DETECTION OF BACTERIAL AGENTS CAUSING URINARY TRACT INFECTION AMONG CHILDREN IN KHARTOUM STATE

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ABSTRACT
Background: Tract infection (UTI) is one of the most common pediatric infections. It distresses the child, concerns the parents and may cause permanent kidney damage. Aim: To evaluate the frequency of the bacterial agents responsible for urinary tract infections among children from age 5-15 and the antimicrobial sensitivity profile of the uropathogens involved in these infectious processes. Methods: Questionnaire was conducted to collect the data from patient under study then (100) mid-stream urine sample was form children, cultured on bacteriological media, then isolated bacteria subjected to antibacterial susceptibility test. Results: According to the results, the 100 sample was verified into female (72.8%), while male (77.8%). the most frequent Gram negative bacteria were Escherichia coli 33%, S.aureus 14%, Proteus mirabilis 7%, Others Staphylococcus 5%, Enterobacter spp 4%, Pseudomonas aeruginosa 4%, Klebsiella pneumonia 3% Conclusion: With regard to bacterial susceptibility to antimicrobial agents, it was noted that gram negative bacteria have higher resistance to, AMC, AMP.

KEYWORDS: Etiology, UTIs, Susceptibility, Antimicrobial, Resistance.

INTRODUCTION
Urinary tract infection (UTI) consists of microbial invasion and multiplication in any of the structures of the urinary system. The severity of infection ranges from asymptomatic colonization, or that is without tissue degeneration through to symptomatic invasion of the tissues of any of the structures of the urinary system. World-wide, a minimum occurrence of 150 million symptomatic cases of UTIs are observed every year, however the real...
incidence is underestimated because a large portion of urinary infections are cured without medical follow up. The etiology of UT infections is related to the great diversity of microbial invaders, such as: bacteria, viruses and fungi. UTI in children may indicate serious anatomic abnormality like Vesicoureteral reflux (VUR), or neurogenic bladder. It is very necessary to identify children with UTI and treat them as soon as possible to avoid any long term complications and to reduce the risk of any significant morbidity. Unrecognized UTI may progress into renal damage, hypertension and end stage renal disease. Misdiagnosis, delay in diagnosis, and treatment of pediatric urinary tract infection appears to cause renal scarring and may produce hypertension and end-stage renal disease.

MATERIALS AND METHODS

Ethical consideration
After approval of the management of the Hospitals demonstration concerned authority the approval of the patient on their own free without using any mean of pressure and taken in account all professional ethic and the sample were collected by the patient.

Study population
The study was conduct among children suffering from symptom of urinary tract infection.

Sample Collection
One hundred of Fresh mid-stream urine (MSU) samples were collected inside sterile container from Children suspected to have UTIs. The samples were labeled and transported to the Medical laboratory of the AL Yarmouk college and were processed within 1to 2 hour after sample collection.

Isolation of bacteria
All samples were cultured on CLED media and MacConkey agar followed by incubation at 37 °C for 24 hours.

Antibiotic sensitivity test
Seeding of inoculums: A suspension of the tested organism was prepared and compared with the McFarland turbidity standard. A sterile cotton swab was immersed in the suspension and the excess fluid removed by pressing and rotating in the edge of the tube above the level of the suspension, followed by streaking the swab evenly over the surface of the Nutrient agar in four directions, rotate the plate 180 degree to ensure even distribution, then 3-5 minutes for the surface of the agar to dry.
Application of antibiotic disc
Sterile forceps was used to place antibiotic discs. Within 10 minutes of applying the discs the plates was incubated aerobically at 37°C for 24 hours, after overnight incubation a ruler used to measure the antibiotic discs zones size and then reporting the organism as resistant, intermediated or sensitive (Cheesbrough, 2006).

Isolated were identified by bacteriological and biochemical methods.

RESULTS
Table: 1. Frequency of bacteria growth according to gender
Out of one hundred sample urine 70 showed positive bacterial growth (70%) total female were 55, 40 of them (72.8%) had urine bacterial growth while 30 (66.7%) male out of total 45 also showed urine bacterial growth (Table 1).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Growth (%)</th>
<th>No growth (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30(66.7)</td>
<td>15 (33.3)</td>
<td>45 (45)</td>
</tr>
<tr>
<td>Female</td>
<td>40(72.8)</td>
<td>15 (26.2)</td>
<td>55 (55)</td>
</tr>
<tr>
<td>Total</td>
<td>70(70)</td>
<td>30 (30)</td>
<td>100</td>
</tr>
</tbody>
</table>

Frequency between growth and age group
Related to age group, children age (5-10) years were 25 (80.7%) had high level of growth, in contrast those aged (11-15) years were 45 (66.7) with low level of growth (Table 2)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Growth (%)</th>
<th>No growth (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 5-10</td>
<td>25(80.7)</td>
<td>6(19.3)</td>
<td>31(31)</td>
</tr>
<tr>
<td>Age 11-15</td>
<td>45(65.3)</td>
<td>24(34.7)</td>
<td>79(79)</td>
</tr>
<tr>
<td>Total</td>
<td>70(70)</td>
<td>30(30)</td>
<td>100(100)</td>
</tr>
</tbody>
</table>

Population of bacteria among UTI
Different types of microorganism were isolated from urine ranging from gram negative bacteria were Escherichia coli constituted (33%) followed by Staphylococcus aurues (14%) then Proteus mirabilis (7%), other staphylococci (5%), Enterobacter spp. (4%), Pseudomonas aeruginosa (4%) and Klebsiella pneumoniae (3%) (Table 3)

Table (3) Show the number of isolate pathogen

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Percentage (%) isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>33</td>
</tr>
<tr>
<td>Staphylococcus aurues</td>
<td>14</td>
</tr>
</tbody>
</table>
The frequency of bacteria according to age and gender

In the table (4) shows that in male and female was *E.coli* and according to age group from 5-10 and 11-15 was *E.coli* fallowed by second dominating bacteria.

### Table (4). The frequency of bacteria according to age and gender

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Age 5-10 (%)</th>
<th>Age 11-15 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E.coli</em></td>
<td>13</td>
<td>20</td>
<td>10(40)</td>
<td>23(51.2)</td>
</tr>
<tr>
<td><em>S.aures</em></td>
<td>4(8.8)</td>
<td>10</td>
<td>8(32)</td>
<td>6(13.3)</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>4(8.8)</td>
<td>3(5.4)</td>
<td>2(8)</td>
<td>5(11.1)</td>
</tr>
<tr>
<td><em>Others Staphylococcus</em></td>
<td>2(4.4)</td>
<td>3(5.4)</td>
<td>4(16)</td>
<td>1(2.2)</td>
</tr>
<tr>
<td><em>Enterobacter spp.</em></td>
<td>3(6.7)</td>
<td>1(1.8)</td>
<td>1(4)</td>
<td>3(6.6)</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>3(6.7)</td>
<td>1(1.8)</td>
<td>0(0)</td>
<td>4(8.8)</td>
</tr>
<tr>
<td><em>Klebsiella pneumonia</em></td>
<td>1(2.3)</td>
<td>2(3.7)</td>
<td>0(0)</td>
<td>(6.6)</td>
</tr>
</tbody>
</table>

Antimicrobial result

Then all positive samples was manipulated to antimicrobial sensitivity test The antimicrobial used was Amoxicillin, Ampicillin, Co-Trimoxazole, Cefotaxime, Norfloxacine, High resistance rate to AMP and AMC show in table (5)

### Table (5) show the result of the antimicrobial n=70

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>AMC</th>
<th>A</th>
<th>MP</th>
<th>CTX</th>
<th>COT</th>
<th>NX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numb Of Path</td>
<td>R %</td>
<td>S %</td>
<td>R %</td>
<td>S %</td>
<td>R %</td>
</tr>
<tr>
<td><em>E.coli</em></td>
<td>33</td>
<td>78.8</td>
<td>21.2</td>
<td>93.9</td>
<td>6.1</td>
<td>27.2</td>
</tr>
<tr>
<td><em>S.aures</em></td>
<td>14</td>
<td>85.7</td>
<td>14.3</td>
<td>7.1</td>
<td>92.9</td>
<td>21.4</td>
</tr>
<tr>
<td><em>p. mirabilis</em></td>
<td>7</td>
<td>71.5</td>
<td>28.5</td>
<td>57.1</td>
<td>42.9</td>
<td>28.5</td>
</tr>
<tr>
<td><em>Others Staphylococcus</em></td>
<td>5</td>
<td>60</td>
<td>40</td>
<td>0</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td><em>Enterobacter Spp.</em></td>
<td>4</td>
<td>75</td>
<td>25</td>
<td>75</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>4</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td><em>Klebsiella pneumonia</em></td>
<td>3</td>
<td>100</td>
<td>0</td>
<td>66.6</td>
<td>33.4</td>
<td>66.6</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The study was undertaken to see the most bacterial pathogen in UTI sample out of 100 samples 70 showed positive growth (70%) these sample can be distributed into male 45 and
female 55, the female was show high number of isolated bacteria 40 (72.8%) while male was 30(66.7%).

The patient under study was distribute into two age group, the age group which show high level of growth was (5-10) 25 (80.7%) than group (11-15), 45 (66.7%) respectively. The most frequent Gram negative bacteria were Escherichia coli 33%, S.aureus 14%, Proteus mirabilis 7%, Others Staphylococcus 5%, Enterobacter spp. 4%, Pseudomonas aeruginosa 4%, Klebsiella pneumonia 3% This result was in disagreement with (Alo Moses.et al 2012) due to his report that Staphylococcus aurues was dominate 43.6% and that could be to the personal hygiene and the method.

Other study in Nablus by (Raya Mohammad 2009) that E.coli was most dominated 51.8% and the two agree that female gender was the most effect gender than male The higher percentage of E.coli infection compared with the other organisms could be explained on the basis of their normal habitat in the intestinal tract that is why it is the most common organism founded. The gender difference should also be considered, since the urine orifice was so close to the anal opening. Most of the infections were observed in the second and third groups of age (5-10yrs) and this can be explained by their improper cleaning of themselves in the toilets and the bad hygiene status of their families. That is why they are more susceptible to the infection at this stage of life.

All the isolated bacteria showed different patterns of susceptibility and resistance to the available antibiotics. Higher resistant levels were detected in Amoxicillin, Ampicillin, respectively. These findings require careful selection of the drug for the treatment and management of UTIs among pediatrics.

CONCLUSION
In conclusion, study showed that bacteria have a great role in urinary tract infections (UTIs) among pediatrics constituting which caused by different type of microorganism.

RECOMMENDATIONS
1. In reference to the generated data from this study, it is recommended that; Carryout more studies of urinary tract infections UTIs among children on the same area from time to time and other areas to ensure continuous updating of the epidemiology of the problem.
2. Immediate contact with physician when suffering from problems in the urinary tract and avoid having any medication before getting the results of urine analysis and urine culture.

3. Doctors are encouraged to ask their patients to do urine culture and sensitivity when they suspect UTI, in order to give the best treatment.

4. More health promotion programs are needed to be implemented at schools, to increase the awareness of students and their teachers and improve their healthy behaviors.

REFERENCES


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