Is Ureaplasma Urealyticum a Significant Pathogen in Nephrology?

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Introduction

Ureaplasma urealyticum belongs to the family Mycoplasmatacae, class Mollicutes, the smallest of free-living bacteria. Two important members of the family Mycoplasmatacae are Mycoplasma with 69 recognized species and Ureaplasma with two species. Ureaplasmal infections are sexually transmitted diseases. The absence of the cell wall renders the mycoplasmas resistant to penicillins, cephalosporins and other antibiotics that interfere with the integrity of the cell wall (for these reasons the mycoplasmas were thought to be viruses). In contrast, mycoplasmas are generally sensitive to antibiotics that inhibit protein synthesis (macrolides, tetracyclines and new fluorinated quinolones). The eradication of these pathogenic mycoplasmas from various tissue sites requires an intact and functional immune system.

Ureaplasma urealyticum colonises the urogenital tract in as many as 50% of sexually active adults. This bacterium can elicit a spectrum of maladies, such as various arthritides, nongonococcal urethritis, prostatitis, cervicitis, infertility, lower and upper urinary tract infections and has been also implicated as cause of infectious stones in the urinary tract.

Patients and Methods

This study was performed to elucidate the possible role of Ureaplasma urealyticum in urinary tract infections and stone formation. Among 585 outpatients with sexually transmitted infections caused by Chlamydia trachomatis and / or Ureaplasma urealyticum, we chose 220 patients with Ureaplasma infection alone, female 159 and male 61, aged 19 – 67 years. We performed cultural identification for Ureaplasma. The urethral specimens were inoculated into special solid medium. Urine cultures from voided urine were performed in almost all patients, into liquid growth medium. Chlamydia trachomatis was detected in urethral samples by means of a direct immunofluorescent monoclonal antibody technique. Detection of Mycobacterium tuberculosis in urine was performed by means of PCR (Polymerase Chain Reaction) technique. Diagnosis of nephrolithiasis and pyelonephritis was estimated by means of ultrasonography, plain films of the abdomen, excretory urograms.

Results

Urethral swab for Ureaplasma was positive in all patients (220), urine culture for Ureaplasma positive in 103 patients, urine culture for common bacteria positive in 16 patients (E.coli 10, Enterococcus 2, Proteus mirabilis 2, Citrobacter 1, Klebsiella 1). PCR for Mycobacterium tuberculosis in urine was positive in 16 patients (suggesting active renal tuberculosis). Urinalysis showed mostly pyuria, in 132 patients (60%), microhaematuria in 34 (15,4%) and normal urinary sediment in 54 patients (24,5%). We diagnosed nephrolithiasis in 77 patients (35%) in the absence of other urease-producting bacteria (such as Proteus), urethritis in 220 patients (100%), cystitis in 99 patients (45%) and chronic pyelonephritis in only 4 patients (1,8%), in the absence of other uropathogens except Ureaplasma.We excluded those patients with active renal tuberculosis and those with common urinary tract infections (such as E.coli etc.). Treatment: To erradicate infection and to reduce stone growth, we used macrolides, tetracyclines and fluoroquinolones, sometimes klindamycin, guided by susceptibility tests. Combined regimen included three groups of antibiotics successively. Persons with fully competent immune systems may have difficulty eliminating ureaplasmas, even with recommended prolonged drug therapy. We used azithromycin 2x250mg 6-10 days, or roxithromycin 2 x 150mg 10-15 days, or erithromycin 3x500mg 10 days, or clarithromycin 2x500mg 6-10 days, and then doxycyclin 2x100mg 10-15 days, followed by ciprofloxacin 2x500mg 10-15 days or ofloxacin 2x200mg 10-15 days. Sometimes the antimicrobial regimen included klindamycin 4x150mg 8-16 days.

Discussion

Although Ureaplasma urealyticum commonly colonizes asymptomatic, sexually active individuals as an opportunistic pathogen, the etiological role of this mycoplasma in disease is supported by isolation of the organism from the site of inflammation, as well as blood, and the serologic response to infection (1). In many countries Ureaplasma urealyticum and Chlamydia trachomatis are the most common causes of sexually transmitted diseases, albeit Ureaplasma fewer than Chlamydia (2). These agents may frequently occur together (3). In limited clinical studies ureaplasmas have been cultured from the upper urinary tract of some patients with struvite renal stones and interstitial renal diseases (4). Struvite stones were also produced in rats by inoculation of human ureaplasmas (5). Some observations strongly suggest that Ureaplasma is linked to the formation of infectious stones in the urinary tract (6). We think that the contribution of Ureaplasma urealyticum to the stone formation mechanisms is no more under a questionmark, but the extent of this contribution remains still

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debatable. In our findings Ureaplasma urealyticum contributed to nephrolithiasis in 35% of infected patients without evidence of urinary tract obstruction. Urine cultures for Ureaplasma were significantly positive, meaning that Ureaplasma was located apparently not only in lower but in the upper urinary tract. We noticed normal urinary sediment in one fourth of patients. So, if simptomatology exists, by means of sterile usual urine culture and normal urinary sediment we should not conclude about non-existing of urinary infection, but look for ureaplasmas! Further research is needed to define the role of Ureaplasma in producing renal calculi and pyelonephritis.

Infections with Ureaplasma are transmitted by sexual contact, thus the disease can be prevented by avoidance of sexual activity or use of proper barrier precautions. Sex partners must be evaluated promptly and treated appropriately.

Conclusion: Involving in lower and upper urinary tract infections, as well as infectious stones, Ureaplasma urealyticum seems to be a significant pathogen in neprology.

References

1. Murray PR, Kobayashi GS, Pfaller MA, Rosenthal KS. Mycoplasma and Ureaplasma. In: Farrel R, editor: Medical Microbiology, ed 2, St.Louis, Mosby, 1994; 353-358.
2. .Stanojcic A, Radmilovic A, Cakic Z. The frequency of sexually transmitted diseases among urinary tract infections. XXXV Congress of the EDTA, Rimini 1998, Ab 174
3. Stanojcic A, Radmilovic A, Cakic Z, Peric J. Ureaplasma urealyticum and Chlamydia trachomatis urinary tract infections. XXXIII Congress of the EDTA, Amsterdam 1996; Ab199
4. Grenabo L, Hedelin H, Pattersson S. Urinary infection stones caused by Ureaplasma urealyticum: a review. Scand J Infect Dis Suppl 1988; 53: 46-49
5. Yuce A, Yucesoy M, Yucesoy K et al. Ureaplasma urealyticum-induced urinary tract stones in rats. Urol Res 1996: 24(6) 345-348
6. Krieger JN, Boatman ES, Kenny GE. Ureaplasma urealyticum upper urinary tract infection: persistence and pathogenicity in a canine model. J Urol 1989;141 (6): 1437-43