SIR Publishers
CENTER FOR INTERNATIONAL SCIENTIFIC PUBLICATIONS
JOURNAL OF APPLIED MEDICAL SCIENCES
ISSN(Online): 2984-6730
Volume-9, Issue-01, Published |16-01-2026|

MORPHOSTRUCTURAL FEATURES OF BIOLOGICAL FLUIDS IN ABNORMAL UTERINE BLEEDING

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ABSTRACT

Menstrual flow analysis using the Lithos-System technology is a poorly studied, non-invasive, and promising method for the early diagnosis of female reproductive organ diseases. This study allowed us to obtain an integrated assessment of both systemic and local homeostasis during abnormal uterine bleeding in women of reproductive age.

Keywords: abnormal uterine bleeding, menstrual flow, biological fluid morphology.

RELEVANCE

Abnormal uterine bleeding (AUB) is a general term used to describe uterine bleeding that exceeds the volume and duration of normal menstruation in women of reproductive age [1]. AUB occurs in 14-25% of women of reproductive age [2] and can have a significant impact on their physical, social, emotional, and material quality of life. According to G.E. According to Chernukha et al. (2018), in Russia, AUB is one of the main causes of iron deficiency anemia, reducing women's productivity and quality of life. It also ranks second among the reasons for women's hospitalization in gynecological hospitals and serves as an indication for two-thirds of hysterectomies and endometrial ablations. Along with its direct impact on women's quality of life, AUB represents a significant national challenge, both for healthcare and for the economy as a whole. In the past decade, interest in studying the pathogenesis of AUB has increased significantly, driven by the increasing frequency of ovulatory and anovulatory uterine bleeding, particularly during the period of menstrual function establishment [2]. Treatment and rehabilitation of patients with this pathology are highly relevant, as relapses of the disease worsen the prognosis for reproductive function, which is a social and economic problem [1].

In modern gynecology, the study of the pathogenesis of abnormal uterine bleeding has received increasing attention, particularly in recent years, due to the increasing frequency of ovulatory and anovulatory uterine bleeding, particularly during the period of establishing menstrual function [14]. Treatment and rehabilitation of patients with this pathology are highly relevant, as relapses of the disease worsen the prognosis for reproductive function, which is a social and economic problem [15]. Intermenstrual uterine bleeding in the form of menorrhagia and menometrorrhagia are common forms of menstrual dysfunction during the reproductive period. Approximately five to ten percent of women in the population who do not have risk factors (use of hormonal and intrauterine contraceptives) suffer from menorrhagia [1].

Analyses of gynecological morbidity indicate that menstrual disorders in the form of uterine bleeding (UB) are now a much more common reason for visits to treatment and preventive medical centers [2]. For example, according to one national study [1], uterine bleeding of various etiologies accounted for 19.1% of 20.1 million gynecological visits over two years. Furthermore, 25 percent of gynecological surgical procedures are associated with uterine bleeding (UB). It should be noted that 30 to 50 percent of all hysterectomies are due to intrauterine pathology, while in 20 percent of cases, the cause of uterine bleeding was not histologically verified [1,10].

The average duration of disability for patients due to uterine bleeding is more than 10 days, which is comparable to the loss of ability to work due to salpingooophoritis and other pelvic diseases with inflammatory processes.

The impossibility of using a standardized treatment regimen for some patients is explained by the unique mechanisms of AUB. Therefore, clarifying the etiology and pathogenesis of the disease is

undoubtedly of interest to clinicians, as it determines the scope and nature of therapeutic measures and the selection of hormonal drugs for hemostatic or corrective therapy [2,11]. From the perspective of hormonal regulation disorders and trophism of the basal layer of the endometrium, it is necessary to study the mechanisms of AUB development of inorganic origin. However, despite the wide range of pathomorphological, immunohistochemical, and cytogenetic studies, the data obtained on the relationship between AMC and endocrine influences are controversia [2,12].

It is generally accepted [1,13] that the risk of progression of uterine bleeding (relapse, transition to an atypical variant, malignancy) largely depends on the proliferative activity of glandular epithelial cells. Glandular-stromal and cytokaryometric characteristics of hyperplastic endometrium, revealed by morphometry, are a morphological manifestation of the proliferative activity of cells [14].

Comparative microspectrophotometry using a computerized image analyzer has also retained its relevance as an alternative morphometric method, allowing for quantitative and qualitative ("proliferative activity" and "differentiation index") characterization of the ploidy of the cell nuclei being studied [15]. It should be noted that informative quantitative methods for studying the protein-synthetic and proliferative activity of cells in EHE are undeservedly rarely used, and we were unable to find morphological criteria for predicting the possible development of EHE recurrence in the available literature [3,4,6].

The etiology and pathogenesis of AUC remain poorly understood, while their incidence continues to increase. Recent literature data demonstrate the high diagnostic value of the Lithos-system technology ("wedge-shaped" and "marginal" dehydration) [3,5, 7, 8] for various diseases, including reproductive organ pathology, which has allowed its use in patients with AUC [1,2, 9].

Objective: To study the morphological characteristics of recurrent endometrial hyperplasia using a comprehensive morphological analysis of uterine mucosal scrapings to identify criteria for predicting endometrial hyperplasia recurrence.

MATERIALS AND METHODS

The study was conducted at the Department of Obstetrics and Gynecology, Faculty of Medicine, Bukhara State Medical Institute. We examined 41 patients aged 18 to 44 years (32.6 ± 1.1 years). A control group of 32 apparently healthy volunteers without genital pathology was selected. The age of the patients in both groups was comparable ($p > 0.05$). Peripheral blood serum (PBS) and menstrual supernatant (MS) were analyzed in both groups. MS was obtained by aspirating 5 ml of contents from the uterine cavity during menstrual bleeding using a Pipelle catheter. The indicated biological fluids (BF) were centrifuged for 5 minutes at a speed of 3000 rpm**.**

For the study, 0.2 ml of the dehydrated droplet (facies) was applied to the surface of a standard 75 x 25 mm glass slide and dried at room temperature for 24 hours. The slides were pre-soaked in a detergent solution for 24-48 hours, then rinsed under running water for 10 minutes and placed in Nikiforov's solution, consisting of equal parts alcohol and ether, for 30 minutes. Before applying the sample, the slides were wiped with a dry, lint-free cloth. The structure-forming elements of the dehydrated droplet (facies) were studied at magnifications ranging from 10x to 80x using a Leica ICC 50 binocular microscope and a Pixera color digital camera. The study assessed the overall facies structure (systemic organization) and local structures. The study revealed that the facies structure differed significantly between the control and study groups.

RESULTS AND DISCUSSION

Thus, in the facies of the SSC, the irradial type of facies ($p<0.001$) was observed more often than in the control group - a marker of failure of the body's adaptive mechanisms, markers of chronic intoxication - toxic plaques ($p<0.005$), signs of acute and chronic inflammatory processes - lingual

structures ($p<0.001$), sickle-shaped structures indicating necrobiotic processes ($p<0.002$), markers of vasospasm and microcirculation disorders - comb structures ($p<0.001$) and streaky cracks ($p<0.001$), markers of hypoxic and ischemic conditions - tourniquet blocks ($p<0.001$), as well as signs of deep metabolic disorders - dichotomies ($p<0.002$). In the control group, the presence of certain pathological structures was associated with the presence of extragenital pathology (EGP) in patients, including vegetative-vascular dystonia, cervical osteochondrosis, and chronic inflammatory processes (chronic tonsillitis, chronic bronchitis, etc.). When studying the supernatant facies of the uterine vulva (MV) of healthy women, it was noted that 43.8% of cases had a radial facies type, while 56.2% had a partial-radial type, considered a normal variant. The supernatant facies of the MV differed significantly from the facies of the uterine cavity (SCC). Thus, in 100% of cases, triradiate fissures were found in the central zone of the supernatant MV, which is normal in this case, as MV are stagnant due to their temporary presence in the uterine cavity.

It should be noted that in the supernatant facies of the peripheral blood of the control group, in contrast to the facies of the peripheral blood complex, no cases of pathological inclusions were observed. This confirms the diagnostic value of the MB study, since the influence of the existing EGP on the structure of the peripheral blood facies cannot be ruled out. Examining the supernatant facies of the peripheral blood of patients with AUB, it was revealed that the radial type was observed in 43.9% of cases, partially radial in 41.5%, and irradial in 12.1%, which is a marker of profound metabolic disorders in the body. Toxic plaques were found in 12.2% and dead-end fissures in 9.8%, which are markers of intoxication. Lingual structures, markers of the inflammatory process, were observed in 41.5% of cases, with lingual fields being found in 9.8%, indicating a pronounced inflammatory process. In addition, markers of vasospasm and microcirculation disorders were identified — ridge structures (7.3%) and streaky fissures (19.5%); markers of necrobiosis — sickle-shaped elements (4.9%); markers of tension of adaptive mechanisms of homeostasis — "twist" cracks (44%); markers of hypoxic and ischemic processes in tissues — cord-like formations (14.6%); markers indicating deep metabolic disorders in the body — dichotomies (41.5%). In contrast to the structure of the construction of the facies of the supernatant of the uterine fluid of the control group, where three-beam fissures in the central zone were observed in 100% of cases, in the facies of women with AUB, three-beam fissures were detected only in 61%. This is due to the fact that with profuse bleeding, the factor of long-term presence of pathological uterine fluid in the uterine cavity is excluded. When conducting a correlation analysis of the obtained data, a relationship was observed between the presence of pathological structures in the facies of the CF supernatant and existing gynecological diseases in patients with AUB.

Thus, chronic endometritis correlated with the presence of toxic plaques ($r \approx 0.3$) (Fig. 2), and the presence of leukocyte infiltration in the endometrial tissues, revealed by histological examination, was combined with toxic plaques ($r \approx 0.4$) and tongue-shaped structures ($r \approx 0.4$) (Fig. 3). The presence of uterine fibroids correlated with markers of vasospasm - pectinate structures ($r \approx 0.2$) (Fig. 4); markers of hypoxic conditions and ischemia - tourniquets ($r \approx 0.3$) (Fig. 5); markers of intoxication - dead-end fissures ($r \approx 0.2$). Thus, this study confirms the diagnostic value of examining the uterine cavity and uterine tract using the Lithos-System technology, which allows not only to identify the leading causes of AUB but also to conduct differential diagnosis of markers of extragenital and genital pathologies.

Today, uterine tract is a poorly studied biochemical marker that provides a wealth of information about the condition of a woman's reproductive organs.

CONCLUSIONS

1. Using microbiological imaging in the diagnosis of gynecological pathologies using the Lithos-System technology allows for the rapid and cost-effective acquisition of objective information on the condition of the female reproductive system in a prenatal clinic setting, using small volumes of biopsy specimens.

2. The non-invasive and atraumatic nature of the sample collection method, as well as the ease of processing and storage, opens up extensive opportunities for screening studies, patient follow-up, and the identification of women at risk for developing AUB. The ability to interpret the obtained information is one of the challenges of modern gynecological practice**.**

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ISSN(Online): 2984-6730
Volume-9, Issue-01, Published |16-01-2026|

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