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# Modern Approaches to the Treatment of Bacterial Vaginosis during Pregnancy

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**Abstract:** The problem of violations of vaginal microbiocenosis during pregnancy is of particular importance in obstetric practice, since changes in the vaginal microflora lead to a complicated course of pregnancy, childbirth and the postpartum period, as well as to the development of infectious and inflammatory processes in the mother and fetus [10].

Clinical studies in recent years have shown the need to treat bacterial vaginosis (BV) during pregnancy [2, 8, 9, 12, 16, 19, 20, 22]. However, to date, this remains a difficult task, which is largely due to the possible negative effect of etiotropic drugs on the fetus, especially in early pregnancy [1, 3, 16, 19].

**Key words:** bacterial vaginosis pregnancy, chlorhexidine, vaginal microcenosis.

Most of the drugs used for the treatment of bacterial vaginosis are allowed for use only in the second and third trimesters of pregnancy [16,19, 20, 22]. Only local therapy with antiseptics, which are no less effective, is allowed for use in all trimesters of pregnancy.

Modern criteria for choosing an antiseptic should to be based on compliance with the principle of drug safety in combination with its high clinical efficacy. With local treatment, systemic absorption of the drug and the likelihood of adverse reactions are reduced and practically absent, there is a direct injection of the drug into the focus of infection, which allows you to reduce the course dose of the drug. In the modern literature, there is practically no data on the treatment of vaginosis in the early stages of gestation, which, apparently, is due to insufficient information about the safety of etiotropic drugs.

The preparation – vaginal candles containing 0.016 g of chlorhexidine bigluconate and a water-soluble base, is allowed for use during pregnancy. Chlorhexidine is one of the most active local antiseptics with a wide spectrum of action against Gram-positive and Gram-negative bacteria, protozoa, viruses, fungi. The drug has the following mechanism of action: chlorhexidine salts dissociate in the physiological environment, the cations released in this case bind to negatively charged shells bacteria. Even in low concentrations, chlorhexidine can cause a violation of the osmotic balance of bacterial cells, their loss of potassium and phosphorus, which serves as the basis for the bactericidal effect of chlorhexidine. The water-soluble base of the drug, having high osmotic activity and weak bactericidal action, actively adsorbs exudate, which also helps to suppress the growth of microorganisms and ensures faster penetration of drugs into tissues. The drug is widely used in gynecological practice [5].

**The purpose** of this study is to study the effectiveness of the drug with chlorhexidine in the form of vaginal candles in patients with BV who are in the early stages of pregnancy, and to analyze the further course of pregnancy, childbirth, the postpartum period and the condition of newborns.

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**Materials and methods of research.**

80 pregnant women at high risk of infectious complications were examined: 23 (28.8%) in the first, 25 (31.2%) in the second and 32 (40%) in the third trimesters of pregnancy. The criteria for including patients in the treatment group with vaginal candles with chlorhexidine were: diagnosis of BV, age 18-41 years and in the I, II, III trimester of pregnancy. The exclusion criteria are the detection of STIs.

The assessment of the state of vaginal microcenosis was carried out on the basis of microscopy of Gram-stained vaginal smears and cultural examination of the vaginal contents for facultative anaerobic bacteria, yeast-like fungi, genital mycoplasmas and lactobacilli. The degree of microbial contamination was determined by the method of sectorial seeding of the vaginal discharge on 5% blood agar, Saburo medium and MRS. Species identification of microorganisms was carried out by conventional methods. Activation of opportunistic viral infections (cytomegalovirus infection and genital herpes) was detected using PCR diagnostics in vaginal scrapings.

Microbiological diagnosis of BV by microscopy of vaginal gram smears was based on the following criteria:

1) the presence of "key" cells;

2) the absence of a pronounced leukocyte reaction;

3) massive microbial contamination with a predominance of morphotypes of obligate anaerobic bacteria (bacteroids, mobiluncus, fusobacteria, leptotrichia) and gardnerella;

4) the absence or identification of single gram-positive rods of the lactobacillus morphotype in the field of view.

**The results of the study.**

Of the 23 women in the first trimester of pregnancy, normocenosis (H) was detected in 8 (34.8%), BV in 9 (39.2%), vaginal candidiasis (VC) in 3 (13%), nonspecific vaginitis (NV) in 3 (13%). In the second trimester (25 pregnant women) (H) was diagnosed in 13 women (52%), BV – in 6 (24%), VC – in 2 (8%), NV – in 4 (16%). In the third trimester of pregnancy (32 patients), microcenosis met the normal criteria in 23 women (71.9%), vaginal infections (BV, VC, NV) were diagnosed in 6 (18.8%), 2 (6.3%) and 1 (3%) women, respectively.

The average age of pregnant women was 22 ± 2 years. The average age of menarche is 13 ± 1.5 years. The menstrual cycle was regular in 10 (12.5%) patients. Gynecological history was burdened in most patients: chronic endometritis – in 9 (11.3%); chronic salpingopharitis – in 8 (10%); cervical erosion – in 12 (15%); genital herpes with periodic exacerbations before pregnancy in 6 (7.5%); vaginal warts in 5 (6.3%); uterine fibroids – in 3 (3.8%).

According to the reproductive history: infertility in the anamnesis – in 5 pregnant women (6.3%); pregnancy after IVF and PE – in 1 (1.3%); undeveloped pregnancies in the anamnesis – in 8 (10%); spontaneous miscarriages in the anamnesis – in 8 (10%) pregnant women; premature birth in anamnesis in 5 (6.3%). Complaints characteristic of BV (unpleasant odor of abundant milk-colored secretions) were presented only by 14.5% of pregnant women. Thus, bacterial vaginosis during pregnancy was asymptomatic in most patients and was detected only during examination.

Microscopy data initially revealed "key" cells and massive microbial contamination of the vaginal discharge in all pregnant women with BV. The microflora was represented by polymicrobial associations, among which the morphotypes of gardnerella (76.6%) and bacteroids (34.7%) were most common. In 12 women (23.5%), single morphotypes of lactobacilli were found in the field of view.

The culture study revealed facultative anaerobic microorganisms in a high titer: group B streptococcus (3.5%), enterococcus (3.5%), epidermal staphylococcus (22.3%), non-pathogenic

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corynebacteria (9.3%). Lactobacilli were isolated in 26 (32.5%) women in a titer not exceeding 4 lg CFU/tampon. A study on genital mycoplasmas showed that in 54 (67.5%) women BV was combined with excretion *Ureaplasma urealyticum,* mainly in a titer exceeding 104 UIC/ml.

After treatment, elimination of microorganisms associated with BV was achieved in 75 women (93.6%). Normalization of the titer of lactobacilli (6-8 lg CFU/ml) was noted in 73 of them. In two women, the titer of lactobacilli was low (<4 lg CFU/ml), which required a second stage of treatment using vaginal candles containing chlorhexidine bigluconate in order to stimulate their reproduction. This therapy was effective.

In two patients (6.4%), it was not possible to achieve a positive effect of treatment: according to microscopy data, a high titer of BV-associated bacteria (Gardnerella in both cases) remained, lactobacilli morphotypes were absent and "key" cells were preserved. In the second trimester, these women were prescribed metronidazole systemically with a positive effect.

In one of 31 (3.2%) pregnant women with BV, group B streptococcus was isolated in large quantities, which is a risk factor for complications during gestation [13, 14]. The drug containing chlorhexidine proved to be effective in eliminating group B streptococcus. However, no similar effect was observed with respect to enterococci.

There were no complications such as vaginal candidiasis or nonspecific vaginitis among the observed pregnant women. The patients also did not complain about itching and burning in the vagina, which are possible when using the drug.

The analysis of the course of pregnancy, childbirth and the postpartum period was carried out in all the observed women. Childbirth and cesarean section operations proceeded without complications in all the observed women. Healthy full-term babies were born without visible malformations. Their condition was assessed on the Apgar scale at the 1st minute of life - 8-8 points, at the 5th minute – 8-9 points.

**DISCUSSION.**

Currently, it has become obvious that the idea of vaginal infections as purely isolated processes that do not entail reproductive health disorders and complications of the gestation period is a thing of the past. Suppression of colonization resistance of the vaginal microflora contributes to the ascending infection of the endometrium and fallopian tubes and the development of infectious and inflammatory diseases of the pelvic organs, which cannot but affect the reproductive health of women planning pregnancy [7].

Currently, a number of studies have been conducted indicating the role of dysbiotic disorders of vaginal microbiocenosis, in particular bacterial vaginosis (BV) in the development of pathology of pregnancy, childbirth and postpartum infectious complications [1, 7, 16, 19]. The first trimester of pregnancy is the most important in the formation and further development of the fetus. The majority of gestational losses (71.4–74.5%) occur precisely in the first trimester of pregnancy – terms from 5 to 12 weeks. At the same time, it was found that bacterial vaginosis occurs in 59% of women with miscarriage [1]. The frequency of BV in the early stages of gestation in the risk group reaches 33.5% [1], which is confirmed by our data (40.3%). At the same time, the risk of developing chronic placental insufficiency, premature birth, birth of children with low body weight, postpartum endometritis, and wound infection increases significantly more often [3, 6, 8, 11, 15, 17, 18, 21]. Thus, it can be assumed that accelerated diagnosis of vaginosis and the search for effective and at the same time safe drugs for early treatment of BV will significantly reduce the frequency of termination of pregnancy and other possible complications.

According to the results of a number of studies, clindamycin phosphate and metronidazole are most often used for the treatment of BV in the II and III trimesters of pregnancy, which reduces the frequency of premature birth [16, 19, 20, 22].

Thus, clinical and microbiological recovery occurred in 75 (93.6%) pregnant women. The persistent positive effect of treatment remained in 73 pregnant women. Despite the high risk of early termination of pregnancy, after BV treatment and dynamic follow-up during pregnancy, all women delivered healthy full-term babies with a body weight of 2,700-4,050 g without developmental abnormalities. The postnatal period in all newborns was without complications.

Summarizing the results of the study, it can be concluded that safety, high therapeutic activity, good tolerability of the drug, absence of side effects, ease of use, and affordability make it possible to recommend vaginal candles for the treatment of bacterial vaginosis in all stages of pregnancy.

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