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Original article

DISTRIBUTION OF *MYCOPLASMA* SPP. AND *UREAPLASMA* SPP. AMONG PREGNANT WOMEN

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SUMMARY:

The purpose of the present study is to determine the prevalence of genital mycoplasmas (*M. genitalium, M. hominis, U. parvum, U. urealyticum*) in pregnant women by molecular biological methods.

Material/Methods: A prospective epidemiological study of 107 pregnant women hospitalized in the Clinic of Obstetrics and Gynecology, University Hospital-Pleven, Bulgaria, was conducted. Vaginal secretion samples were taken from all 107 pregnant women. A Polymerase chain reaction (PCR) assay was used to detect the genomic DNA of the bacteria in pregnant women.

Results: The highest is the relative share of women in the age group from 20 to 35 years - 66 (64.68%), followed by women under 20 years - 27 (25.23%) and women over 35 years - 14 (13.08%). Detection of bacterial DNA was found in 85 (79.44%) of the cases, with present *Ureaplasma* spp. Colonization in 42 women (39.25%). Although no statistical dependence was found on open bacteria and age groups (p-value = 0.4688), it is noteworthy that the prevalence of *Mycoplasma* spp. and *Ureaplasma* spp. as a whole in the age group from 20 to 35 years, which has the highest birth rate, is more than twice higher than the group of up to 20 years and more than five times higher compared to the group over 35 years.

Conclusions: Studies on the incidence of *Mycoplasma* spp. and *Ureaplasma* spp. in pregnant women is important for controlling the pregnancy, predicting the risk of developing maternal-fetal infection and discussing the options for timely treatment.

Keywords: *Mycoplasma* spp., *Ureaplasma* spp., pregnant women, Polymerase chain reaction

INTRODUCTION:

The bacteria of the genus *Mycoplasma* and the genus *Ureaplasma* are small free-living microorganisms that inhabit the mucous membranes of the respiratory and urogenital tracts in humans. They are conditionally pathogenic microorganisms and usually do not cause disease. Under adequate conditions, they can cause acute, chronic and latent infections. *M. pneumonia, M. hominis*, *M. genitalium* and *U. urealyticum* are of the greatest importance for human pathology. In rare cases, mycoplasmas penetrate the submucosa and cause invasive diseases. The transmission of bacteria takes place through direct contact between people, including household and sexual contact. Children up to 5 years of age carry the infection subclinical. The most susceptible are young people. Significant colonization of *Mycoplasma* has been found predominantly in pregnant women compared to non-pregnant women [1]. The presence of *Mycoplasma* spp. and *Ureaplasma* spp. in the genitourinary tract of pregnant women is associated with miscarriages, premature birth, premature rupture of the amniotic membranes and birth of children at low gestational age. According to J. Hubenova (1982), *Mycoplasma* spp. can cause intrauterine infection of the fetus. Newborns are often colonized with *Mycoplasma* spp. and *Ureaplasma* spp. during birth, if the mothers are carriers without active infection.

M. hominis resides commensally in the cervix and vagina. The frequency of colonization in different studies varies between 20% and 50% [2, 3]. *M. hominis* can be isolated from the endometrium and fallopian tubes in about 10% of women with salpingitis. A number of studies have suggested that *M. hominis* is potentially pathogenic and has been linked to a variety of disorders: bacterial vaginosis, pyelonephritis, pelvic inflammatory disease, chorioamnionitis, endometritis, preterm birth, low birth, miscarriage, stillbirth, postpartum fever and perinatal mortality, and infertility [4, 5, 6]. *Ureaplasma* are directly as-

sociated with inflammation and can invade the amniotic sac early during the pregnancy if intact fetal membranes are present, causing persistent infection and adverse pregnancy outcome [4, 7].

Colonization of the newborn by genital mycoplasmas can occur if the mother's lower genital tract is infected during birth or *in utero* earlier during the pregnancy. This can remain transient and without consequences. The level of vertical transmission is from 18% to 55% among newborns from colonized mothers.

The purpose of the present study is to determine the prevalence of genital mycoplasmas (*M. genitalium, M. hominis, U. parvum, U. urealyticum*) in the lower parts of the genital tract in pregnant women by molecular biological methods.

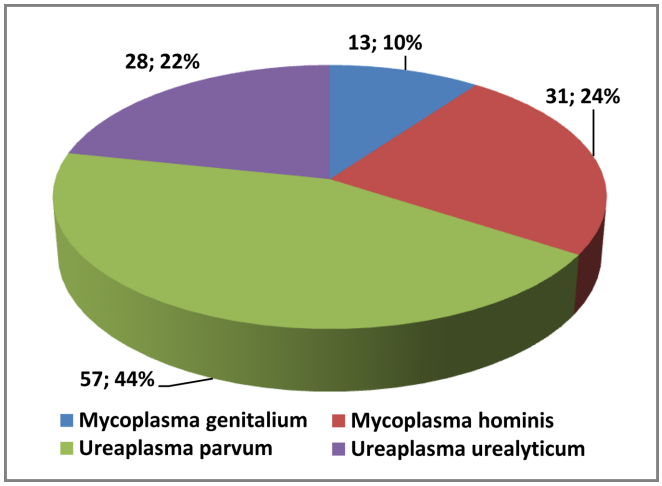
MATERIALS AND METHODS:

A prospective epidemiological study of 107 pregnant women hospitalized in the Clinic of Obstetrics and Gynecology, University Hospital-Pleven, Bulgaria, was conducted. Vaginal secretion samples were taken from all 107 pregnant women for the period from September to Decemberq 2020. A Polymerase chain reaction (PCR) assay was used to detect the genomic DNA of the bacteria in pregnant women of different ages and of different ethnicities. Women were divided into three age groups. The first group consisted of pregnant women up to 20 years (n = 27), the second group-between 21 and 35 years (n = 66) and the third group - more than 35 years (n = 14). Demographic data were collected through interviews and surveys. The data are processed with a statistical software package STATGRAPHICSPlus and Microsoft Exel 2010. The study was performed at the University Research Laboratory at Medical University-Pleven. The results were processed with a statistical office suite and presented in tables and figures.

RESULTS:

The studied 107 pregnant women hospitalized in the Clinic of Obstetrics and Gynecology, Pleven, were aged from 15 to 41 years, an average of 27 ± sd 6.988. The highest is the relative share of women in the age group from 20 to 35 years was the highest - 66 (64.68%), followed by women under 20 years - 27 (25.23%) and women over 35 years - 14 (13.08%). The species distribution of the identified *Mycoplasma* spp. and *Ureaplasma* spp. is shown on Figure 1.

Fig. 1. Distribution of identified bacterial species



Detection of bacterial DNA was found in 85 (79.44%) of the cases, with present *Ureaplasma* spp. colonization – in 42 (39.25%) women. The share of the representatives of both genera found was 28.04% (Table 1).

Table 1. Distribution and frequency of representatives of *Mycoplasma* spp. and *Ureaplasma* spp. among the studied women

Isolated bacteria	Number of cases (N)	Relative share (%)
1. *Mycoplasma* spp. *(M. genitalium* and *M. hominis)*	13	12.15
2. *Ureaplasma* spp. *(U. parvum* and *U. urealyticum)*	42	39.25
3. *Mycoplasma* spp. and *Ureaplasma* spp.	30	28.04
4. Without isolated bacteria	22	20.56
Total	107	100

The results obtained by the surveyed women in the three age groups are shown on Table 2.

Table 2. Distribution of causative agents by species and age groups

Age groups	Negativen (%)	*Mycoplasma* spp. n (%)	*Mycoplasma* spp. and *Ureaplasma* spp. n (%)	*Ureaplasma* spp. n (%)	Total
< 20 y.	3 (2.80%)	3 (2.80%)	10 (9.35%)	11 (10.28%)	27 (25.23%)
20 y. – 35 y.	17 (15.89%)	8 (7.48%)	18 (16.82%)	23 (21.50%)	66 (64.68%)
> 35 y.	3 (2.80%)	3 (2.80%)	3 (2.80%)	3 (2.80%)	14 (13.08%)

DISCUSSION:

Our results for the prevalence of *Mycoplasma* spp. and *Ureaplasma* spp. among Bulgarian pregnant women were twice as high as the established prevalence among women in Iran, Italy and China. Among 22 studies comparing adverse pregnancy outcomes, 15 showed a significant association with the presence of *U. urealyticum* [3]. Andrews et al. found that the presence of *U. urealyticum* in the upper female genitalia is associated with a threefold increase in postpartum endometritis and an eightfold increase in post-cesarean endometritis in women who gave birth by caesarean section after spontaneous delivery [8]. With regard to *M. hominis*, there is an even more pronounced association with adverse pregnancy outcomes [6]. The presence of these bacteria significantly correlates with low birth weight and early gestational age. Yamazaki T. found that the presence of *Ureaplasma* spp. in the genital tract in healthy women significantly potentiated the invasion of *C. trachomatis*, suggesting that mixed infection is an important factor in bacterial pathogenesis in the genital tract [7]. According to other studies and authors, the incidence of mycoplasma infections is 48.21% in women and 20.71% in men. Pregnant women with mycoplasma colonization that has reached the uterine cavity have an increased risk of preterm birth or birth of an infected newborn with low body weight. Moridi points out that the prevalence of genital mycoplasma infection in Iran is due to *U. urealyticum* (17.53%), *M. genitalium* (11.33%) and *M. hominis* (9.68%), respectively, which is parallel to Christian Leli (Italy) and the results from Xiaofei (China). According to the results of another team of researchers, a similar study showed that the incidence of infections with *M. genitalium*, *M. hominis* and *U. urealyticum* in women with symptoms of urinary tract infection is higher than in men with urinary and genital tract infections (6.46% vs. 5.4%, 7.67% vs. 5.88% and 21.04% vs. 12.13% [4].

Although no statistical dependence was found on found bacteria and age groups (p-value = 0.4688), it is noteworthy that the prevalence of *Mycoplasma* spp. and *Ureaplasma* spp. as a whole in the age group from 20 to 35 years, which has the highest birth rate, is more than twice higher than the group of up to 20 years and is nearly five times higher compared to the group over 35 years. We can assume that, like any sexually transmitted disease, the incidence of *Mycoplasma* spp. and *Ureaplasma* spp. rises with increasing sexual activity.

CONCLUSIONS:

Mycoplasma vaginal colonization is a serious medical and social problem. Studies on the incidence of *Mycoplasma* spp. and *Ureaplasma* spp. in pregnant women is important for controlling the pregnancy, predicting the risk of developing maternal-fetal infection and discussing the options for timely treatment.

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