FREQUENCY AND TREATMENT OF URINARY TRACT INFECTION IN CHILDREN SUBJECTED TO URINE CULTURE, IN SANA'A, YEMEN

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Background: This study was carried out to estimate the frequency of urinary tract infection among children subjected to urine culture presenting to Sam Hospital, Sana'a city, Yemen and to determine the susceptibility of the isolated bacteria to the antibiotics. **Methods:** Record-based study was done in Sam Hospital in Sana'a city Yemen during three years 1/ 1/ 1999-31/ 12 / 2001. Out of 70500 patients seen for different causes through that period 820 (1.16%) having urinary symptoms (fever, rigor, vomiting, frequency or screams during the act of urination) were subjected to urine culture. Data about age and sex were also collected. **Results:** Frequency of urinary tract infections among children examined by urine culture was 36.8% (n=302), with mean age of 7.6 years, 272 (90.1%) of them were females, and 30 (9.9%) were males. More than half 154(51%) of infected patients were less than three year old. The isolated bacteria was Escherichia.coli 201 (66.3 %) followed by Staphylococcus suprofyticus 45 (14.9%, Proteus spp 15 (4.9%), Klebseilla 12 (3.9%) then Enterococcus spp 12 (3.9%). Sensitivity of E. coli, to Nalidexic acid was 70%, to Amoxicillin/Clavulanic acid was 29.9%, to Co-trimoxasole was 16.4%, and to Nitrofurantoin was 15.9%. **Conclusion:** The majority of the infected patients were females and the highest frequency of the disease was in the first three years of age. The most common isolated microorganism was E.coli followed by Staphylococcus suprofyticus, Proteus spp, then Enterococcus spp. The highly active antibiotic for most organisms isolated was Nalidexic acid, then amoxicillin/ clavulanic acid. Nalidexic acid can be used as a first line empiric treatment and/or prophylaxis of UTI in children.

Keywords: Urinary tract infection, children, Yemen.

INTRODUCTION

Urinary tract infections (UTIs) are a common cause of morbidity in children.[1] UTI causes significant illness in the first 2 years of life. Misdiagnosis very often leads to avoidable ill health and long-term renal damage.[2] At least 8% of girls and 2% of boys have urinary tract infections in childhood, and between 30% and 40% have another episode within two years.[3] Male to female ratio was 1:10[4]. Nearly all UTIs are ascending infection. The bacteria arise from the fecal flora, colonize the perineum, and enter the bladder via the urethra. In uncircumcised boys the bacterial pathogens arise from the flora beneath the prepuce. UTIs are much more common in uncircumcised boys.[4]

The flora greatly changes with skin commensals after circumcision. Circumcision might be beneficial from this point of view.[5] Present guideline recommends that empiric treatment should be started in all cases of suspected UTIs after an appropriate urine specimen is obtained to avoid severe illness. The use of an inappropriate antibiotic will delay effective treatment and increase the risk of renal scarring that is associated with chronic renal failure later in life.[3,4,6-,8] Diagnosis cannot be made on urinalysis and other findings alone. Quantitative urine culture before initiation of antimicrobial therapy is considered to be the gold standard for diagnosis of bacterial UTIs.[9] Antimicrobial susceptibility testing help in selection of appropriate treatment for patients with confirmed bacterial UTI.[10]

An African study reported that Escherichia coli (32%) and Proteus spp. (22%) form more than 50% of the total isolates. The Gram positive bacteria isolated was Staphylococcus aureus representing 11%. All isolates were susceptible to cefuroxime and resistant to ampicillin. Susceptibility to amoxicillin/clavulanic acid was 77.8% and to nitrofurantoin was 67%. Only 11.1% of isolates were susceptible to cotrimoxazole.[2] In females E .coli followed by

Klebsiella and Proteus spp. causes 75-90% of all infection. Guidelines recommend trimethoprim - sulfamethoxazole for empirical treatment of uncomplicated UTI unless trimethoprim-sulfamethoxazole resistance in a community exceeds 10% to 20%.[11] One third to two third of E.coli isolated from children may be resistant to (cotrimoxazole) and the first line empiric treatment and prophylaxes for UTIs is nitrofurontin.[12] Cephadroxil was found to be slightly superior to co-trimoxazole (trimethoprim / sulfamethoxazole) and cefprozil in preventing asymptomatic bacteriuria episodes and symptomatic UTIs in children with recurrent UTI and normal urinary tract system.[13] Cefaclor can be an alternative choice for prophylactic treatment because of its safety, good compliance and low rates of resistant E. coli.[14]The aim of this study was to estimate the frequency of urinary tract infection in children subjected to urine culture and to determine the highly effective antibiotics.

MATERIAL AND METHODS

This hospital record based study was done in Sam Hospital in Sana'a city, Republic of Yemen during three years 1/ 1/ 1999- 31/ 12/ 2001. The hospital provides services to the community through outpatient clinics and admissions and receives patients from Sana'a city, surrounding areas and some times from other governorates, beside referred cases from private clinics. Out of 70500 patients under 15 years old seen for different causes through that period, 820 (1.16%) had complaints related to urinary tract infections. These were fever, rigors, vomiting, frequency of micturition or screams during the act of urination. Patients with such complaint were subjected to urine investigations. For toilet trained children midstream urine was requested, while sterile urine collection bag for younger children was used. The bacteria was identified by standard method and the anti microbial susceptibility determined by disk diffusion. UTI was defined positive by the combination of a positive urine culture (growth of $\geq$ 100 bacteria/ml) and complaint related to urinary tract infections. Data about age and sex were collected and processed manually.

RESULTS

Out of the 820 patients who had compliant related to UTI and who were subjected to urine culture (Mean Age 7.6 years), males were 190 (23.2%) and females were 630 (76.8%). From these cases only 302 (36.8%) were confirmed as UTIs by urine culture, 90.1% (272) of them were females and 9.9% (30) males. The ratio of males to females was 1:26.

Patients less than three year old constituted 51% of the total infected patients. Table-1 shows the distribution of urinary tract infection by ages. The isolated bacteria was Escherichia.coli 201 (66.3 %) followed by Staphylococcus suprophyticus 45 (14.9%, Proteus spp 15 (4.9%), Klebseilla 12 (3.9%) then Enterococcus spp 12 (3.9%). Sensitivity of E. coli, to nalidexic acid was 70%, to amoxicillin/ clavulanic acid was 29.9%, to co-trimoxasole was 16.4%, and to nitrofurantoin was15.9% (table-2).

Table-1: Distributions of urinary tract infections by ages

Ages	Males No (%)	Females No (%)	Total No (%)
0-1 year	16 (5.3)	34 (11.3)	50 (16.6)
>1-2 years	8 (2.6)	52 (17.2)	60 (19.9)
>2-3 years	4 (1.3)	40 (13.2)	44 (14.6)
>3-10 years	2 (0.7)	98 (32.5)	100 (33.1)
>10-15 years	0 (0)	48 (15.9)	48 (15.9)
Total	30 (9.9)	272 (90.1)	302 (100)

DISCUSSION

The total number of patients subjected to urine culture was low, because not all patients having symptoms and signs of UTI were subjected to urine culture. At times the pediatricians treated the patients according to the microscopic examination of the urine. Also sometimes the patients were unable to pay for urine culture. Also in this study only 302 (36.8%) of the examined patients were confirmed as UTIs. This is low in comparison with other studies[3,4]. This can be explained by the same causes mentioned above. In the current study UTIs in males were very low, the ratio of male to female was 1:26, in comparison with other studies where the ratio was 1-10.[3,4]. This may be due to early circumcision, which is usually carried out in the day seven after birth in Yemen.

In this study, patients less than three years constituted more than half of the total infected patients. This agrees with another study [15].

The most common microorganism isolated was E.coli, this agrees with other studies.[4,15] Followed by Staphylococcus suprofyticus, Proteus species, Klebseilla, then Enterococcus spp. These findings agree with other studies but differ in the order of the organism.[4,15] Also in this study nalidexic acid was active against the most isolated microorganisms. This is in contrast with other studies which, reported that the active antibiotic was cotrimoxazole, in other study was nitrofurantoin.[11,12]

Table-2: Isolated bacteria from urine and their sensitivity to antibiotics

Antibiotics	**E.coli (n=201)**	**Staph. Suprophyticus (n=45)**	**Proteus species (n=15)**	**Klebsiella (n=12)**	**Enterococci (n=12)**
Nalidixic acid	70%	66.7%	80%	100%	50%
Amoxicillin/ Clavulanic acid	29.9%	26.6%	40%	25%	0%
Co-trimoxazole	16.4%	13%	40%	0%	0%
Nitrofurantoin	15.9%	20%	0%	25%	25%

In conclusion the majority of the infected patients were females while males were very low and the highest frequency of the disease was in the first three years of age.

The most common isolated microorganism was E.coli followed by Staphylococcus suprofyticus, Proteus spp, Klebseilla, then Enterococcus spp. The highly active antibiotic for most organisms isolated was nalidixic acid then amoxicillin/ clavulanic acid. Nalidixic acid can be used as a first line empiric treatment and/or prophylaxis of UTI in children.

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