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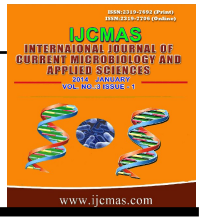

Original Research Article

Prevalence of urogenital tract infections during pregnancy in Maghnia hospital (Algeria)

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A B S T R A C T

The urogenital infections are among the most common medical practice, the risk of these infections during pregnancy are some of the gestational age is favored by internal and external factors. Our study focused on research scope of germs responsible for urinary and genital infections in 120 pregnant women in Maghnia. The identification of bacteria responsible for these infections shows a rate of 24.16% for *Staphylococcus* genital damage and 20.83% of urinary manifestations. *Enterobacteriaceae* found in urinary tract infections are *Escherichia coli* 19.16%, Klebsiella 6.66%, *Proteus* in a proportion of 3.33%, *Citrobacter* and *Enterobacter* 1.66%. The study of genital swabs revealed the existence of *E. coli* at a frequency of 5%, *Enterobacter* at a rate of 4.16%, *Citrobacter*, *Klebsiella Pseudomonas* in a proportion of 2.5%. The results of antibiotic resistance in *Enterobacteriaceae* and *staphylococci* tested against 18 antibiotics revealed a diversity of antibiotypes and a remarkable rate of resistant strains. *Escherichia coli* were the most prevalent causative organisms.

Introduction

The urogenital infections are among the most common in medical practice, often considered trivial infections are readily diagnosed and treated by the medical practitioner, but they can, in a particular context, became more complicated or severe. These infections seem to be constantly renewed and spread for the diversity of causes that can be endogenous or exogenous. Endogenous-because the pregnant woman undergoes changes affecting the urogenital tract predisposing and facilitating the colonization of germs of all kinds; Exogenous-they are mainly due to sex that allow the introduction of the pathogen in the genital tract. Bacteria of the commensal flora of the anterior urethra, particularly *Proteus mirabilis*, reach in urine bladder by ascending path, either spontaneously during voiding micro flow in women, either by the introduction of bacteria during instrumental maneuver. Among the agents no less important Candida infection meet and commonplace

germs such as Enterobacteriaceae and Staphylococci (Adukauskiene *et al*., 2006).

Materials and Methods

Seventeen samples of urine and fifteen genital secretions were performed on 120 pregnant women aged between 20 and 44 years with clinical signs of urogenital infection over a period of three months from March to May 2011 at the hospital Maghnia (Algeria). These are hospitalized or sent by treating doctors.

Genital samples

They do before any genital toilet, woman gynecological position and in a good light, it is to collect genital secretions of the vagina to the cervix with a sterile speculum, lubricated and two sterile swabs (or a loop aseptic platinum), one used for cytology and the other in the cultivation, harvesting These will be analyzed immediately.

Urine samples

The sampling is carried out before any toiletries, and local or systemic anti-infective treatment. The urine is collected in a sterile tube and carried to the laboratory.

All the specimens were analyzed within an hour, then samples were analyzed for culture and sensitivity.

By Using standard quantitative loop a 1 µl and 10 µl were used to inoculate urine sample on Chapman Agar, Mac- Conkey and Blood agar plates (OXOID-England). Plates were incubated for 24 hr at 37°C.

A diagnosis of UTI (Urinary tract infections) was made when there were at least 10^5 colony forming unit (CFU)/ml of urine. *S. aureus* was identified by colonial morphology, gram positive staining, positive catalase activity, and positive coagulation of citrated rabbit plasma (bioMe 'rieux, Marcyl'Etoile, France).

Disc diffusion method was used to determine susceptibility of the isolates as previously described. Individual colonies were suspended in normal saline to 0.5 McFarland and using sterile swabs the suspensions were inoculated on Muller Hinton agar for18-24 hr. *E. coli* ATCC 25922 and *S.aureus* ATCC 25923 were used as control strains. For gram-negative and positive bacteria eighteen discs of antibiotic were tested: Céfotaxime (30 µg), Doxycycline(30 µg), Chloramphenicol (30 µg), Tetracycline (30 µg), Céfazoline (30 µg), Acide nalidixique (30 µg), Gentamicine (10 µg), Oxacilline, Metronidazole (10 µg), Ampicilline (10 µg), Amoxicilline (25 µg) , Penicilline G (10 UI), Spiramycine (100 µg), Lincomycine (15 µg), Erythromycine (15 µg), Colistine (10 µg), Sulfamethoxazole (200 µg), Nitroxoline (20 µg) .

Results and Discussion

The study of genital swabs revealed the existence of *E. coli* at a frequency of 5%, *Enterobacter* 4.16%, *Citrobacter*, *Klebsiella* Pseudomonas in a proportion of 2.5%,. *Enterobacteriaceae* found in urinary tract infections are *E.coli*, at a frequency of 19.16%, *Klebsiella* at a rate of 6.66%, *Proteus* in a proportion of 3.33% and for *Citrobacter* and *Enterobacter*. These are results that seem to be obvious because during pregnancy, several changes occur such as: The expansion of the urethra by a certain compression of the urinary tract of Gram-

positive cocci *Staphylococci* also cause this type of infection at frequencies of 24.16% in the genitals infections and 20.83% in urinary events (Sotto *et al.*, 2001).

Urinary tract infections

Seventy samples of urine were taken from pregnant women. The table 1 shows that infections are declining in the age range 32-44 years. Except for Citrobacter there is an increase of infection.

Genital infections

The samples were taken from 50 pregnant women. The table 2 shows that infections are declining in the age range 32-44 years From the two tables note that: The infection decreases between 32 and 44 years. Gram negative are important in urinary tract infections. Gram positive are more important in genital infections (Ahmad, 2012; Al-Haddad, 2005; Anandkumar *et al*., 2003; Assefa *et al*., 2008).

Antibiotic susceptibility

Interpretation of the results of susceptibility testing was performed by the WHONET 5 software, for some antibiotics; resistance intervals and sensitivity are not defined. *Staphylococci* are resistant to several antibiotics, including penicillin, ampicillin and erythromycin 100% , followed by oxacillin 92% , cefazolin 81% and cefotaxim, 74.3%, 81.8% resistant to tetracyclin, doxycyclin followed with a rate of 72.1%, and have a total resistance to, 78.1% resistance to gentamicin, 85.7% resistant to chloramphenicol, 93.3% resistant to sulfamethoxazol, 92.9% resistant to nalidixic acid. The gram negative bacilli have a total resistance to penicillin G and céfazolin (100%), 96.8% resistant to oxacillin, 96.3% to ampicillin and 83.3% resistant to cefotaxim.

The Gram-negative bacteria

The figure.1 and 2 showed Gram-negative bacteria resistance to some antibiotics.

Gram positive bacteria

The figure 3 and 4 shows resistance of Gram positive bacteria to some antibiotics.

Enterobacteriaceae

The results of antibiotic resistance of *Enterobacteriaceae* strains isolated and tested against 18 antibiotics revealed a diversity antibiotypes and a remarkable rate of resistant strains compared to the number of antibiotics, or 100% of strains resistant to penicillin G, and also to cefazolin (full strength), 96.8% resistant to oxacillin, 96.3% resistant to ampicillin and 83.3% resistant to cefotaxime, where a high resistance to the family of β-lactams (Assefa *et al*., 2008; Beyene and Tsegaye , 2011, Culig *et al*., 2010; Demilie *et al*., 2012; Masinde *et al*., 2009).

According METRAL and Brucker, 1998, the resistance in *Enterobacteriaceae* responsibility of the acquisition of a plasmid β-lactamase resistance to extended spectrum (ESBL). There is also a remarkable resistance to erythromycin with 100% of our strains are resistant (macrolide), 94.9% resistant to gentamicin (aminoglycoside), 90% resistant to nalidixic acid (quinolone) 88.9% resistant to sulfonamide (sulfa family), 87% resistant to chloramphenicol (chloramphenicol family) and 81.8% resistant to tetracycline followed by

Table.1 The number of urinary tract infections contribution to age

Bacteria	Between 20 and 32 years	Between 32 and 44 years
Staphylococcus aureus	8	2
coagulase-negative staphylococci	9	6
E.coli	18	7
Klebsiella	5	3
Enterobacter	4	0
Citrobacter	1	3
Proteus	3	1
Total	48	22

Table.2 The number of genital infections contribution to age

Bacteria	Between 20 and 32 years	Between 32 and 44 years
Staphylococcus aureus	7	3
coagulase-negative staphylococci	10	9
E.Coli	9	2
Citrobacter	2	0
Enterobacter	5	1
Klepsiella	2	0
Total	35	15

Figure.1a) The rate of negative grams resistant to penicillin G. b) The rate of negative grams resistant to gentamicin.

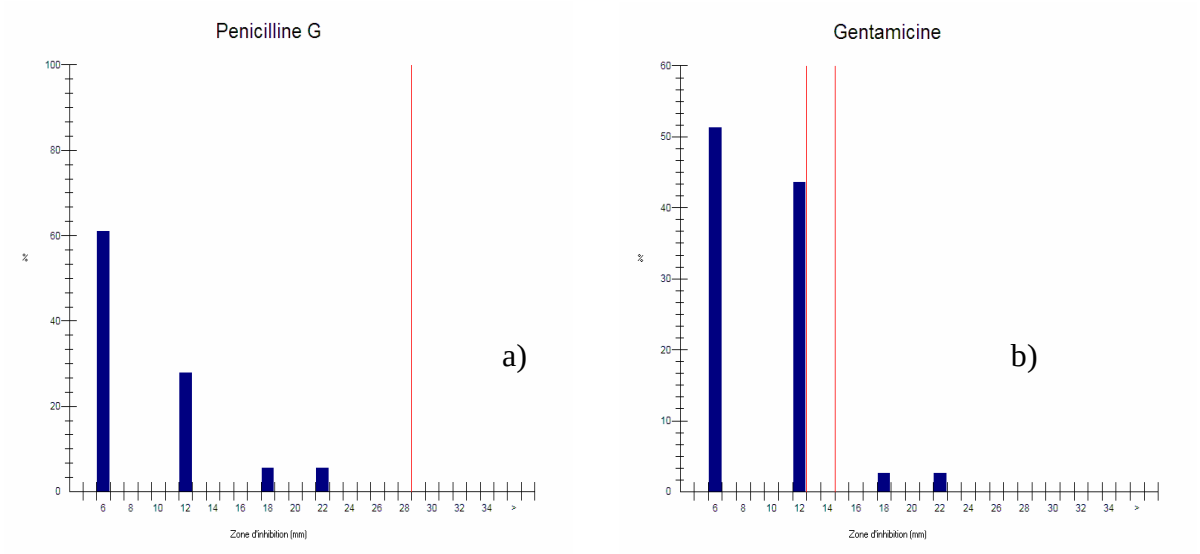


Figure.2a) The rate of negative grams resistant to amoxicillin; b) The rate of negative grams resistant to sulfamethoxazole

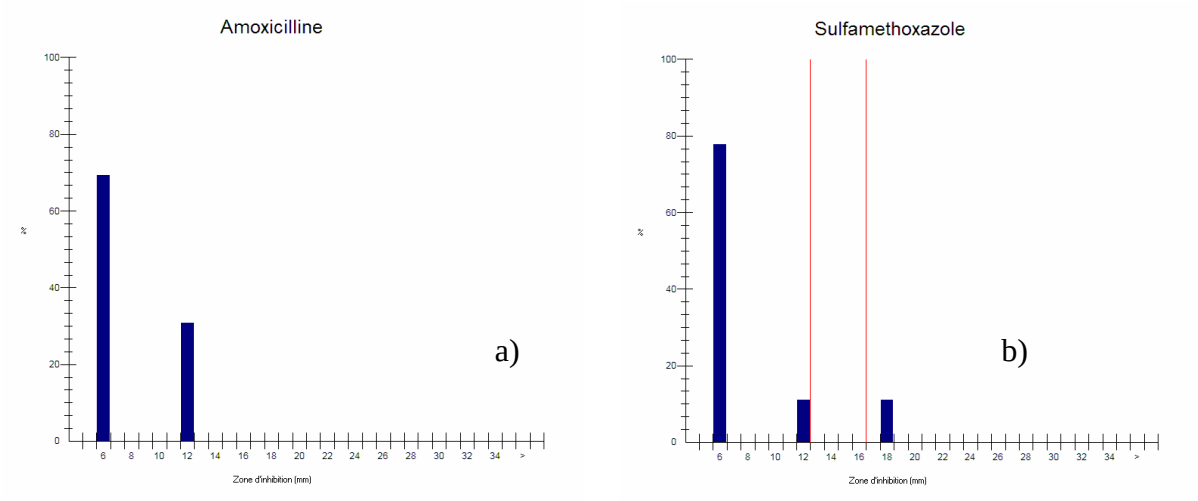
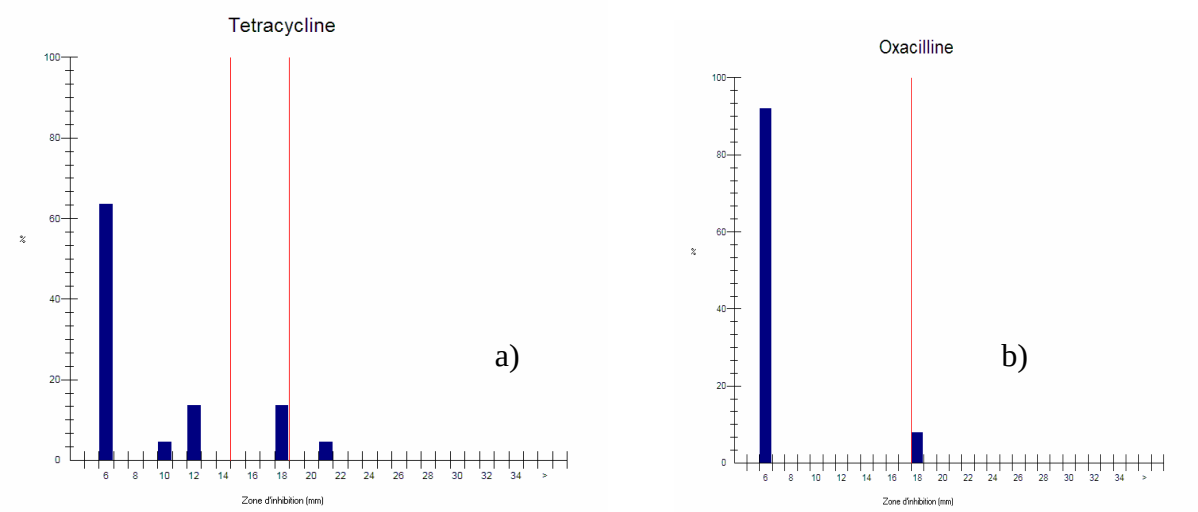


Figure.3 a) The rate of positive grams resistant to cefotaxime. b) The rate of positive grams resistant to Ampicillin.



doxycycline in rate with 74.5% (tetracycline) The study of multidrug resistance in *Enterobacteriaceae* isolated, shows a similar resistance of *Enterobacteriaceae* in relation to different antibiotics (Bonkat *et al*., 2013; Dimetry *et al*., 2007; Eiros Bouza and Ochoa Sangrador, 2007 ; Hamdan *et al*., 2011; Malinverni, 2002; Metral and Brücker, 1998).

For an antibiotic to be effective it must first be entering the bacterium, factors altering the permeability is the cause of resistance. This mechanism does not affect Gram-positive because antibiotics diffuse freely through the peptidoglycan which forms the wall of the bacteria. In Gram-negative bacteria, however, the barrier is the lipopolysaccharide (LPS) of the outer membrane prevents the penetration of

antibiotics but porins, forming channel proteins allow passage of hydrophilic molecules such as penicillins wide spectrum cephalosporins, aminoglycosides, chloramphenicol or tetracycline. The driven mutations quantitative changes of these porins are responsible for acquired resistance often cross several families of antibiotics.

The gram positive cocci

Isolated staphylococci resistant to several antibiotics, including penicillin and ampicillin ranks first with a rate of 100% resistance (total resistance) followed by oxacillin with a rate of 92% of cefazolin with a rate of 81 % of cefotaxime and at a rate of 74.3%. We notice a significant resistance against b-lactam antibiotics (Enayat *et al*., 2008; Nasher *et al*., 2001; Zhanel *et al*., 2005).

The β-lactamase of Staphylococcus is a penicillinase which induces resistance to penicillin G and A (Ampicillin, Amoxicillin). This staphylococcal penicillinase is inactivated by products known as "beta-lactamase inhibitors" (clavulanic acid tazobactum, sulbactam) which, together with beta-lactams, restore their effectiveness. In hospital, at least 80% of Staphylococci are beta-lactamase producers. Or by changing the target chromosomal

The resistance of Staphylococcus strains isolated is not limited to the family of b-lactam, as 81.8% of our strains resistant to tetracycline, doxycycline followed with a rate of 72.1% (tetracycline), and have a total resistance to erythromycin (macrolide), 78.1% resistance to gentamicin (aminoglycoside), 85.7% resistant to chloramphenicol (chloramphenicol family), 93.3% resistant to sulfamethoxazole (family sulfonamides), 92.9% resistant to nalidixic acid (quinolone).

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