MEDICINE

INCIDENCE OF SEXUALLY TRANSMITTED INFECTIONS: LOCAL STUDY IN UKRAINE

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ABSTRACT

Introduction. The structure of incidence of sexually transmitted infections is changing constantly. Information on such changes supports correct planning of clinical and diagnostic activities of institutions providing specialized medical care by qualified specialists.
Objective: to investigate the prevalence of sexually transmitted infections with pathogens clinically significant to the genitourinary system in Ukraine and at the local level.
Materials and methods. Polymerase chain reaction was used to test the biological material obtained from the genitourinary clinical specimens from subjects with sexually transmitted infections, who underwent clinical and laboratory examinations in Oleksandrivsk Clinical Hospital (Kyiv, Ukraine) for Chlamydia trachomatis, Mycoplasma hominis, Mycoplasma genitalium, Ureaplasma urealyticum, Trichomonas vaginalis, Human papillomavirus, and Neisseria gonorrhoea. During 2017, 607 subjects of both genders, including 295 (48.6%) females and 312 (51.4%) males, were examined. Their mean age was 32±3.5.
Findings. Chlamydia trachomatis was found in 159 (26.2%) of 607 examined subjects – 85 males and 74 females. Mycoplasma hominis was found in 122 of 585 (21.1%) examined subjects – 64 males and 58 females. Mycoplasma genitalium, respectively, in 17 (6.62%) of 258 subjects – 6 males and 11 females. Ureaplasma urealyticum was found in the largest number of subjects (305, i.e. in 48.77% of 601 examined subjects) – 157 males and 148 females. Trichomonas vaginalis was found in 28 (5.23%) of 535 subjects – 15 males and 13 females. Human papillomavirus was found in 158 of 297 (53.2%) examined subjects – 88 males and 70 females. Neisseria gonorrhea was found in 33 of 297 (8.45%) subjects – 8 males and 25 females.
Conclusions. As suggested by the local study of the sexually transmitted infections incidence in Ukraine, the most clinically significant for the genitourinary system are Human papillomavirus (53.2%), Ureaplasma urealyticum (48.77%), Chlamydia trachomatis (26.2%) and Mycoplasma hominis (21.1%). Therefore, tests for these pathogens in the specified region is currently the most appropriate during diagnostic examinations and counselling of subjects with genitourinary infections.

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Introduction. Sexually transmitted infections (STIs) occupy one of the leading places in modern practice of dermatovenereologists. Human diseases with possible sexual transmission include "conventional venereal diseases" such as syphilis, gonorrhoea, chancroid, venereal and inguinal granuloma, as well as other STIs that became relevant in the 20th century: trichomoniasis, candidiasis, genital herpes, chlamydia, and mycoplasma and papillomavirus lesions of the genitourinary organs [1]. STIs are important medical and social problems not only in the context of high prevalence of, but also in high rates of complications and consequences, which adversely affect the demographic indicators and public health situation in Ukraine [5].

Currently, in most countries, STIs are the most common infectious diseases, which are the subject to recording. According to WHO, more than 330 million patients with urogenital infections are registered globally every year, with the most common pathogens being Chlamydia trachomatis, Trichomonas vaginalis, Ureaplasma urealyticum. In Ukraine, at least 2 million people are infected with STIs annually. There has been no trend for reduction of this indicator so far [3].

The urgency of the problem with STIs is due to their high prevalence, mainly among young, most able-bodied people, multicentricity of lesions, high incidence of severe complications such as secondary infertility, ectopic pregnancy, pathological pregnancy, pathological delivery, intrauterine foetal infections, extragenital pathology (Reiter's syndrome, lesions of the respiratory system, eyes and vessels), copulative function impairment [2, 3, 5]. At the current stage of development of the medical science, issues of incomplete curation of STIs are still relevant due to their polyetiologic nature and multicentricity. The problem of frequent relapses and re-infections in such patients caused by the pathogens peculiarities, combination of infections, and genital and extragenital localization of inflammation foci [6]. The structure of incidence of sexually transmitted infections is constantly changing. Information on such changes helps providers of qualified, and specialized medical care to adequately plan clinical and diagnostic activities.

Objective: to investigate the prevalence of pathogens which are most clinically significant for the genitourinary system in patients with sexually transmitted infections in Ukraine at the local level.

Materials and methods. The method of polymerase chain reaction was used to study the biological material obtained in 2017 from the genitourinary organs of STI patients who underwent clinical and laboratory examinations in Oleksandrivsk Clinical Hospital (Kyiv, Ukraine) for *Chlamydia trachomatis, Mycoplasma hominis, Mycoplasma genitalium, Ureaplasma urealyticum, Trichomonas vaginalis, Human papillomavirus, and Neisseria gonorrhoea*. 607 subjects of both sexes, including 295 (48.6%) females and 312 (51.4%) males, were examined. Mean age was 32±3.5.

The PCR, as the most specific and sensitive method for the identification of microorganisms, was used to detect the pathogens in the genitourinary system of the subjects in the study group [9]. Biological material for testing was sampled in accordance with the current guidelines [4]. Upon recording, test samples were placed in Eppendorf tubes containing 1 ml of sterile physiological saline and stored frozen at -10 °C prior to testing.

Primers certified in Ukraine and DT-96 amplifier (SPA DNK Technology, Russian Federation) were used to detect the specified microorganisms.

Findings. *Chlamydia trachomatis* was found in 159 (26.2%) of 607 examined subjects – 85 males and 74 females. *Mycoplasma hominis* was found in 122 of 585 (21.1%) examined subjects – 64 males and 58 females. *Mycoplasma genitalium*, respectively, in 17 (6.62%) of 258 subjects – 6 males and 11 females. *Ureaplasma urealyticum* was found in the largest number of subjects (305, i.e. in 48.77% of 601 examined subjects) – 157 males and 148 females. *Trichomonas vaginalis* was found in 28 (5.23%) of 535 subjects – 15 males and 13 females. *Human papillomavirus* was found in 158 of 297 (53.2%) examined subjects – 88 males and 70 females. *Neisseria gonorrhoea* was found in 33 of 297 (8.45%) subjects – 8 males and 25 females (Table 1).

According to Table 1, in gender terms, *Mycoplasma genitalium* is found in females almost twice as frequently as in males, 4.26% and 2.36%, respectively. Neisseria gonorrhoea is found in females almost thrice as frequently as in males, 6.3% and 2.15%, respectively. Other studied microorganisms were found in males and females at similar rates.

Of note, the number of tests for various STI pathogens in Ukraine varies significantly. According to the authors, this is due to the lack of guidelines for STI management and absence of insurance schemes for STI cases in the country, at the background of high cost of tests relative to the average living standard. Thus, the largest number of tests are assigned to the most common STIs (*Chlamydia trachomatis, Mycoplasma hominis, and Ureaplasma urealyticum*) and *Trichomonas vaginalis*, given the ability of STI pathogens to persist within these protozoa [1, 3].

Table 1. Detection of sexually transmitted infections in the study group: total number and by gender

No.	Pathogen	Total tested subjects	n abs., total / %	Males, n abs. / %	Females, n abs./%
1	*Chlamydia trachomatis*	607	159/26.2	85/14	74/12.2
2	*Mycoplasma hominis*	585	122/21.1	64/11.07	58/10.03
3	*Mycoplasma genitalium*	258	17/6.62	*6/2.36	11/4.26
4	*Ureaplasma urealyticum*	601	305/48.77	157/26.12	148/24.65
5	*Trichomonas vaginalis*	535	28/5.23	15/2.8	13/2.43
6	*Human papillomavirus*	297	158/53.2	88/29.63	70/23.57
7	*Neisseria gonorrhoea*	397	33/8.45	*8/2.15	25/6.3

Note: * – reliability of differences in data for males and females ($p < 0.05$)

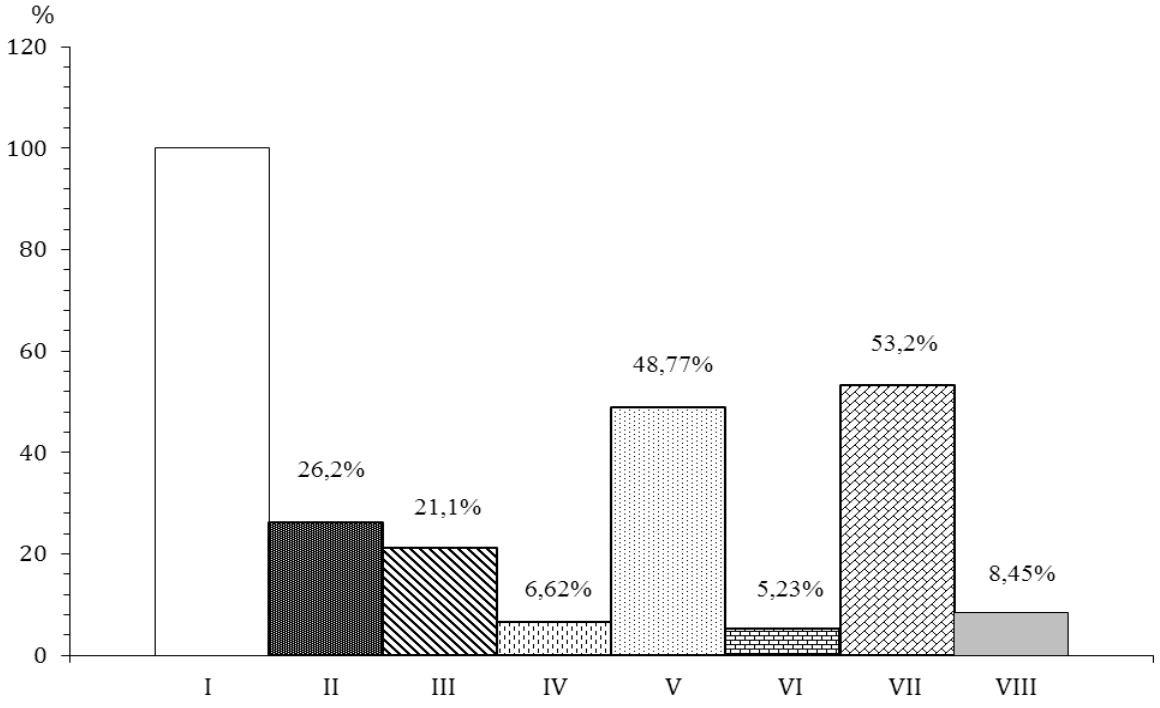

Fig. 1. Overall indicators of STI pathogens detection in the study group

Legend:
I- Total number of examined subjects (100%)
II- Chlamydia trachomatis
III- Mycoplasma hominis
IV- Mycoplasma genitalium
V- Ureaplasma urealyticum
VI- Trichomonas vaginalis
VII- Human papillomavirus
VII- Neisseria gonorrhoea

Overall indicators of detection of STI pathogens in the study group are presented graphically (Fig. 1.). It is evident that currently, among the most common STI pathogens in Ukraine are *Ureaplasma urealyticum* – 48.77%, *Chlamydia trachomatis* – 26.2% and *Mycoplasma hominis* –

21.1%. However, another subject of concern is that *Human papillomavirus* accounted for the highest rate of detection - 53.2%. According to the authors, this figure is associated with several factors, in particular, because the study was carried out in the vulnerable group of population, and also low level of vaccinations against papillomavirus infection, as well as low awareness of the general population in the country about the risks of consequences due to this infection.

Neisseria gonorrhoea today remains important STI pathogen and found in 33 of 297 (8.45%) examined subjects. *Mycoplasma genitalium* is currently not frequently found: in 6.62% of examined subjects. Noteworthy is significant decrease in the detection of *Trichomonas vaginalis*. This microorganism was found in only 5.23% of examined subjects. It is known that before the widespread introduction of the PCR diagnostics of *Trichomonas vaginalis*, instead of smear microscopy, the detection was about 30% in patients with STIs [5]. On our view, this can be explained by the detection of *Trichomonas vaginalis* using the highly specific PCR, compared to older microscopy data, when other protozoa species, including *Trichomonas tenax*, *Pentatrichomonas hominis*, and *Giardia lamblia*, were mistakenly identified as *Trichomonas vaginalis* [7.8].

Conclusions. As suggested by the local study of the incidence of sexually transmitted infections in Ukraine, the most clinically significant for the genitourinary system of subjects at the current stage are *Human papillomavirus* (53.2 %), *Ureaplasma urealyticum* (48.77%), *Chlamydia trachomatis* (26.2%) and *Mycoplasma hominis* (21.1%). Therefore, tests for these pathogens are currently the most appropriate during diagnostic examinations and counselling of subjects with suspected genitourinary infections.

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