

# UREAPLASMA UREALYTICUM AND MYCOPLASMA HOMINIS RESISTANT TO FLUOROQUINOLONES, MACROLIDES AND TETRACYCLINE

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**Abstract:** *Ureaplasma urealyticum* and *Mycoplasma hominis* are commonly isolated from the lower genitourinary tract of healthy adults but could be responsible for genitourinary disease if it is a great colonization. A batch of 101 men and 92 women was studied in order to determine the presence of microorganisms. In positive cases, antibiograms were analyzed. Growth conditions and antibiotic susceptibility testing of the *Ureaplasma urealyticum* and *Mycoplasma hominis* are the aim of the study. The data and the results of Macrolides, Tetracycline and Fluoroquinolones treatment and drug resistant provide sufficient evidence for the etiologic importance of ureaplasmas and mycoplasma in chronic prostatitis or vaginitis before antibiotics treatment. Drug resistance is observed in antibiograms and decision for proper antibiotic is proposed.

**Keywords:** *Ureaplasma urealyticum*, *Mycoplasma hominis*, antibiogram, drug resistant

**Rezumat:** *Ureaplasma urealyticum* și *Mycoplasma hominis* sunt în general izolate din partea inferioară a tractului urogenital la adulți sănătoși, dar pot fi responsabile de boli genitourinare dacă este o colonizare abundentă. A fost urmărit un lot de 101 bărbați și 92 de femei pentru a determina prezența microorganismelor. La cazurile depistate pozitiv, s-a analizat antibiograma. Scopul studiului este urmărirea condițiilor de creștere și susceptibilitatea la testarea antibioticelor pentru tulpinile de *Ureaplasma urealyticum* și *Mycoplasma hominis*. Datele și rezultatele la tratamentele cu macrolide, tetracicline și fluorochinolone și rezistențele medicamentoase demonstrează suficient de evident importanța diagnosticului etiologic al ureaplasmei și micoplasmelor înaintea introducerii tratamentului antibiotic în prostatite sau vaginite cronice. Este observată rezistența la medicamente și este propusă decizia terapeutică conform antibiogramelor.

**Cuvinte cheie:** *Ureaplasma urealyticum*, *Mycoplasma hominis*, antibiograma, rezistența la antibiotice

## INTRODUCTION

*Ureaplasma urealyticum* and *Mycoplasma hominis*, commonly isolated from the lower genitourinary tract of healthy adults, in a great colonization are responsible for nongonococcal urethritis of men, a sexually

transmitted disease which might cause ascending inflammatory reactions of the prostate. At female are involved in cervicitis, endometritis or pelvic inflammatory disease and pathologic obstetrical history. Clinical isolates of *Ureaplasma urealyticum* and *Mycoplasma hominis* resistant to high levels of Macrolides, Tetracyclines and Fluoroquinolones is a problem discussed by many authors.(1,2) *Ureaplasma* and *Mycoplasma* species have been considered universally susceptible to tetracycline, but in the last years species have an increase resistance to tetracycline (30 to 100 ug/ml).

## MATERIAL AND METHOD

Between October 2007 and March 2009 were investigated men with urethritis symptoms for presents of *Ureaplasma urealyticum* and/or *Mycoplasma hominis* isolated from urethral secretion. In the same period, women with genitourinary indications were tested from vaginal secretion for *Ureaplasma urealyticum* and/or *Mycoplasma hominis*. Urethral samples were taken with a dacron swab placed into urethra 2-3 cm and turned to obtain as many cells as possible after cleaning the external meatus.

The subjects had no urinate for 3 hours. Urethral and urine samples were taken before and after massage of prostate from all patients. In women vaginal samples were taken from the endocervical region after exocervical mucus had been cleaned with a swab without local antiseptic. Mycofast evolution 3 (urogenital mycoplasma, ureaplasma diagnosis and antimicrobial susceptibility Testing) was used for the isolation of *Ureaplasma urealyticum* (Uu) and *Mycoplasma hominis* (Mh). Mycofast evolution 3 identifies Uu and Mh grows Ph after 24 hours incubation in a liquid milieu. During growth Uu metabolize urea and arginine, respectively resulting in a color change of the medium, which contains phenol red indicator, from yellow- orange turned. The enumeration of mycoplasma based on the rate of urea or arginine hydrolysis, which is proportional to the number of germs contained in the sample. The susceptibilities of *Mycoplasma hominis* and *Ureaplasma urealyticum* to 9 classic and new antimicrobial agents were determined by agar dilution. Information about antibiotics susceptibilities for Macrolides, Tetracyclines and

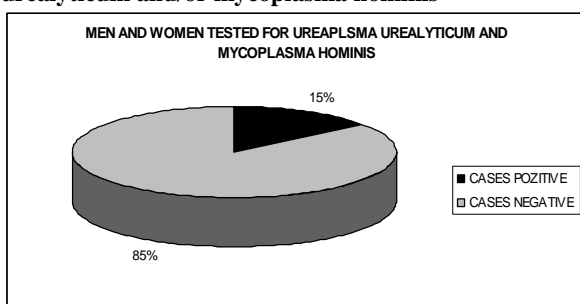
## CLINICAL ASPECTS

Fluoroquinolones were found and analysis.

### RESULTS

193 cases, 101 men and 92 women respectively, were investigated for the presence of *Ureaplasma urealyticum* and/or *Mycoplasma hominis*. 11 men and 17 women were positive for one or both of microorganisms, the rate was 11% of the men and 18,48% of the women lot. *Ureaplasma urealyticum* was isolated from all 11 men and from 15 women and *Mycoplasma hominis* from 10 men and 4 women. Total of 193 cases in study male and female, repartition of total 28 positive and 165 negative is represent by percentage in figure 1.

**Picture no. 1. Centralisation of cases ureaplasma urealyticum and/or mycoplasma hominis**



For all 28 cases with urethral secretion or vaginal positive results antibiogram were made.

The macrolides tested were as follows: azithromycin, erythromycin and roxithromycin. The lincosamide josamycin were also tested. The quinolones tested were ophloxacin and ciprofloxacin. For all 11 men and 17 women the results for all 9 antimicrobial agents (8 antibiotics and 1 sulphamide) were determined as susceptible, resistant and intermediate.

For first 11 cases, represented men, the susceptibility (S), resistant (R) and intermediate (I) result for all antimicrobial were done. The diagram is in figure 2. The best result, 81,81% remain doxycycline, after that 72,72% susceptibility had josamycin and pristamycin, third with 63,63% from cases are roxithromycin and azithromycin. Fluoroquinolones susceptibility was only 36,36% for ophloxacin and only 27,27% for ciprofloxacin. Sulphamethoxazol and Erythromycin were considered to by test for only 4 cases and all were resistant (Picture no. 2).

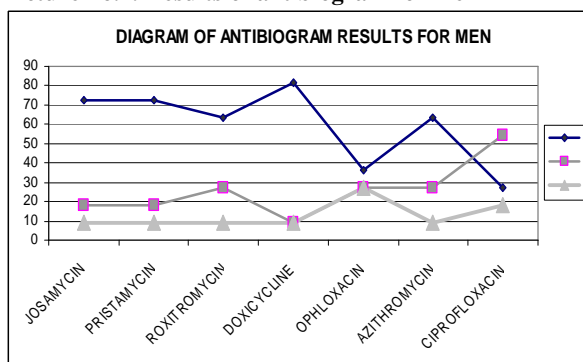
For the 17 cases of female positive for *Mycoplasma hominis* and *Ureaplasma urealyticum* the susceptibility (S), resistant (R) and intermediate (I) results for all antimicrobial were done in the same way. The diagram was represented in figure 3.

A difference exists between antibiograms in women and men involved in study.

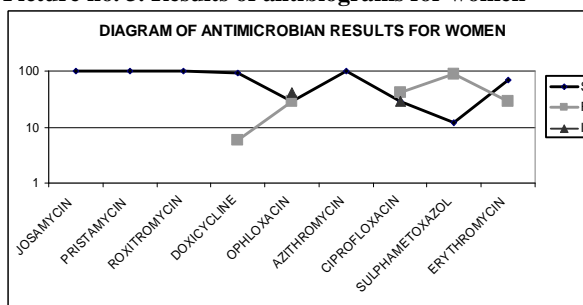
For all 9 antimicrobial agents better results were found at female. First, there is a percentage of 100% susceptibility for azithromycin, josamycin and pristamycin. Doxycycline had susceptibility 94,11% and 5,88% resistant. Fluoroquinolones are again with great resistant, having only 29,41% susceptibility. In female

study sensitiveness for erythromycin was impressive, 70,58% and sulphamethoxazol was good in 11,76%.

**Picture no.2. Results of antibiogram for men**



**Picture no. 3. Results of antibiograms for women**



### DISCUSSIONS AND CONCLUSIONS

*Ureaplasma urealyticum* and *Mycoplasma hominis* are considered to be opportunistic pathogen. The Mycoplasmatales lack a cell wall, and some members are thought to be phylogenetically related to gram-positive bacteria. Many studies announced antimicrobial resistant especially to trimetoprim/ sulphamethoxazol, ciprofloxacin and ophloxacin as was found here as well as literature describe.(2) Furthermore, I found a better antibiogram resource for female then for men with *Ureaplasma urealyticum* and/or *Mycoplasma hominis*.(3,4)

Some papers reported in vivo fluoroquinolone-resistant mutants of *Ureaplasma urealyticum* and *Mycoplasma hominis*. The organisms quinolone-resistant clinical isolates identified in other study have been characterized for their good susceptibility for new macrolides and new lincosamide.(5)

In conclusion, in nongonoccal urethritis and prostatitis at men and cervicitis, endometritis, pelvic inflammatory disease and pathologic obstetrical history at women, it is important to ask for *Ureaplasma urealyticum* and *Mycoplasma hominis* test. Although doxycycline, sulphamides and fluoroquinolones are administer often as empirical treatments for urethritis and vaginitis and for other symptoms of lower genitourinary tract, this antibiotics present resistant in a great percentage of patients when *Ureaplasma urealyticum* and *Mycoplasma hominis* exists, provide sufficient evidence for the importance of etiologic diagnosis.

### REFERENCES

1. Gruson D, Pereyre S, Renaudin H. et al. In Vitro Development of Resistance to Six and Four Fluoroquinolones in *Ureaplasma urealyticum* and *Mycoplasma hominis*, Respectively. *Antimicrob. Agents Chemother.* 2005,49:1190-1193.
2. Degrange S, Renaudin H, Charron D, et al. Tetracycline Resistance in *Ureaplasma* spp. and *Mycoplasma hominis*: Prevalence in Bordeaux, France, from 1999 to 2002 and Description of Two tet(M)-Positive Isolates of *M. hominis* Susceptible to Tetracyclines. *Antimicrob. Agents Chemother.* 2008,52:742-744.
3. Roberts M, Koutsky L, Holmes K. et al. Tetracycline-Resistant *Mycoplasma hominis* Strains Contain Streptococcal tetM Sequences. *Antimicrob Agents Chemother.* 1985,28(1):141-143.
4. Bebear C, Renaudin H, Clerc M. et al. DNA Gyrase and Topoisomerase IV Mutations in Clinical Isolates of *Ureaplasma* spp. and *Mycoplasma hominis* Resistant to Fluoroquinolones. *Antimicrob Agents Chemother.* 2003,47(10):3323–3325.
5. Waites K, Cassell H. In vitro susceptibilities of mycoplasmas and ureaplasmas to new macrolides and fluoroquinolones. *Antimicrob Agents Chemother.* 1988, 32:1500-1502.