

Prevalence of *Ureaplasma urealyticum* and *Mycoplasma genitalium* in men with non-gonococcal urethritis

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معدل انتشار جراثيم الميوتات الحائلة لليوريا والمفطورات التناسلية بين الرجال المصابين بالتهاب إحليل غير سيلاني
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الخلاصة: أجريت هذه الدراسة في طهران عاصمة جمهورية إيران الإسلامية لاستقصاء معدلات انتشار أنواع الميوتات الحائلة لليوريا والمفطورات في الرجال المصابين بالتهاب إحليل غير سيلاني. وقد تم جمع عينات من المسحات الإحليلية من 125 حالة مرضية و125 رجلاً صحيحاً شاهداً. وأجري زرع هذه المسحات فلوحيظ أن معدلات كشف الميوتات الحائلة لليوريا بين الحالات 19.2% وبين الشواهد 7.2%، ومعدلات كشف المفطورات التناسلية 7.2% بين الحالات و0.8% بين الشواهد، ومعدلات كشف المفطورات البشرية 2.4% بين الحالات و1.6% بين الشواهد. وقد أوضح التحليل الإحصائي تبايناً ملحوظاً بين مجموعات الحالات والشواهد من حيث معدلات انتشار الميوتات الحائلة لليوريا والمفطورات التناسلية، في حين أنه ليس هناك تباين مشابه بالنسبة للمفطورات البشرية. وقد استنتجنا من ذلك أنه ربما كان لكل من الميوتات الحائلة لليوريا والمفطورات التناسلية دور سببي في التهاب الإحليل غير السيلاني عند الرجال.

ABSTRACT This study in Teheran, Islamic Republic of Iran, investigated the prevalence of *Ureaplasma urealyticum* and *Mycoplasma* species in men with non-gonococcal urethritis. Urethral swab samples were collected from 125 cases and 125 healthy men as a control group. The samples were then investigated by culture methods. The rates of detected bacteria in case and control groups were 19.2% and 7.2% for *U. urealyticum*, 7.2% and 0.8% for *M. genitalium*, and 2.4% and 1.6% for *M. hominis* respectively. Statistical analysis showed a significant difference between case and control groups in the prevalence of *U. urealyticum* and *M. genitalium* but not *M. hominis*. It is concluded that in men, *U. urealyticum* and *M. genitalium* may have an etiologic role in non-gonococcal urethritis.

La prévalence de *Ureaplasma urealyticum* et *Mycoplasma genitalium* chez des hommes atteints d'urétrite non gonococcique

RESUME Cette étude réalisée à Téhéran (République islamique d'Iran) a examiné la prévalence des espèces *Ureaplasma urealyticum* et *Mycoplasma* chez des hommes atteints d'urétrite non gonococcique. Des prélèvements par écouvillonnage urétral ont été effectués sur 125 cas et 125 hommes en bonne santé servant de groupe témoin. Les prélèvements ont ensuite été examinés par des méthodes de culture. Les taux de bactéries détectées dans le groupe des cas et dans le groupe témoin étaient de 19,2 % et de 7,2 % pour *U. urealyticum*, de 7,2 % et 0,8 % pour *M. genitalium*, et de 2,4 % et 1,6 % pour *M. hominis* respectivement. L'analyse statistique a montré une différence significative entre le groupe des cas et celui des témoins dans la prévalence de *U. urealyticum* et *M. genitalium* mais pas de *M. hominis*. On en conclut que *U. urealyticum* et *M. genitalium* chez les hommes peuvent jouer un rôle étiologique dans l'urétrite non gonococcique.

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Received: 22/10/02; accepted: 08/04/03

Introduction

The genital tract is an advantageous place for the growth of many microorganisms. Some of these microorganisms, when localized and colonized at the appropriate anatomical site, may cause various pathological disorders such as urethritis, endometritis, epididymitis and salpingitis. Urethritis, or inflammation of the urethra, is a multifactorial condition that is primarily sexually acquired. It is characterized by discharge and/or dysuria but may be asymptomatic. Urethritis is described as either gonococcal, when *Neisseria gonorrhoeae* is detected or non-gonococcal when it is not. *Chlamydia trachomatis* is the most common cause of non-gonococcal urethritis, accounting for 30%–50% of cases. *Ureaplasma urealyticum* and *Mycoplasma genitalium* are also associated with urethritis and account for 10%–20% of cases. Other infrequent causes include *Trichomonas vaginalis*, *N. meningitidis*, *Herpes simplex virus* and *Candida* species (spp.) [1–5]. In many studies *M. genitalium* and *U. urealyticum* have been detected more frequently, often significantly so, in the urethra of men with non-gonococcal urethritis than in healthy men [6–11].

The aim of this study in Teheran, Islamic Republic of Iran, was to investigate the rate of infection with *U. urealyticum* and *Mycoplasma* spp. in men with non-gonococcal urethritis compared with a control group.

Methods

During 2000–01 we selected 125 men with non-gonococcal urethritis from those referred to the School of Public Health and the Institute of Public Health Research at Teheran University of Medical Sciences. A control group of 125 men, attending Dr

Shariati Hospital Research and Clinical Centre for Infertility, were also selected. Two urethral swab samples were collected from each subject in the urethritis and control groups.

One of the swabs was transferred to PPLO [pleuropneumonia-like organisms] broth medium, the other was used for gram staining [10]. In the laboratory, PPLO broth media containing specimens was filtered by filter paper (Millipore), and inoculated into the special PPLO broth and PPLO agar media, comprising a beef heart infusion broth supplement with fresh yeast extract (10% v/v; 25% w/v), horse serum (20% v/v), phenol red (0.002%) and urea, arginine or glucose (1%) (Difco Laboratories, Michigan, USA). These cultured media were then incubated at 37°C, under 5% CO₂ for 1–2 days (*U. urealyticum*), 1 week (*M. hominis*) and 1–2 months (*M. genitalium*). *U. urealyticum*, *M. hominis* and *M. genitalium* metabolized urea, arginine and glucose, respectively, and changed the pH level and colour of the broth media. On the agar media, *U. urealyticum* produced small colonies (15–60 µm diameter) whereas *M. hominis* and *M. genitalium* produced large colonies (200–300 µm diameter) with 'fried egg' appearance [12–14].

The Z-test was used for statistical analysis of the data.

Results

Table 1 shows the age distribution of the case and the control subjects who provided samples for this study.

Table 2 summarizes the strains isolated from the urethral samples of men with non-gonococcal urethritis and the controls. The prevalence of detected bacteria in cases and controls respectively were 19.2% and 7.2% for *U. urealyticum*, 7.2% and 0.8%

Table 1 Age distribution of men with non-gonococcal urethritis and control group men

Age (years)	Urethritis cases (n = 125)		Controls (n = 125)	
	No.	%	No.	%
<16	24	19.2	15	12.0
16–25	19	15.2	30	24.0
26–35	20	16.0	41	32.8
36–45	18	14.4	17	13.6
46–55	19	15.2	12	9.6
>55	25	20.0	10	8.0

n = total number of subjects tested.

for *M. genitalium* and 2.4% and 1.6% for *M. hominis*.

According to the Z-test, the data showed a significant difference in the prevalence of *U. urealyticum* ($P = 0.0026$) and *M. genitalium* ($P = 0.0049$) between the urethritis and control groups (Table 2).

Discussion

One of the first sexually transmitted diseases to be associated with mycoplasmal

infection was non-gonococcal urethritis in men [15]. The etiology of non-chlamydial, non-gonococcal urethritis remains controversial. *U. urealyticum* has been detected more frequently and in higher concentrations in men with non-chlamydial, non-gonococcal urethritis than in men with *Chlamydia*-positive, non-gonococcal urethritis [16]. *U. urealyticum* is often present in non-gonococcal urethritis, accounting for 10%–20% of cases [3,8,17], and these results agree with our findings (19.2%).

In 1981, *M. genitalium* was first isolated from the urethras of 2 of 13 men with urethritis [18], but studies assessing its association with disease were inhibited by the difficulty of propagating this organism in culture. The subsequent development of DNA-based tests led to studies that suggested an association of *M. genitalium* with urethritis [19–23]. The results of our study showed *M. genitalium* in swabs from 9 (7.2%) cases and 1 (0.8%) control ($P = 0.0049$). In our study, this organism was detected at a lower rate than in previous studies that have detected *M. genitalium* in 11%, 14% and 29% of men with non-gonococcal urethritis and in 0%, 4.3% and 8.5% of controls [9,19,24]. It is clear that most *Mycoplasma* spp. cannot be

Table 2 Prevalence of positive cultures in the urethral swabs of men with non-gonococcal urethritis and control group men

Species	Urethritis cases (n = 125)		Controls (n = 125)		Z-value	P-value
	No.	%	No.	%		
<i>Ureaplasma urealyticum</i>	24	19.2	9	7.2	2.80	0.0026
<i>Mycoplasma genitalium</i>	9	7.2	1	0.8	2.58	0.0049
<i>Mycoplasma hominis</i>	3	2.4	2	1.6	0.45	0.3264

n = total number of subjects tested.

considered as important causes of non-gonococcal urethritis because they are isolated so rarely from the genitourinary tract in either healthy or diseased states. Although *M. hominis* may be isolated from up to 30% of patients, our findings and many other studies have failed to implicate it as a cause of non-gonococcal urethritis [25,26]. However, the results of our study do provide further evidence for an etiologic

role of *U. urealyticum* and *M. genitalium* in men with non-gonococcal urethritis.

Acknowledgements

The authors wish to thank Dr K. Ghazi-Saeedi, R. Hafezi, N. Iranparast and F. Fallah for their kind assistance in this study.

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