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A Survey Study of Urinary Tract Infections and their Susceptibility in Ibn- Al- Balady Hospital in Baghdad - Iraq

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Abstract: ***Background: The most common bacterial infection occurred in the urinary tract. Urinary tract infections are diseases of infancy and older age. In the first 3 months of life these infections occurred due to blood spread that is means bacteremia while in older patients urinary tract infection usually occurred because of upward ascending rout via the urethra. Aim of study: The incidence rates of UTIs during the first year of life and in patients less than 15 years old is studied.Also their association with gender, sex, and determine the antibiotic sensitivity of bacterial isolates. Patients and Methods: During two calendar years 2015 and 2016.2758 urine samples were collected from children 0-15 years old at Ibn- AlBalady hospital in Baghdad city. Two methods were used for culture of urine:vitektest and conventional biochemical test. Sensitivity to antibiotics done by Kirby Bauer disc diffusion method. Results: The incidence rate in girls was more than in boys. Out of them (2758) 834 have growth (UTI) and 1924 have no growth. E.coli was the highest percentage 33.21%. Klebsiella spp. (8.51%), proteus spp. 9.95%, Salmonella typhi 0.47% and Pantoea spp. was the lowest percentage (0.35%). Conclusion: The incidence of urinary tract infection is highasshown inthisstudy.Themostcommon organism cultured from uncomplicated UTI is Enterobacteriaceae. Many factors aided in the initial choice of antibacterial drugs these factors include patients age and antibacterial sensitivity in the particular region.***

Keywords: UTI (Urinary tract infection), vesicoureteric reflux. Ascending infection, Antibiotic resistance, Enterobacteriaceae

1. Introduction

In patients with urinary tract anomalies 30% of them UTI is the first presenting clinical disease (1). In patients who have pyrexia of unknown originUTI is the most common cause (2).Children who have vesicoureteric reflux 30% of them developUTI which can put these children at risk for recurrent infections andscarring of the kidney.Age factor is important for developing renal scarring so young children and infants are at higher risk for renaldamage from urinary tract infections than older children (3). The most serious bacterialinfections and mostcommonbacterialinfections in pediatric age group are UTI(4). The percentage of boys who develop UTI is 2%while in girls at least 8%. The clinical features and the incidence of UTIs in children are very different for both sexes and at different stages of life (5).80% of UTIs in children are caused by bacteria which has high resistance to antibiotics. This resistance to antibiotic makes the treatment of UTI more difficult so the morbidity is highand the costs forre-evaluation is high because ofre-treatment and frequent hospitalization and use of broadspectrum antibiotics is high (6). Also during treatment of UTI the organisms can lose its sensitivity to an antibiotic (7).

2. Aim of the Study

The aims of present survey are to find out the prevalence of urinarytractinfections in infant and young child in Ibn-Al Balady hospital in Baghdad because of their serious effect and determine the antibiotic resistance patterns in UTI in children.

3. Patients and Methods

Bacterial isolates: 2758 urine samples were collected from children expected to have UTT in Ibn-AlBalady hospital in Baghdad. The children at age 0-15 years with diagnosis of urinary tract infection withfollowing variableswere examined: age, gender and bacterial species. Two methods were used for bacterial isolates conventional biochemical tests and vitek 2 system (8).

Antibiotic susceptibility testing: According to clinical and Laboratory Standards Institute (CLSI) guidelines we use Kirby-Bauer disk diffusion method for antibacterial susceptibility after the bacterial isolates (9).The antibacterial agents included Ceftriaxone, Trimethoprime, Gentamycin, Ampicillin, Amikacin. Nitrofurantion, Norfloxacin, Ceftazidime

Statistical Analysis

The values in this study and the difference factors were subjected to the Statistical Analysis System SAS program (10).The comparism between percentages was evaluated by Chi-square test.

4. Results and Discussion

It is difficult to point the exact incidence of urinary tract infections UTIs in children but still UTIs are the most common bacterialinfections seen by pediatricians (11).

Results of our survey study included 2758samples from children whoaresuspected to have UTI during two years 2015 and 2016. Out of them 834 were with positive growth and 1924 with no growth (Table1).A significant increase in

the number of cases observed in Ibn-AlBalady hospital in 2015 may be caused an increased search for thosecases in particular urinalysis which was performed on any infant or child whose clinical progress deviated in any way from the normal or it was considered that the apparent increase in the incidence resulted from an increase in detection rate, suggesting that patients with mild signs had previously been overlooked,this resultagreewith Alietal.(12), but in 2016, there is apparent decrease in number of UTI, this is rended to health care or devices health care-associated infection, like those associated with central catheters or may be early diagnosis to UTI and lastly it may be due to using antibiotic with high activity. In infants and young children it is vital to diagnose UTI early because this infection may be a marker to the presence of anomalies of urinary tract and in the neonatal period it may be associated with bacteraemia. Also it is important to diagnose UTI early to protect the renal function of the growing kidney (11).

Table 1: Incidence of Urinary tract Infection by years

Years	Cases	Growth	%	No growth	%	Chi-Square-$\chi2$
2015	1817	600	33.02	1217	66.97	9.261**
2016	941	234	24.86	707	75.13	11.74**
Total	2758	834	30.23	1924	69.76	9.941**
Chi-Square-$\chi2$	---	---	4.326*	---	4.326*	---
* (P < 0.05), ** (P < 0.01)						

Of 2758 samples, 1394 were female and 1364 were male (Table2) shows important differences at different age,the highest rate of infections occurred at age group (7-15) year (2018case). In infants 740 cases. Similar results were reported by Jumbo *et al* (13) who reported that UTIs in female was higher than that in males. Because theurethra isshortand its location close to the perineal region, female get higher rate of UTI than male.Also because of poor perineal hygiene and errors in self management made by school age who clean the perineum forwards from the anustoward the vulva and have habit of infrequent micturition which leads to over distention of the urinary bladder with subsequent incomplete emptying leads to residual urine and stagnation of urine which allow for bacterial colonization to occur moreeasily and rapidly(14).

Table 2: Incidence of UTI among male and female in every year

Years	Male	%	Female	%	Total	Chi-Square-$\chi2$
2015	1010	55.58	807	44.41	1817	4.519*
2016	354	37.61	587	62.38	941	9.366**
Total	1364	49.45	1394	50.54	2758	---
Chi-Square-$\chi2$	---	6.952**	---	6.952**	---	---
* (P < 0.05), ** (P < 0.01)						

Table 3: Incidence of UTI according the age every year

Years	Age				Total	Chi-Square-$\chi2$
	<1-6 years	%	7-15 years	%		
2015	644	35.44	1173	64.55	1817	9.277**
2016	96	10.20	845	89.79	941	13.894**
Total	740	26.83	2018	73.16	2758	11.653**
Chi-Square-$\chi2$	---	6.413**	---	6.413**	---	---
** (P < 0.01)						

Also in our survey study froma total of 834 bacterial growth, E.coli was the highest percentage (33.21%), Klebseilla spp. (8.51%), Proteus spp.(9.95%), Salmonella Typhi (0.47%) and Pantoea spp. was the lowest percentage (0.35%) (Table 4).

The diagnosis of UTI in a young childisdone by taking urine specimen for culture.Urinalysis can be usedprior to culture to supportdiagnosis of UTI (11).

Table 4: Percentage of isolated bacteria from UTIs for two years 2015 and 2016

Bacteria	Number of isolates	Percentage from total samples	Percentage from growth
E. coli	277	10.04%	33.21%
S. aureus	31	1.12%	3.71%
Klebseilla spp.	71	2.57%	8.51%
Proteus spp.	83	3.00%	9.95%
Pseudomonas aeruginosa	23	0.83%	2.75%
P. putidae	6	0.21%	0.71%
p. lutent	5	0.18%	0.59%
S. epidermidis	30	1.08%	3.59%
S. warneri	2	0.07%	0.23%
Salmonella Typi	4	0.14%	0.47%
S. haemolyticus	11	0.39%	1.31%
Acinetobacter spp.	22	0.79	2.63
Enterobacter spp.	33	1.19	3.95
Streptococcus spp.	15	0.54	1.79
Enterobacter sakazakii	8	0.29	0.95
Serratia odoritera	5	0.18	0.59
Serratia fonticola	2	0.07	0.23
Pantoea spp.	3	0.10	0.35

Table 5: Antibiotic sensitivity test

Isolated Bacteria & number	Antibiotic sensitivity test										
	AK	CIP	TMP	TE	C	AUG	AMP	CTR	CIT	VA	E
E.coli (144)	(%7.0)8	(%10.5)12	(%9.6)11	(%7.0)8	(%4.3)5	(%11.4)13	(%8.7)10	(%6.1)7	(%2.7)4	(%2.08)3	-
Staph.aureus(21)	(%38.0)B	(%33.3)7	-	(%4.3)1	-	(%4.7)1	(%9.5)2	(%4.7)1	(%4.7)1		-
Proteus ssp.(28)	(%3.5)1	(%17.8)5	(%7.1)2	(%7.1)2	(%3.5)1	(%3.5)1	(%25)7	(%14.2)4	(%3.5)1	(%7.1)2	-
Klebsila spp.(18)	(%22.2)4	(%5.5)1	(%16.6)3	(%11.1)2	-	(%10)1	(%27.7)5	(%5.5)1	-	-	(%5.5)1
Entero ssp.(10)	(%20)2	(%10)1	(%10)1	-	-	(%10)1	(%10)1	(%10)1	(%10)1	-	-
Streptococcaus ssp.(30)	-	(%25)1	-	(%8)2	-	-	-	-	(%25)1	-	-

The most common bacteria cultured from uncomplicated UTI are Enterobacteriaceae(11), Russell (15) reported that E.coli givena strong suspicion of urinary tract infection. Vigi et al. (16) also found that E.coli is the primary etiologic agent associated with UTI in children. A according to study achieved in Baghdad/ Iraq Al-Dawny and Yousif showed that 49% of UTI in Baghdad caused by E.coli (17).

Three useful and beneficial goals are obtained from rapid and correct diagnosis of the management of UTI firsly is prevention of progressive renal disease by eradication of the bacterial pathogen. Secondly is detection of anomalies of urinary tractand management ofrecurrentinfections.

On the other hand, current study indicated that the antimicrobial agents with highest levels of activity against E.coli isolates were ampicillin then, TMP, the highest resistance was shown to AZM and AMC. Only Pseudomonas have resistance to 9types of antibiotics while Proteus, Klebseilla showed resistant to (CN, NOR and CFM)and (TMP, CN and NOR) respectively. Staphylococcus and streptococcus were sensitive to some and non to others, Table (5), (6).Antimicrobial susceptibility pattern of uropathogens varies widely by region, but our results correspond with data obtained by other investigators (23, 24).

Al Marjani (25) reported that the bacterial culture results isolates from cockroaches were all haveresistant to those antibiotics. Amoxycillin-, Cefixime, Al Marjani et al. (26)reported that P. aeruginosa which were cultured from the patients were highly resistant, were resistance 100% for Carbencillin; 80% for Cefixime, and 84% for Amoxicillin-clavulanic acid. The mainfacters determine your choice of antibacterial agent, the knowledge of the predominant pathogens inthe patient's age and antibacterial sensitivity patterns in the practice area.

In conclusionthe incidence of urinary tract infection in pediatric age group is high and ismore common in female. The mostcommon microorganism causes UTI is Enterobacteriaceae. The choice of antibiotic is based on patients age and antibacterial sensitivity pattern in that particular region.

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