

THE INFLUENCE OF THE GENITAL MICROBIOME AND SEXUALLY TRANSMITTED INFECTIONS ON THE DEVELOPMENT OF ENDOMETRIAL HYPERPLASIA WITHOUT ATYPIA

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Proliferative processes in the uterus, in particular endometrial hyperplasia (EH), are an important problem in gynecology, as they can lead to impaired reproductive health in women. The aim of the study was to investigate the prevalence of opportunistic pathogens and sexually transmitted infections in the vagina and uterine cavity among women with GE without atypia. Materials and methods. The study included 55 patients with abnormal uterine bleeding (AUB) in whom, after surgical removal of the functional layer of the endometrium by curettage, EH was diagnosed. The control group consisted of 35 women with secretory changes in the endometrium. Microbiological and bacteriological examination of the biopsy from the uterus and vaginal contents was carried out by standard methods. Determination of pathogens of sexually transmitted infections was carried out by ELISA and PCR methods. The significance of the intergroup relationships by quantitative distribution was determined using the nonparametric coefficient χ^2 , due to small samples. The difference between subgroups was considered significant at $p < 0.05$. Results. Gardnerella vaginalis was significantly more frequently detected in women with EH (12.7% versus 2.9% in the control group), with an odds ratio (OR) of 4.96. Mycoplasma hominis also significantly increases the risk of EH (34.5% in women with EH, OR = 5.04). The frequency of detection of Candida albicans in women with EH was 38.2%, which exceeds the indicators in the control group. Contamination of the uterine cavity with vaginal microflora (for example, Escherichia coli and Proteus vulgaris) is also associated with pathological changes in the endometrium. Chronic endometritis is more common in women with EH (6.1% vs. 3.7% in the control group), which emphasizes the role of chronic inflammation in the development of proliferative processes. Conclusions. The study confirmed the relationship between infectious-inflammatory processes and the development of EH. The data obtained indicate the need for timely diagnosis and treatment of sexually transmitted infections to prevent the development of EH. Careful control of the vaginal microflora is an important component of prevention. The importance of integrating microbiological examination into routine gynecological practice is emphasized to increase the effectiveness of EH treatment and prevent recurrences.

Key words: endometrial hyperplasia, endometrial proliferative processes, infection, vaginal microbiome, endometrial microbiome, microbial colonization of the uterus.

Proliferative processes in the uterus, such as endometrial hyperplasia (EH), are an important problem in gynecological practice, as they can lead to serious consequences for women's health. One of the possible risk factors for the development of these processes is the presence of opportunistic and sexually transmitted infections (STIs) affecting the female body. Research based on data analysis helps to better understand this relationship.

Microbial colonization plays a significant role in the physiological functions of many organs, and changes in the microbiome can be accompanied by the development of various pathologies. The role of chronic inflammation in the development of proliferative processes in the endometrium (EH, polyps), which is closely related to the state of the vaginal microbiome [1, 2].

In modern literature, there is a large number of

publications and evidence that change the long-standing idea of a sterile environment of the uterine cavity. Microbial colonization of the endometrium and its metabolic activity, which participate in various processes in the endometrium, are important for the functioning of the endometrium and, possibly, for the normal development of pregnancy [1, 2]. Recent studies have examined the relationship between the presence of bacteria in the uterus, proliferative processes of the uterus [3, 4]. Most of the work is devoted to the relationship between the uterine microbiome and its influence on the endometrial immune system, which is an important factor in its proper function of the endometrium [5, 6]. It has been proven that bacteria can also influence the morphology of endometrial cells and tissue, and protect against the penetration and reproduction of pathogenic species of microorganisms. This makes the endometrial microbiome essential for the regeneration of the endometrium in the proliferative phase and the subsequent susceptibility of the endometrium to decidualization and normal placental development [7, 8]. There are still few studies that would assess the influence of the endometrial microbiome on the development of endometrial hyperplasia, there is very little useful information about microbial colonization of the uterine mucosa and their functions. Further studies of the state of the uterine cavity microbiome will allow us to supplement information about its participation in functional processes and pathogenesis of the development of endometrial hyperproliferative conditions.

The **aim** of the study was to investigate the prevalence of opportunistic pathogens and sexually transmitted infections in the vagina and uterine cavity among women with GE without atypia.

MATERIALS AND METHODS

The work was carried out during 2023-2024 with the involvement of clinical materials of the KNP "City Clinical Hospital No. 6" DMR in the city. Dnipro, which is the clinical base of the Department of Obstetrics and Gynecology of Dnipro State Medical University, under the research program "Development of new approaches to the diagnosis, treatment and prevention of gynecological and obstetric pathology" (state registration number 0118u001277).

The study included 55 patients with abnormal uterine bleeding (AUB) in whom after surgical removal of the functional layer of the endometrium by curettage, NEH was diagnosed. The control group consisted of 35 women with secretory changes in the endometrium.

Bacteriological studies were performed in all women to determine the qualitative and quantitative composition of the microbial flora in the vaginal environment after stopping the bleeding. The

endometrial scraping taken during surgical stopping of bleeding was immediately placed in a container with a transport medium for aerobic and anaerobic flora.

Microscopic examination was carried out by examining Gram-stained smears with the determination of the main morphological types of bacteria (rod-shaped, coccoid, coiled and mixed). Qualitative microbiological examination was carried out in stages from sowing vaginal contents and scrapings onto elective media, and then onto solid differential diagnostic nutrient media. Isolation of anaerobes was carried out on enriched blood agar, under anaerobic cultivation conditions in an anaerostat. Identification of isolated microorganisms, as a rule, was carried out to the genus or family in accordance with the Bergey determinant.

The concentration of bacteria was determined by sowing a series of solutions of bacterial suspensions onto solid nutrient media with subsequent counting of colonies that grew on the agar surface. The concentration or titer of bacteria was expressed in colony-forming units per 1 ml (CFU/ml).

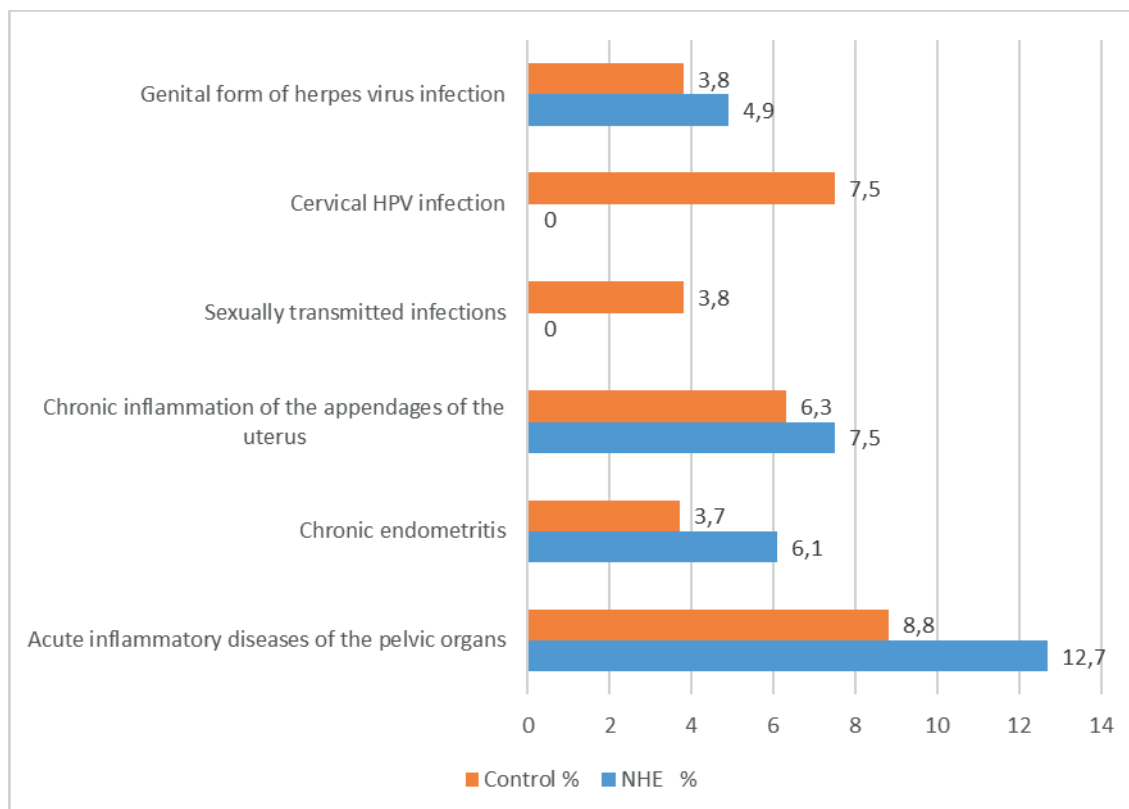
The determination of sexually transmitted infections (*Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoea*, *Mycoplasma genitalium*) was performed using ELISA and PCR methods.

The study compared two groups of women: the first group consisted of 55 women with endometrial hyperplasia, all women underwent immunohistochemical examination of endometrial biopsy, the second group consisted of 35 women from the control group who did not have this diagnosis. The main objective of the study was to determine how often certain STIs occur among women with proliferative processes in the uterus compared to the control group.

Statistical analysis was carried out in the software environment R version 3.4.1 (2017-06-30); the R Foundation for Statistical Computing Platform: x86_64-w64-mingw32/x64 (64-bit) under license from GNU General Public License. The reliability of intergroup relationships by quantitative distribution was determined using a nonparametric coefficient χ^2 , due to small samples. The difference between the subgroups was considered reliable at $p < 0.05$ [9].

RESEARCH RESULTS

Inflammatory diseases of the female reproductive organs can be a likely predictor of hyperplastic lesions of the endometrium, separate localizations of infectious and inflammatory diseases of the pelvic organs, the structure of which is presented in Fig. 1.



Note: * – statistical difference with the indicators of the control group, $p < 0.05$

Fig. 1. The frequency of infectious and inflammatory diseases of the genital organs in the anamnesis of women with NHE and control group, (%)

The frequency of infectious and inflammatory diseases of the genital organs among women from different clinical groups is presented in percentages. The comparison is made between women with EH and the control group. In women with EH, the frequency of diseases is slightly higher (12,7%) compared to the control group (8,8%). This indicates that women with EH are at a higher risk of developing acute inflammatory processes. The frequency of chronic endometritis in women with EH is 6,1%, which is higher than in the control group (3,7%). The frequency of chronic inflammatory processes of the uterine appendages is relatively similar between the groups: 7,5% for EH and 6,3% for the control group. Sexually transmitted infections (STIs) were not detected among women with EH but had a frequency of 3,8% in the control group. This may suggest a trend toward a lower prevalence of STIs among women with EH. Cervical HPV infection was not detected in women with EH, while in the control group, it was found at a frequency of 7,5%. This may also suggest a certain protective role of EH against this infection. The frequency of genital herpesvirus infection in the EH group

is 4,9%, while in the control group, this figure is 3,8%, indicating a slightly higher frequency of this infection in women with EH.

Data analysis indicates that women with EH have a higher frequency of acute and chronic inflammatory diseases compared to the control group. This may indicate an increased risk of developing such pathologies in women with EH. The absence of STIs and cervical HPV infection among women with EH suggests that these infections may not be the primary risk factors for the development of EH, or EH may have a certain protective effect. Women with EH have a slightly higher frequency of genital herpesvirus infection, which may indicate a certain connection between this infection and the development of EH; however, this connection requires further investigation. Overall, the results indicate that women with EH may be more susceptible to certain infectious and inflammatory diseases, which requires closer monitoring and timely diagnosis in clinical practice.

To clarify the role of vaginal microflora contamination in the genesis of endometrial hyperproliferation, we conducted an analysis

of the spectrum of aerobic and anaerobic microflora in vaginal secretions and uterine aspirates by culturing biological material on differential diagnostic media.

Table 1 provides data on the frequency of detection of various STIs in women with endometrial hyperplasia and in the control group. The study was conducted by culturing biological material from vaginal secretions and uterine aspirates on differential diagnostic media to determine the spectrum of aerobic and anaerobic microflora.

Data analysis from the study comparing women with endometrial hyperplasia and women from the control group indicates a significant association between infections such as *Gardnerella vaginalis*, *Trichomonas vaginalis*, *Candida albicans*, *Mycoplasma hominis*, *Ureaplasma urealiticum*, and *Chlamydia trachomatis*, and the development of this pathology.

In women with endometrial hyperplasia,

Gardnerella vaginalis was detected in 12,7% of cases (7 out of 55), significantly higher than in the control group — only 2,9% (1 out of 35). This suggests a possible link between the presence of *Gardnerella vaginalis* and the development of endometrial hyperplasia. Specifically, for *Gardnerella vaginalis*, the odds ratio (OR) is 4,96, indicating an almost fivefold increase in the risk of developing endometrial hyperplasia in women with this infection compared to the control group. *Mycoplasma hominis* also shows a high risk, with an OR of 5,04, indicating a fivefold increased likelihood of developing the pathology.

Mycoplasma hominis was found in 34,5% of cases among women with endometrial hyperplasia (19 out of 55), compared to 11,4% in the control group (4 out of 35). This may indicate the influence of this infection on the development of hyperplasia.

Table 1

The structure of sexually transmitted infections in examined women

Pathogens	Endometrial hyperplasia (n =55)		Control group (n =35)	
	n	%	n	%
<i>Gardnerella vaginalis</i>	7	12,7*	1	2,9
<i>Trichomonas vaginalis</i>	8	14,5	-	-
<i>Candida albicans</i>	21	38,2*	5	14,3
<i>Mycoplasma hominis</i>	19	34,5*	4	11,4
<i>Ureaplasma urealiticum</i>	16	29,1	8	22,9
<i>Chlamydia trachomatis</i>	17	30,9*	4	11,4

Note: * – statistical difference with the indicators of the control group, $p < 0,05$

Trichomonas vaginalis was detected in 14, 5% of women with endometrial hyperplasia (8 out of 55), while in the control group, this infection was not detected at all. This may indicate that *Trichomonas vaginalis* could play a role in the development of this pathology. The presence of *Trichomonas vaginalis* appears to be particularly dangerous, as it was not recorded in the control group. This suggests an extremely high risk of developing endometrial hyperplasia when infected with *Trichomonas vaginalis*.

Candida albicans was detected in 38,2% of cases among women with endometrial hyperplasia (21 out of 55), significantly more than in 14,3% of the control group (5 out

of 35). These data indicate a possible link between *Candida albicans* and pathological endometrial proliferation. The *Candida albicans* infection has an odds ratio of 3,71, indicating a significant increase in the risk of developing endometrial hyperplasia — 3,71 times higher compared to the control group. This underscores the importance of this infection as a risk factor for women's health.

Ureaplasma urealiticum occurred in 29,1% of cases in women with hyperplasia (16 of 55), which was slightly higher than in the control group (22,9%, or 8 of 35). Although the difference is less pronounced, it may also indicate a potential effect of this infection. *Ureaplasma urealiticum* infection

showed an OR = 1,38, indicating only a slight increase in the risk of developing endometrial hyperplasia, but still emphasizing the need for monitoring and treatment of this infection. Finally, Chlamydia trachomatis has an OR = 3,37 which also indicates an increased risk of endometrial hyperplasia.

Chlamydia trachomatis was found in 30,9% of cases among women with endometrial hyperplasia (17 of 55), significantly higher compared to 11,4% in the control group (4 of 35). This indicates a potential connection between the presence of this infection and the development of pathological proliferation of the endometrium.

The results of the study indicate that the presence of certain sexually transmitted infections, such as Gardnerella vaginalis, Trichomonas vaginalis, Candida albicans, Mycoplasma hominis and Chlamydia trachomatis, is significantly more often associated with the development of endometrial hyperplasia compared to controls. This suggests that the contamination of the vaginal microflora can play an important role in the genesis of hyperproliferative processes in the uterus, emphasizing the importance of timely diagnosis and treatment of these infections

for the prevention of gynecological diseases. These results emphasize the importance of timely diagnosis and treatment of STIs to prevent serious gynecological complications. In particular, infections with Mycoplasma hominis, Gardnerella vaginalis, and Candida albicans have the greatest impact on the development of endometrial hyperplasia. This study shows that prevention and effective treatment of these infections can significantly reduce the risk of developing pathological processes in the uterus, thereby ensuring a better health status for women.

It is believed that the uterine cavity belongs to the sterile microecological niche of the body. The conducted study showed that there was no growth of microflora in uterine cultures of women of the control group, while individual representatives of vaginal microflora were found in the uterine cavity of women with NEH.

Table 2 provides data on the spectrum of opportunistic pathogens detected simultaneously in the uterine cavity and in the vagina of women with EH. The study was conducted to clarify the role of vaginal microflora contamination in the genesis of hyperproliferative processes in the uterus.

Table 2

The spectrum of microbial pathogens that were detected simultaneously in the uterine cavity and in the vagina of women with endometrial hyperplasia, n=55

Pathogens	From the uterine cavity	From the vagina	Correlation coefficient, r
Escherichia coli	3,6% (2/55)	10,9% (6/55)	0.96
Proteus vulgaris	5,5 (3/55)	7,3% (4/55)	0.94
Enterococcus	3,6% (2/55)	10,9% (6/55)	0.96
Staphylococcus	5,5% (3/55)	10,9% (6/55)	0.95
Streptococcus	7,3% (4/55)	12,7% (7/55)	0,80
Micoplasma hominis	9,0% (5/55)	14,5% (8/55)	0,82
Ureaplasma urealyticum	3,6% (2/55)	7,3% (4/55)	0.93
Corynebacterium	3,6% (2/55)	9,0% (5/55)	0.94
Micrococcus	3,6% (2/55)	5,5% (3/55)	0.92

Endometrial hyperplasia is one of the important gynecological problems that requires careful study of its etiology and risk factors. One of the possible factors is contamination of the uterine cavity with vaginal microflora, which can lead to pathological changes in the mucous membrane of the uterus. This essay will analyze the effect of various microorganisms

found both in the vagina and in the uterine cavity on the development of endometrial hyperplasia, taking into account correlations and Odds Ratio (OR) indicators. Analysis of the impact of detected microorganisms on the occurrence of proliferative changes in endometrium is important for understanding alternative ways of their initialization.

Escherichia coli was detected in 3,6% of cases in the uterine cavity of women with endometrial hyperplasia with a concentration of $2,2 \pm 0,31$ lg CFU/ml. In the vagina, this microorganism was found more often - in 10,9% of cases with a higher concentration of $3,4 \pm 0,23$ lg CFU/ml. The OR for *Escherichia coli* is , and the correlation coefficient (r) between vaginal and uterine presence of this pathogen is 0.96. This indicates that *Escherichia coli* is a common representative of the vaginal microflora, and its presence in the uterus may be the result of an ascending infection.

Proteus vulgaris was detected in 4,9% of cases in the uterine cavity with a concentration of $2,4 \pm 0,42$ lg CFU/ml, while in the vagina it was detected in 6,6% of cases with a concentration of $2,7 \pm 0,49$ lg CFU/ml / ml. The OR for *Proteus vulgaris* is 1,22 and the correlation coefficient (r) is 0,68. This microorganism is known for its opportunistic pathogenic status, which is activated under certain conditions, such as a violation of the vaginal microflora or after medical interventions. Its presence in the uterus may be associated with the risk of developing infectious complications.

Enterococcus was detected in 1,6% of cases in the uterine cavity with a concentration of $2,1 \pm 0,15$ lg CFU/ml and in 10,9% of cases in the vagina with a concentration of $3,5 \pm 0,22$ lg CFU/ml. The OR for *Enterococcus* is 0,45 and the correlation coefficient (r) is 0,54. A higher level of *Enterococcus* in the vagina indicates its typical location in the lower parts of the reproductive tract. A low concentration in the uterine cavity may indicate accidental contamination or a past infectious process.

Staphylococcus was detected in 4,9% of cases in the uterine cavity with a concentration of $2,5 \pm 0,26$ lg CFU/ml and in 10,9% of cases in the vagina with a concentration of $2,9 \pm 0,36$ lg CFU/ml. The OR for *Staphylococcus* is 1,29 and the correlation coefficient (r) is 0,76. The presence of *Staphylococcus* in the uterus and vagina may be related to its opportunistic pathogenic status. This microorganism is able to cause infections under certain conditions, for example, with immunodeficiency.

Streptococcus was detected in 6,6% of cases in the uterine cavity with a concentration of $2,8 \pm 0,51$ lg CFU/ml and in 11,5% of cases

in the vagina with a concentration of $3,2 \pm 0,58$ lg CFU/ml. The OR for *Streptococcus* is 1,39 and the correlation coefficient (r) is 0,80. *Streptococcus* is often a component of the normal microflora of the vagina, but its presence in the uterus may be the result of ascending infection or contamination.

Mycoplasma hominis was detected in 8,2% of cases in the uterine cavity with a concentration of $3,4 \pm 0,36$ lg CFU/ml and in 13,1% of cases in the vagina with a concentration of $3,8 \pm 0,33$ lg CFU/ml. The OR for *Mycoplasma hominis* is 4,08 and the correlation coefficient (r) is 0,82, which are the highest of all pathogens tested. This indicates a significant impact of *Mycoplasma hominis* on the development of endometrial hyperplasia.

Ureaplasma urealyticum was detected in 3,6% of cases in the uterine cavity with a concentration of $2,0 \pm 0,12$ lg CFU/ml and in 6,6% of cases in the vagina with a concentration of $2,4 \pm 0,52$ lg CFU/ml. The OR for *Ureaplasma urealyticum* is 1,12 and the correlation coefficient (r) is 0,66. The low concentration of this microorganism in the uterus may indicate a minor influence on the development of pathology, but its presence still deserves attention.

Corynebacterium was detected in 3,6% of cases in the uterine cavity with a concentration of $2,3 \pm 0,25$ lg CFU/ml and in 8,2% of cases in the vagina with a concentration of $2,8 \pm 0,4$ lg CFU/ml. The OR for *Corynebacterium* is 1,30 and the correlation coefficient (r) is 0,74. The presence of *Corynebacterium* in the uterus may be a sign of contamination from the vaginal microflora.

Micrococcus was detected in 3,6% of cases in the uterine cavity with a concentration of $2,4 \pm 0,12$ lg CFU/ml and in 4,9% of cases in the vagina with a concentration of $2,7 \pm 0,26$ lg CFU/ml. The OR for *Micrococcus* is 1,15 and the correlation coefficient (r) is 0,70. As an opportunistic microorganism, *Micrococcus* is present in small amounts both in the vagina and in the uterus, which indicates a low risk of developing an active infection.

CONCLUSIONS

Endometrial hyperplasia (EH) is one of the most important problems in modern gynecology, which requires a detailed study of its etiology and risk factors. One of the possible factors influencing the develop-

ment of this pathology is infections, in particular sexually transmitted infections (STIs). This study is aimed at analyzing the relationship between infections and proliferative processes in the uterus, which helps to better understand the mechanisms of endometrial hyperplasia.

The results of the study showed that certain STIs, such as *Gardnerella vaginalis*, *Trichomonas vaginalis*, *Candida albicans*, *Mycoplasma hominis*, and *Chlamydia trachomatis*, were significantly more common in women with endometrial hyperplasia compared to controls. This relationship emphasizes the importance of timely diagnosis and treatment of infections to prevent serious gynecological complications.

One of the most significant infections affecting the development of EH is *Mycoplasma hominis*. The study found that women with endometrial hyperplasia had the highest rate of infection with *Mycoplasma hominis* of all infections and had a significant hazard ratio (OR = 4,08). This fact indicates that *Mycoplasma hominis* can play a key role in the development of proliferative processes in the uterus, which requires special attention from doctors.

Another significant infection is *Gardnerella vaginalis*, which was found in 12,7% of women with endometrial hyperplasia, which is significantly higher than in the control group (2,9%). This suggests that *Gardnerella vaginalis* may be an important risk factor for EH. Also, the frequency of *Candida albicans* infection was significantly higher among women with endometrial hyperplasia (38,2%), indicating the need to pay more attention to the monitoring and treatment of this infection.

Interestingly, infections such as *Trichomonas vaginalis* and cervical HPV infection were not detected in women with endometrial hyperplasia, whereas these infections were more common in the control group. This may indicate that these infections are not the main risk factors for the development of endometrial hyperplasia, or the pathology itself creates some protection against these pathogens.

In addition to the direct influence of infections on the development of EH, the study also showed a high level of correlation between the microflora of the vagina and the uterus. This emphasizes the importance of careful control of the vaginal microflora to prevent infections that can penetrate the uterus and contribute to the development of proliferative processes.

Thus, this study highlights the importance of timely diagnosis and treatment of infections for the prevention of gynecological diseases. The detection of *Mycoplasma hominis*, *Gardnerella vaginalis* and other infections as potential triggers for the development of

endometrial hyperplasia indicates that control of the condition of the vaginal microflora can be a key factor in preventing the development of this pathology. In the future, this can significantly improve women's health and reduce the risk of serious complications.

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INFORMATION ON CONFLICT OF INTEREST.

The authors declare that there is no conflict of interest.

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РЕЗЮМЕ

**ВПЛИВ МІКРОБІОМУ СТАТЕВИХ
ОРГАНІВ ТА ІНФЕКЦІЙ, ЩО
ПЕРЕДАЮТЬСЯ СТАТЕВИМ
ШЛЯХОМ НА РОЗВИТОК ГІПЕРПЛАЗІЇ
ЕНДОМЕТРІЯ БЕЗ АТИПІЇ
ХАСХАЧИХ Д.А.**

Проліферативні процеси в матці, зокрема гіперплазія ендометрія (ГЕ), є важливою проблемою в гінекології, оскільки можуть призводити до порушення репродуктивного здоров'я жінок. **Метою** дослідження було дослідити розповсюдженість

серед жінок з ГЕ без атипії умовно патогенних мікроорганізмів та інфекцій, що передаються статевим шляхом в піхві і порожнині матки. **Матеріали та методи.** В дослідження було включено 55 пацієнток з аномальною матковою кровотечею (АМК) у яких після хірургічного видалення функціонального шару ендометрія шляхом кюретажу діагностована гіперплазія ендометрія без атипії (НГЕ). Контрольну групу склали 35 жінок з секреторними змінами ендометрію. Проводилося мікробіологічне і бактеріологічне дослідження біоптату з матки і вмісту піхви стандартними методами. Визначення збудників інфекцій, які передаються статевим шляхом проводили методами ІФА і ПЛР. Достовірність міжгрупових зв'язків за кількісним розподілом визначали за допомогою непараметричного коефіцієнта χ^2 , у зв'язку з малими виборками. Відмінність між підгрупами вважали достовірною при $p < 0,05$. **Результати.** *Gardnerella vaginalis* значно частіше виявляється у жінок із ГЕ (12,7% проти 2,9% у контрольній групі), із відношенням шансів (OR) 4,96. *Mycoplasma hominis* також суттєво підвищує ризик розвитку ГЕ (34,5% у жінок із ГЕ, OR = 5,04). Частота виявлення *Candida albicans* у жінок із ГЕ становила 38,2%, що перевищує показники у контрольній групі. Контамінація маткової порожнини мікрофлорою піхви (наприклад, *Escherichia coli* та *Proteus vulgaris*) також асоціюється з патологічними змінами ендометрія. Хронічний ендометрит частіше виявляється у жінок із НГЕ (6,1% проти 3,7% у контрольній групі), що підкреслює роль хронічного запалення у розвитку проліферативних процесів. **Висновки.** Дослідження підтвердило зв'язок між інфекційно-запальними процесами та розвитком ГЕ. Отримані дані свідчать про необхідність своєчасної діагностики та лікування інфекцій, що передаються статевим шляхом, для запобігання розвитку ГЕ. Ретельний контроль вагінальної мікрофлори є важливим компонентом профілактики. Підкреслюється важливість інтеграції мікробіологічного обстеження в рутинну гінекологічну практику для підвищення ефективності лікування ГЕ і профілактики її рецидивів.

Ключові слова: гіперплазія ендометрія, проліферативні процеси ендометрія, інфекція, мікробіом піхви, мікробіом ендометрія, мікробна колонізація матки.