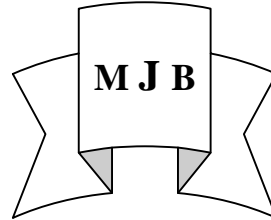


Distribution of Pathogens and Their Antibiotic Sensitivities in Urinary Tract Infection in Children Under Five Year in Hilla, Iraq

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Abstract

A cross sectional study was done on out patient children, where urine culture and sensitivity test was done on samples taken by suprapubic aspiration .The positive cultures were studied in relation to age and gender. The study shows a difference in the distribution of uro- pathogens and it's microbial sensitivities. Females predominate upon males in all age groups. E.coli, klebsiella and proteus are the most common pathogens 44%, 18%, 17%, respectively. The most active antibiotics are nalidixic acid, Gentamicin and nitrofurantion 82%, 81%, 80% respectively.

الخلاصة:

دراسة مقطعية أجريت على الأطفال دون سن الخامسة خارج المستشفى. أخذت عينات البول بواسطة السقط فوق العاني وأرسلت إلى فحص الزرع والحساسية الدوائية للمضادات الحيوية. درست نتائج الزرع الموجبة بعلاقتها مع العمر والجنس و أوضحت الدراسة إن هنالك فروقا في توزيع الممرضات البولية وحساسيتها الدوائية ، وكما وتبين رجحان للاثاث على الذكور وبجميع الفئات المختارة .كانت نسب توزيع اشريشيا القولون ،الكلبسيلا ،بروتيويس ٤٤ % ، ١٨% ، ١٧% وعلى التوالي .إن اكثر المضادات الحيوية حساسية كانت (ناليدكسك اسيد، حتتاميسين والنايتروفورانتوين ٨٢% ، ٨١% ، ٨٠% وعلى التوالي).

Aims of study

To determine the distribution of uropathogens, it's relation to age and gender, and to assess their sensitivities to antimicrobial drugs with the choice of best empiric antimicrobial therapy.

Introduction

Urinary tract infection(UTI) is defined as the presence of bacteria (10⁵/ml) in urine along with symptoms of

infection .UTIs ranks second only to the upper respiratory tract as a source of UTIS occur in as many 3-5 percent

of girls and 1 to 2 percent of boys[1-9]. Morbidity from bacterial infection in children is common[8]. Infection of urinary tract before age one, occurs more frequently in boys, with male : female ratio of 2.8-5.4:1[9] than in girls. After age one ,UTIS are more common in girls with male: female ratio of 1:10[9] Gram –negative enteric bacteria are the most common organisms that cause UTIs.[4,5]

Escherichia coli (E.coli) is the most common infecting pathogens in children particularly first infections accounting for up to 80%of UTIS, other pathogens include staphylococcus and strepto coccus species klebsiell ,proteus ,pseudomonas ,entero bacteria and occasionally ,Candida albicans. Adenovirus ,may also occur ,especially as a cause of cystitis[9]. The physician must reliant on clinical data and other laboratory tests (urinalysis, leucocytes response ...) while waiting a urine culture to confirm the diagnosis. A specimen for culture should be obtained through catheterization, supra pubic puncture and cleanly voided mid-stream specimen. Bagged urine specimen is not acceptable ,but it is adequate if the culture is negative. Most UTIS are successfully treated

with out significant sequelae. Early treatment of UTIS especially in infants and young children decrease the risk of kidney damage.

Third- generation cephalosp- orin, such as ceftriaxone ,is an appropriate choice for most patients clinically considered to have upper UTI who can be managed as out patients . However other data suggest oral cefixime [7]. Recent data suggest a 3-5 days course of therapy with Trimethoprim-sulfa Methoxazole , Nitrofurantion or Amoxicillin as initial treatment[9].

Patients and Method

A cross sectional study was done on out patient children below 5 years ($2.63 \pm 1.5SD$)year, where urine specimens collected by supra pubic aspiration, studied by quantitative culture method and anti –microbial sensitivity test was done by disk diffusion technique. One hundred patients with positive results were included in this study in relation to the age and sex.

Results

Among the isolates, E.coli, klebsiella, proteus, entro bacteria and staphylococcus aureus species were common accounting for 44%, 18%, 17%, 9%, 7%, respectively.

Pseudomonas and streptococcal species accounting for 3% and 2% respectively.

There was female preponderance upon all age groups, particularly between 3-4 years with a male: female ratio of (1:3.45). The over all ratio of male: female was (1:1.5). The sequence of pathogens according to sex was as follows:

Male: - *E.coli*(16%), proteus (8%), klebsiella (6%), staph. aureus (4%),

Pseudomonas (3%), entro bacteria (2%) and streptococci (1%).

Female: - *E.coli* (28%), klebsiella (12%), proteus (9%), entro bacteria (7%), and staph. aureus (3%), and streptococci (1%).

E.coli was the commonest pathogens in all age groups, proteus was the second common pathogen in those below one year and between 1-2 years (equal to *E.coli*), otherwise, klebsiella was the second common pathogens in other age groups *Pseudomonas* was encountered only in males, while streptococci was equal between both sexes as shown in table[1].

Anti-microbial sensitivity showed that resistance was common, and the effectiveness of third-generation

cephalosporin (apart from cefixime), Cephalexin, Tobramycin, Rifampcin, Ampicillin, Chloromphenicol, Trimethoprim-sulfa metaxazole, was under 50%. The most sensitive drug was Nalidixic acid, Nitrofurantoin and Gentamicin, 82%, 81%, and 80% respectively followed by Ciproflaxacin, Amikacin, and Cefixime, 63%, 58%, and 54% respectively.

The most sensitive drugs on *E.coli* was Nitrofurantoin (38 out of 44 patients), 86.3%.

The most sensitive drugs on proteus were Gentamicin and Nalidixic acid (14 out of 17 patients), 82.3%.

Gentamicin was the most sensitive drug on klebsiella (17 out of 18 patients) 94.4%, and on enterobacteria 100%.

Ciproflaxacin and Nitrofurantoin were the potent drugs against staph. aureus (85.7% and 71.4%) respectively.

cefixime, Ciproflaxacin, Gentamicin, Nalidixic acid and Nitrofurantoin had 100% efficacy against *Pseudomonas*. Lastly Nalidixic acid was sensitive in 100% for streptococci as shown in table [2].

Discussion

The study showed that there was female preponderance among all age groups (0-5 years), which differs from other studies that show a male preponderance to those below one year [2-9] or no gender difference in infants [10] but the same results were noticed in the study done in Nigeria [11].

E.coli constitutes 44% of pathogens in this study, which is similar to the study done in Ethiopia (46%)[12], while most other studies show a range between 75-90% (4.5,10.14,16). Klebsiella constitute 18%, which is nearby to other studies ranging between 6-13% [9,12,13].

The incidence of proteus in those between [1-2] years was equal to E.coli, which is similar to what mentioned by other authors [9].

In this study we found decrease in bacterial susceptibility to common antibiotics like Trimethoprim-sulfa methaxazole, Cephalexin and Ampicillin (10%, 12%, and 24%) respectively.

Resistance to TMP-SMX now approaches 18% to 22% in United States [14] and 71.5% in Ethiopia [12].

The most sensitive antibiotics in this study were (, Nalidixic acid, Nitrofurantoin and Gentamicin), which could be used as an empiric therapy while we are waiting for culture results instead of other antibiotics like TMP-SMX, Ampicillin and third generation cephalosporin.

Conclusions

There is a change in the distribution of uro pathogens and their susceptibility to anti microbial therapy and the use of empiric treatment prior to culture results.

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Table1 Distribution of Uropathogens according to age and gender

AGE YEAR	E. COLI		KLEBSIELLE		PROTEUS		ENTEROBACTER		STAPH. AUREUS		PSEUDOMONAS		STREPTOCOCCUS		TOTAL
	male	female	male	female	male	female	male	female	male	female	male	female	male	female	
0-1	3	6	1	1	2	4	0	2	1	0	2	0	0	0	22
1-2	1	4	0	1	2	3	1	0	2	0	0	0	0	0	14
2-3	6	5	3	1	2	1	0	0	1	0	0	0	0	0	19
3-4	1	7	0	5	0	0	1	1	0	1	1	0	1	1	19
4-5	5	6	2	4	2	1	0	4	0	2	0	0	0	0	26
Total	16	28	6	12	8	9	2	7	4	3	3	0	1	1	100

Table2 Distribution of antibiotics sensitivities according to Uropathogens

ANTIBIOTICS	<i>E. COLI</i>	<i>PROTEUS</i>	<i>KIEBSIELLE</i>	<i>ENTEROBACTER</i>	<i>STAPH. AUREUS</i>	<i>PSEUDOMONAS</i>	<i>STREPTOCOCCUS</i>	TOTAL
Cefotaxime	13	11	7	4	1	0	1	37
Ceftriaxone	18	8	8	5	2	2	1	45
Cefixime	22	9	7	7	3	3	1	54
Ceftazidime	17	3	2	1	2	1	1	28
Cephalexin	4	2	4	1	0	0	1	12
Ciprofloxacin	26	9	11	6	6	3	0	63
Amikacin	25	12	10	6	3	1	0	58
Gentamicin	33	14	17	9	2	3	1	80
Tobramycin	15	6	4	4	1	1	0	31
Nalidixic acid	35	14	15	8	3	3	2	82
Nitrofuradantoin	38	12	15	8	2	3	1	81
Rifampcin	16	8	10	6	5	0	0	46
Ampicillin	10	4	4	2	3	0	0	24
Chloromphenical	12	6	6	3	4	0	1	32
Co-trimaxazole	4	3	3	0	0	0	0	10
Erythromycin	0	1	0	0	1	0	0	2
Clindomycin	0	1	0	0	0	0	0	1
Cloxacillin	0	0	0	0	1	0	1	2