

Antimicrobial Susceptibility Patterns of Uropathogens in Obstetric patients.

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الخلاصة

لمعرفة طبيعة حساسية الجراثيم المسببة لعدوى المسالك البولية لدى الحوامل , اجريت دراسة مقطعية للنساء الحوامل الوافدات الى مستشفى الولادة والاطفال في محافظة النجف الاشرف والفترة ما بين آب 2006م ولغاية شهر آب من عام 2007 . تبين في الدراسة بان 28% من اولئك المرضى مصابون بعدوى المسالك البولية وان جرثومة الأشريشيا القولونية (*E.Coli*) هي اكثر الجراثيم المستفردة شيوعا لدى هؤلاء الحوامل 44%. كما كانت عالية الحساسية بالسيفوتاكسيم , والسبروفلوكساسين الاميكاسين والجنتاميسين , في حين ان حساسيتها قليلة تجاه الامبسيلين والتراميثوبريم سلفميثوكسازول.

Abstract

Across-sectional study was done to know the patterns of antimicrobial Susceptibility test of isolated uropathogens among pregnant women attending the Department of Gynaecology/Obstetric at the maternity&Child Teaching Hospital in Najaf Governorate.The study was conducted during the period between August 2006 to August 2007 .The study showed that 28%of pregnant women whom complained of signs & symptoms of urinary tract mfection (UTI) had a positive cultural result .The predominant pathogen was *E.coli* (44%) with high susceptibility test result to cefotaxim , ciprofloxacin , amikacin, and a high resistant rate to trimethoprim/ sulfamethoxazole & ampicillin.

Introduction

Urinary tract infections (UTIs) are relatively common problem in women When compared with men , primarily because of the anatomical differences like shorter urethra & its proximity to the vagina and the rectum .Several physiological changes occure during pregnancy that cause other wise healthy pregnant women to be more susceptible than non-pregnant one .(1)

The increased susceptibility was probably due to increased bladder volume, decreased bladder tone & decreased ureteric tone , all these contribute to increased urinary stasis and uretero-vesical reflux (2) .The decreased ureteric tone will allow some strains of bacteria to grow. (3) These infection could be divided in to symptomatic or a symptomatic bacteriuria. Significant bacteriurea whether Symptomatic or a- symptomatic one had been defined as finding more then 100,000 colony – forming unite per ml of urine. (4)

Urinary tract infections were found to be associated with an increased risk of development intrauterine growth retardation ,low-birth weight infant ,cystitis , pyelonephritis (5) . Therefore it is important to identify and treat UTI as early as possible to avoid Such Sequelae .

The most common microorganisms that cause UTI s are *Escherichia coli* , *Proteus mirabilis* , *Klebsiella pneumoniae* . Less common ones include *Gardnerella vaginalis* , *Ureaplasma urealyticum* & *enterococci* (2,6,7) . The incidence of UTI during pregnancy in Western population is 2.5%-8.7% (8) . Historically , ampicillin has been the drug of choice for such infection , but in recent years *E . coli* has become increasingly resistant to ampicillin (9). Ampicillin resistance is found in 20% - 30% of *E.coli* cultured from urine in the outpatient setting.(9)

Alternatively , cephalosporins are well tolerated & adequetely treat the important organisms. Sulfonamides can be taken during the first and second trimesters. But during the third trimester , the use of Sulfonamides carries a risk that the infant will develop Kernicterus , especially preterm infants.(10) Other common antibiotics like fluoroquinolone and tetracyclines should

not be prescribed during pregnancy because of the possible adverse effects on the foetus.

Antimicrobial resistance is a growing problem and a cause of a major concern in many countries (11) Several programs had been arranged which have looked at pathogens from a variety of common infections . These include the WHO Antimicrobial Resistance Monitoring Programme .In the field of urinary tract infections (UTIs) , there has been a steady increase in the level of resistance to commonly used antibiotics , including ampicillin & trimethoprim. (12,13)

The aim of the present study was to identify uropathogens among pregnant women and to determine the frequency of resistance of common uropathogens to Ampicillin, Trimethoprim / Sulfmethoxazole.

Patients & methods

Patients: Across – sectional / study was done during the period between August 2006 & August 2007.

Three hundred pregnant women were enrolled in the present study, all complain of signs & symptoms suggesting urinary tract infections.

Methods:Careful history was taken from each patient ,mid – stream urine was collected from each one , 10ml urine was centrifuged at 3000 RPM for 10-15 minutes , the supernatant was discarded , the sediment was studied microscopically , there after with a wire loop , urine was cultured at 37c°, biochemical tests for cultural result as a confirmatory test for isolated microorganisms , and finally antimicrobial susceptibility tests using a disc diffusion method for the isolated pathogens .

Chi-Square test was used as a test of significance. Difference was recorded as a significant whenever probability (p) was less than 0.05.

Results

A total of three hundred pregnant women attending Gynaecology / Obstetric Department of the Maternity & Child Teaching Hospital in Najaf Governorate were included in the

present study . All women were complaining of signs & symptoms suggesting UTIs ,those already on antibiotics were excluded from sample . Eighty fore (84) patients gave a positive cultural result for UTI , which is corresponding to 28% of total sample .

The distribution of UTI among women according to age group, trimester, parity is shown in (Table 1). UTI was commonest in the age group 25-34 years (47%).

There was an increase in frequency of disease with progress of pregnancy, with 52% of infections in the third trimester, whereas in relation to parity 40% of affected ones were multipara.

Regarding the distribution of the different isolates was shown in (Table 2).

E.coli was the most frequent isolated microorganisims 37 (44%),
Proteus mirabilis 16 (19%), *Staph. saprophyticus* 13 (16%),
Klebsiella pneumoneae 9 (11%), *Streptococcus spp.* 7 (8%) &
Neisseria gonorrhoeae (2%).

The pattern of antibiotic sensitivity of isolates was shown in (Table3) , regarding *E.coli* exhibit significant sensitivity toward amikacin (100%) ,cefotaxim(100%),ciprofloxacin (95%) & gentamicin (90%) , whereas it had lower sensitivity toward ampicillin (45%) ,trimethoprim / sulf methoxazole (30%) . Other microorganisims had same pattern except in certain microorganisms like *Staph saprophyticus* had lower sensitivity toward ciprofloxacin (20%) , & *Streptococcus spp.* was found to be to totally resistant toward ciprofloxalin.

Concerning the rapidity of microscopical urinalysis tests for early diagnosis of UTI, had been Shown in (Table 4) with sensitivity, specificity (82%, 78%) respectively.

Table 1: Distribution of total patients with UTIs by age group, trimester & parity

Variable	UTIs	
	No	%
Age group		
15-24	35	42%
25-34	40	47%
35-45	9	11%
Trimester		
1 st	13	15%
2 nd	28	33%
3 rd	43	52%
Party		
Nalipara	21	25%
1	29	35%
Multipart	34	40%

Table 2: Frequency of distribution of microorganisms isolated from urine.

Type of microorganism	Age group		Total
	15-24	25-34	
	35-45		
<i>E.coli</i>	10	16	37 (44%)
	11		
<i>Proteus mirabilis</i>	2	3	16 (19%)
	11		
<i>Staph. Saprophyticus</i>	9	4	13 (16%)
	0		
<i>Klebsiella pneumoniae</i>	4	2	9 (11%)
	3		
<i>Streptococcus Spp .</i>	3	2	7 (8%)
	2		
<i>Neisseria gonorrhoeae</i>	0	1	2 (2%)
	1		

Table 3:Antimicrobial susceptibility test result of isolated microorganisms from pregnant women with UTI .

Micro-organism	Total No	Antimicrobial susceptibility test result (%)						
		AMP TMP/SMX	CF	CP	GM	CX	AK	
<i>E.coli</i>	37	45	100	95	90	60	100	30
<i>Staph. Saproph .</i>	13	50	90	20	85	70	70	25
<i>Proteus mirabilis</i>	16	0	80	75	95	45	0	45
<i>Kleb. Pn .</i>	9	40	85	100	70	50	65	15
<i>Strep .Spp</i>	7	95	100	0	85	80	85	25
<i>N. Gonorrhoea</i>	2	0	100	100	50	0	100	0

AMP = Ampicillin (20ug) ,CF = cefotaxime (30ug) , CP = ciprofloxacin (5ug) , GM = gentamicin (10ug) , CX = cephalixin (30ug) , AK = Amikacin (30ug) , TMP/SMX = Trimethoprim / Sulf methoxazole (25mg).

Table 4: Accuracy of urinalysis tests for diagnosis of UTI in pregnantwomen.

	Culture +ve	Culture -ve	Total
GUE	True+ve 69	False+ve 48	117
	False-ve 15	True-ve 168	183
	84	216	300

Discussion

The present study showed that UTI was common problem in pregnant women because of the physiological changes associated with pregnancy such as decreased ureteric tone, decreased bladder tone, increased bladder volume further the enlarging uterus will compress the uterus , all the above probably contribute to the high incidence of UTI in pregnant women. The predominant pathogens in the present study were *E.coli* (44%) which was the most frequent one in all age groups . Other pathogen like *proteus mirabilis* (19%) , *staphylococcus saprophyticus* (16%) , our result greed with those research workers in other countries with minor differences which could be due to differences in the enviroment, social habits , standard of personal hygien & difference in education (14.15.16). The frequency of isolation of *P.mirabililis* and *Staph Saprophyticus* was age dependence here, the prevalence of *Proteus mirabilis* increased with increasing age (P<0.05) and that for *staphylococcus saprophyticus* decreased with increasing age (P<0.05) indicate that the highest frequency of isolated *staph.*

saprophyticus among youngest age groups , these result was found in concordance with finding of other studies (15,17) . Concerning the pattern of antimicrobial susceptibility tests , it was found that cefotaxime , amikacin were the most effective antibiotics against *E.coli* , however gentamicin & ciprofloxacin were rather equally effective against *E.coli* ,the present finding was in agreement with finding in others countries (15,18) , sensitivity to Ampicillin was observed in approximately half of the women with UTIs & a lower in TMP /SMX (30%) , which was lower for ampicillin result & higher in TMP / SMX results than other studies (15) . For other findings in regard to antimicrobial susceptibility test to other isolated pathogens , the result was early similar to other studies in other countries (15,19) Regarding microscopical urinalysis test , the validity of this test was higher than that reported in other studies .(20) Because of the higher sensitivity & specificity test results , it was advised to do these test at a regular interval at antenatal clinic for the sake of early diagnosis & early treatment .

Conclusion

For an optimal empirical therapy , an actual data on antimicrobial resistance percentage of uropathogens are required & these data should be available to gynaecologist & urologist to get a benefit in their daily practice & it might be advisable to reconsider the empirical use of Ampicilline & trimethoprim / sulfmethoxazole , simply because of high percentage of resistance in the present study & other similar studies .

Finally since the resistance to cefotaxime and gentamicine is very low, therefore patients could be effectively treated with one of them as an empirical therapy.

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