion, Endometrium, Morphology, Periodic acid–Schiff (PAS) reaction, Fetal membranes.*

Introduction

Spontaneous abortions are one of the pressing problems of modern medicine. The number of early abortions varies from 10 to 30% of all pregnancies[3] and 80-85% is observed in early pregnancy[2]. Often, the lack of knowledge and underestimation of the causes of the first spontaneous abortion is the cause of subsequent spontaneous abortions and other gynecological abnormalities. In the development of prevention issues and adequate methods of treating this pathology, along with clinical studies, the study of morphological changes in the endometrium and fetal membranes is essential.

This contributes to a more detailed understanding of the pathogenetic mechanisms of spontaneous abortion at different stages of pregnancy, taking into account etiological factors and concomitant pathology. Although many works exist on the study of various aspects of spontaneous abortion[1,4]. some questions of the morphological criteria of this pathology at different stages of pregnancy require more detailed clarifications.

Objective

Study of morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic mechanisms.

Materials and Method

The Ministry of Health of the Kyrgyz Republic obligates every City Maternity Hospitals to send placental tissues to the Republican Pathological Bureau for mandatory morphological examination. In the present study, study material was endometrial scrapings with components of fetoplacental tissue obtained after spontaneous abortions (176 cases) in 9-12 weeks of pregnancy, received at the Republican Pathological Bureau. Inclusion criteria are confirmed cases of spontaneous abortions between 9-12 weeks of pregnancy and presence of gynecological inflammatory disorder in patient's previous treatment history. Exclusion criteria are non-confirmed cases of spontaneous abortions (such as induced abortion) and cases of abortions in less than 9 or above 12 weeks of pregnancy. Microscopic examination characterized by the study of histological sections stained with hematoxylin and eosin (H&E), and a mixture of acid fuchsin and picric acid (orange, red, blue colors) used to study the structure of the connective tissue. The Periodic acid–Schiff (PAS) reaction performed to determine neutral and acid mucopolysaccharides. The study area is confined to Bishkek, Kyrgyzstan. The study was conducted for five years (2012-2017).

A histological examination determined the presence and severity of the inflammatory reaction, the severity of angiogenesis, the presence and severity of sclerotic, dystrophic, necrotic, and other changes.

Results

The average age of women was 25.7 year-old. Among all the endometrial scrapings examined, we identified 80 cases of spontaneous abortion, where according to the analysis of the medical records, the patients had concomitant gynecological infectious pathology in the form of chronic endometritis, chronic salpingoophoritis, chlamydia, and vaginitis.

The results of histological examination showed that in most of the cases (more than 70%) inflammatory changes were noted with the following rate: deciduitis (24.5% of cases), endometritis (20.5% of cases), villitis (17.3% of cases), and mixed inflammatory changes (37.7% of cases). The mixed inflammatory changes were characterized by a combination of endometritis with deciduitis and villitis. Upon staining with H&E, histologically, changes in the endometrium were characterized as follows: the glands are mainly oval-round in shape, and glands with a sawtooth shape were also found. The lumen of the glands are empty or contains a small amount of homogeneous secretion. There is a slight decrease in the number of endometrial glands - 3-4 in one field of view, which are located compactly. In 30% of cases, partial destruction of these glands is noted. Flattening of the epithelium of these glands is noted in 40% of cases, with nuclei located at the same level. In other cases, the epithelium of the glands is cylindrical with an uneven apical edge. Histological changes in the stroma of the endometrium were characterized by the presence of leukocyte infiltration in 25% of cases (Fig. 1a), in 17% in combination with edema and foci of necrosis expressed to a various extent. In 70% of cases, spiral vessels are determined, which are hyperemic in 86% of cases. In 60–70% of cases, changes in chorionic villi were characterized by their hypovascularization (1 or 2 vessels present). In 30% of cases, stromal edema was noted (Fig. 1b), in 10% - leukocyte infiltration of villi, and in 20% - villous stromal sclerosis. In 50% of cases, varying degree hemorrhages of the intervillous space are noted.

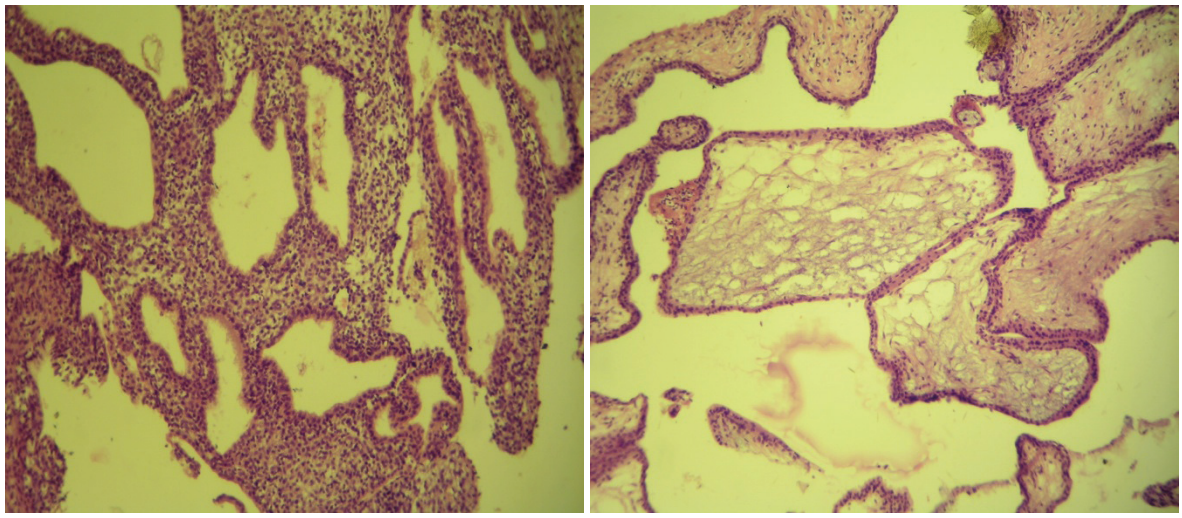

Fig. 1A. Purulent endometritis; stained with Hematoxylin and Eosin (H&E), x200.

Fig. 1B. Swelling of the stroma of immature villi; stained with Hematoxylin and Eosin (H&E), x300.

Pathological changes in the decidual membrane are determined as foci of leukocyte infiltration in 65% of cases (Fig. 2A), in 30% - foci of necrosis and in 20% - foci of hemorrhage (Fig. 2B). In 60% of cases, as their combination.

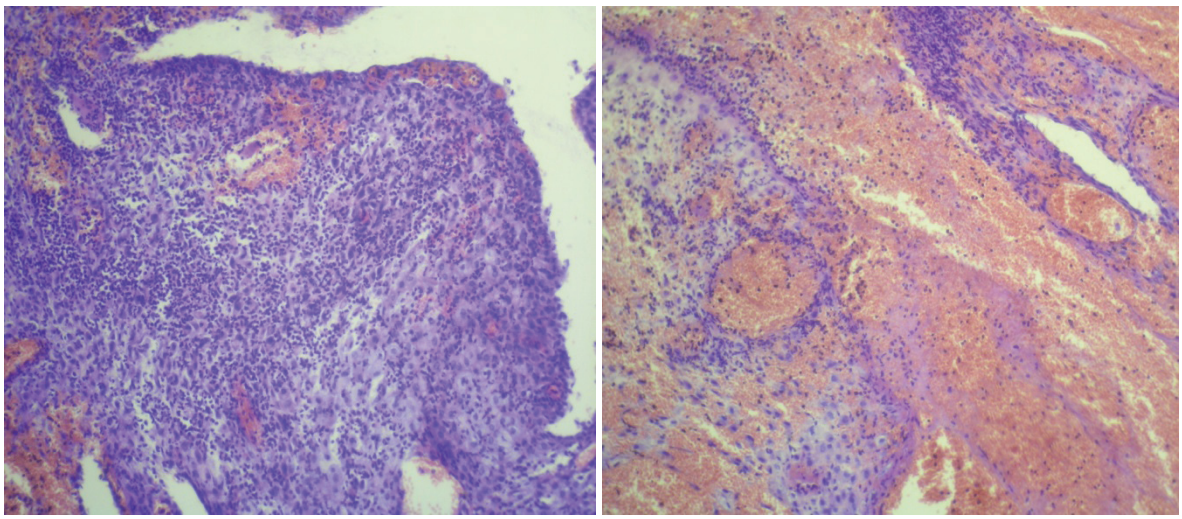

Fig.2A. Leukocyte infiltration in decidual tissue; stained with Hematoxylin and Eosin (H&E), x150.

Fig.2B. Decidual hemorrhage; stained with Hematoxylin and Eosin (H&E), x150.

Discussion

In our study, the decidualization of the endometrial stroma is well expressed in almost all cases. Decidual membrane cells have a light cytoplasm with relatively large nuclei. The PAS reaction determined decreased amount of neutral mucopolysaccharides in the epithelium of the endometrial glands.

The most frequent manifestation of mixed inflammatory pathology was the combination of endometritis and deciduitis, less often, there was a combination of endometritis and villusitis or a total inflammatory reaction. There is a decrease in the number of endometrial glands with a decrease in the content of neutral mucopolysaccharides in the epithelium.

The objective of our research is to study morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic

mechanisms. Microscopic examination revealed varying degrees of inflammatory changes in the endometrium and fetal membranes, with the following additional characteristics: the compact arrangement of endometrial glands, sclerotic, dystrophic, and necrotic changes with varying degrees of hemorrhages in the endometrium and decidual membrane.

Although there are many works associated with investigation of different aspects of spontaneous abortions, our study emphasized the morphological aspect of the pathology, describing the morphological changes in endometrial scrapings and fetal membranes.

This study helps to determine the underlying etiopathogenic causes of spontaneous abortions, more specifically the ratio of inflammatory disorders among other causes. Identifying the inflammatory character of the endometrial scrapings can be a strong impact for the development of further prevention issues. Additionally, treatment of the concomitant gynecological infectious pathology during pregnancy may reduce the incidence of spontaneous abortions.

The only limitation of our study is the sample size; further studies with higher samples required to validate our results and receiving precise results are essential. Therefore future research needed using more advanced equipment and methods.

In Conclusion, histological examination of endometrial scrapings and fetal membranes after spontaneous abortions in 9-12 week pregnant women, with a history of infectious inflammatory pathology, revealed the tissue inflammatory changes of varying severity, with the following additional microscopic characteristics: the compact arrangement of endometrial glands, weak vascularization of villus chorion; sclerotic, dystrophic, and necrotic changes with hemorrhages in the endometrium and decidual membrane.

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References

1. Balsells M., Garcia-Patterson A., Corcoy R. Systematic review and meta-analysis on the association of pregnancy underweight and miscarriage. Eur. J. Obstet.Gynecol Reprod. Biol. 2016; 207-213.
2. Wang X., Chen C., Wang L., et al. Conception, early pregnancy loss, and time to clinical pregnancy: a population-based prospective study. French J. Fertil. Steril. 2003: 79(3): 577.
3. Wolf C.E., Ledler N.J., Engel W., et al. Trombotic disorders in women with recurrent spontaneous abortions or unexplained infertility. Annals of Hematol. 2000: 79: 202-217.
4. Wyatt P.R., Owolabi T., Meier C., et.al. Age-specific risk of fetal loss observed in a second trimester serum screening population. Am.J. Obstet. Gynecol.2005; 192 (1): 240.