

Candidiasis in parturients and newborn infants

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Abstract. Healthy full-term infants born in healthy women without dysbiotic disturbances of the colon microflora have transient microbiocenosis as shown by analysis of yeast-like *Candida* species identifying in dynamics. Infants in the first week of life from the second trial group have dysbiotic disorders in intestinal microbiocenosis. This is caused by a high prevalence of the yeast-like *Candida* species (54 infants - 75% of the total group). Consequently, in this group of infants the phase of increasing microbial contamination in the gastrointestinal tract is prolonged. There's no transformation of this phase to the end of the first week of life. Disbacteriosis develops in newborn infants of this group. The mother is the primary source of colonization of yeast-like *Candida* species in the newborn infants as shown by establishing the identity of these fungi isolated from neonatal meconium, as well as identifying of *Candida* obtained from the intestine of women in the third trimester of pregnancy.

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Introduction

Morphofunctional, physiological and biochemical changes in the genital tract during pregnancy lead to the uniformity of the vaginal microflora [1]. Due to the constantly low pH values one can notice development of conditions for the quantitative increase of facultative microorganisms [2]. And such conditions develop for the growth of mycoplasma and yeast-like *Candida* species [3]. Frequency of their identification in different risk groups of pregnant women increases up to 25-30% [4]. Vaginal microflora of parturients also plays an important role in the formation of normal intestinal microflora in infants [5].

Currently, bacterial candidiasis is an important infection of the vagina [6]. Dysbacteriosis plays an important role in the structure of infectious and inflammatory diseases of the female genital organs [7]. The problem of vaginal candidiasis (VC) became an issue of real clinical relevance [8]. The frequency of vaginal candidiasis has increased in recent years and according to different authors varies from 26 to 40-45% in the structure of infectious pathology of the lower division of reproductive system [9]. Vulvovaginal candidiasis is the second most common vaginal infection in the United States and the first most common vaginal infection in Europe [10].

Material and methods

The correct way of sampling and transporting of the biological material being is an important factor that significantly influences the success of the bacteriological diagnosis. So, taking biological sample should always be carried out prior to the treatment with antibacterial drugs or not earlier than 10 days after their termination, as well as prior to the other local therapeutic interventions.

An advance microscopy of Gram-stained smear was performed after transporting of the material.

Then a vaginal discharge was plated on Sabouraud nutrient medium containing penicillin and streptomycin.

Inoculations were incubated for 48 hours at +37 °C, whereupon Gram-stained smears were prepared from suspicious colonies; then *Candida* species were inoculated on Sabouraud nutrient medium and cultured in an incubator at 37 °C.

Candida species were identified by cell morphology and cultural properties.

Then semi-quantitative assessment of *Candida* growth was performed using four grade levels of microbial contamination:

0 – no growth on solid medium

1 - single colonies - growth of up to 10 colonies typical for *Candida* species on solid medium

2 - moderate growth – from 10 to 100 colonies

3 - massive growth - over 100 colonies on solid medium

Results and discussion

Analysis of the results showed that the average frequency of isolation of *Candida* species was 59.5%, fungi were detected in women of all examined groups: in 66.7% cases of healthy individuals, in 56% cases of pregnant women, in 56.8% cases of gynecological patients. So, healthy people were more likely to have *Candida* species than other categories of people.

Analysis of the number of *Candida* isolates from the same categories of people showed that the control group of people is characterized by different parameters in the number of *Candida* species including a fairly high level of contamination (massive growth was found in 3% of 10 women - grade 3).

Various amounts of *Candida* species were also found among pregnant women in the material, massive growth (grade 3) was found for 6 of 15 women.

The highest growth of *Candida* species (grade 3) was observed in women suffering from colpitis (2 of 6 women), cervical or vaginal dysplasia, erosion of the cervix (1 of 2 women) and in the group with unknown diagnosis (1 out of 10 women) and vaginal candidiasis (2 of 3 women). *Candida* species were detected in 7 of 9 women treated with antibiotics: 1 - (1), 4 - (2) 2 - (3).

In 1 patient treated for colpitis - grade 2 of microbial contamination, in 2 patients treated for ureaplasmosis – grade 2, in the group with unknown diagnosis (were treated one month before taking sample) – grade 1, 2 and 3.

It was found that *Candida* species in the vagina were found in a significant percentage of cases in various contingents of women, including healthy (up to 66%) and pregnant ones (58%) in considerable quantities. No quantitative regularities were established in the study group of people. It is known that *Candida* species can be detected in many healthy individuals: up to 50% from the oral cavity, gastro-intestinal tract (100%), and from the vagina (60%).

Given the high frequency of detection of *Candida* species and significant differences in quantitative parameters of *Candida* species in healthy people and patients with different pathologies of the genital tract, the fact of isolation of *Candida* species in an amount of 10^1 - 10^3 CFU/ml is apparently not enough to make the diagnosis of candidiasis.

We believe that quantitative dynamic approach is better for suspected candidiasis, i.e.

repeated quantitative studies should be carried out. This will increase the accuracy of diagnosis.

Thus, the frequency of isolation of *Candida* from the vagina differs in various contingents of women (healthy, pregnant women, sick ones) and varies from 56 to 66.7%. Semi-quantitative parameters of detected *Candida* species were ranged as 10^1 - 10^3 CFU/swab.

No quantified patterns for materials received from different contingents of women were found.

Determination of the sensitivity of *Candida* species to chemotherapeutics (nystatin, levorin, clotrimazole) revealed lower values of Minimum Inhibitory Concentration (MIC) to levorin and clotrimazole for most of the strains compared with nystatin.

We have analyzed the state of health, pregnancy, childbirth and the postpartum period in 92 women (mothers) according to outpatient cards of pregnant and medical case histories of childbirth. We have also analyzed bacteriological examination of the intestinal microflora in the last trimester of pregnancy and in observed healthy full-term newborn infants.

The observed couples “mother-child” were divided into two clinically comparable groups depending on the microbial ecology of women’s intestine in the last trimester of pregnancy and childbirth.

The first group included children born in mothers with normal pregnancy and childbirth - 20 infants.

An optimal intestinal biocenosis was observed in 100% of women from this group. Newborn infants were breastfed in 20 - 40 minutes after birth and were in rooming-in in maternity wards with breastfeeding mothers.

The second group included children born in women whose pregnancies proceeded against the background of microecological imbalance of the bowel - 72 infants. Grade 2 intestinal dysbiosis was observed in 25% of mothers from the second group, as demonstrated by the decrease in the level of *Lactobacillus* down to 10^5 - 10^6 CFU/g, *Bifidobacterium* down to 10^5 - 10^7 CFU/g of feces and detection of association of opportunistic pathogens (AOP), including yeast-like *Candida* species in small titers: 10^3 - 10^4 CFU/g of feces.

In 75% of cases there were more profound changes in the intestinal microflora of pregnant women, as demonstrated by a significant decrease in the level of *Lactobacillus* < 10^5 CFU/g and *Bifidobacterium* < 10^5 CFU/g of feces combined with pronounced changes in aerobic microflora. There were hemolytic forms of *E.coli* and those with enzymatic mutations (lactose negative, weak-fermenting stains). Association of opportunistic

pathogens including *Candida* fungi in high titers up to 10^6 - 10^7 CFU/g of feces were also detected.

Newborn infants were breastfed for 20-60 minutes of life and were in rooming-in in maternity wards with breastfeeding mothers.

Microbiological examination of newborn infants showed that intestinal microbiocenosis in newborns depends on intestinal microbiocenosis of pregnant women.

Analysis of the dynamics and the frequency of detection of *Candida* species in the feces of newborn infants revealed their considerably greater number in children born from women suffering from dysbiosis of the colon compared with children of the first group.

In newborn infants of the first group yeast-like *Candida* species were found in the feces in a few cases in an amount not exceeding 2.3 ± 0.5 Lg CFU/g, completely eliminating to the fifth - sixth day of life.

In children of the second group the number of yeast-like *Candida* species did not exceed 4.7 ± 0.52 Lg CFU/g, but their occurrence was considerably higher without the downward trend towards the end of the first week (5-6 days after birth).

Conclusion

Thus, the analysis of identifying yeast-like *Candida* species in dynamics revealed that healthy full-term infants born in healthy women without dysbiotic disturbances in the colon microflora is transient.

In the second group of infants on the first week of life microbiocenosis of the bowel has dysbiotic character because of the high prevalence of the yeast-like *Candida* species (54 infants - 75% of the total group).

Consequently, the phase of growing microbial contamination in the gastrointestinal tract in this group of children was prolonged. There's no transformation of this phase to the end of the first week of life. Disbacteriosis develops in newborn infants of this group.

Establishing the identity of these fungi isolated from the neonatal meconium, as well as the identity of the cultures of *Candida* species obtained from the women's intestine in the third trimester of pregnancy, one can say that the mother is the primary source of colonization of the newborn infant by *Candida* species.

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