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Research Article

Escherichia Coli Bacteria Infection in Females Urinary Tract

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Abstract

The gram-negative of the general *Eschcrichia coli*, *Klebsiella*, *Enterobacter*, *Serratia*, *Citrobacter*, and *Proteus* are members of the normal intestinal flora of humors and animals and may be isolated from a variety of environmental sources. *E. coli* and other grain-negative organisms associated with urine infection in females, the signs, symptoms and prevalence of such infections among patients visiting hospitals, the age-wise prevalence and distribution, among married and unmarried women, the role of pregnancy and parturition in such infections, the role of hospitalizations in picking up such urinary tract infection.

Material and Methods

I was collected the urine samples by manual methods and examine the samples by routine examination and culture.

Result

A total of 250 urine samples from female patients visiting Al- wahada & polyclinic hospital, Derna were examined for the presence of Gram negative bacteria and only 100 samples were found culturally positive, the results also indicated that the females in the age group of 15 to 55 years were most susceptible to gram negative urinary infection. About 40% females of 15-25 and age group were showing urinary symptoms, whereas only 11% females of 35-45. Year's age group and 7% of the females of 45-55 years age group had urinary symptoms. Only 1% of the females of 55 to 65 years group U.T.I.

Keywords: *Eschcrichia coli*; *Klebsiella*; *Enterobacter*; *Serratia*; *Citrobacter*; and *Proteus*

Introduction

The gram-negative of the general *Eschcrichia*, *Klebsiella*, *Enterobacter*, *Serratia*, *Citrobacter*, and *Proteus* are members of the normal intestinal flora of humors and animals and may be isolated from a variety of environmental sources. With the exception of *Proteus*, they were sometimes collectively referred to as Colifrom Bacilli because of shared properties, particularly the ability of most of this specie to ferment the sugar lactose. Many of these microorganisms used

to be dismissed as harmless commercial; they were known to be responsible for major health problems worldwide.

A limited number of species including, *E.coli*, *K.Pneumonia*, *Enterobacler*,*Aerogcnes*,*Enterobactor*,*Cloacae*,*Cmarcescens*, and *P*. *Mirabilis*, were responsible for most infections produced by this group of organisms. The increasing incidence of the *Coliforms*, *Proteus* and other gram-negative organisms in disease reflects in part a better understanding of their pathogenic potential but more importantly the changing ecology of bacterial disease. The more importantly use of antibiotics has created drug-resistant gram-negative bacilli that readily acquire multiple resistance through transmission of drug resistance plasmids [R factors]. Also development of new surgical procedures, health support technology, and therapeutic regimens has provided never portals of entry and compromised many host defenses.

Urinary tract infections are common and cause significant morbidity and mentality among population one third one half of humans suffer a urinary tract infection (U.T.I) at some time [1]. The prevalence dependent on age and sex in females increases often infancy, stabilizing at (4-5%) [2].

Although most recover uneven fully, this population group was at substantially risk of recurrent U.T.I during adult life, vividly the onset of sexual activity, bacteriuria rates in females increase dramatically 20% experiencing one or more infections actually. In the elderly of both sexes, gynecologic or prostatic surgery, in continence, instrumentation, and chronic urethral catheterization push U.T.I rates to (30-40%) these infections may be symptomatic or a symptomatic, acute or chronic, and singular recurrent. At times they can produce -permanent damage to the kidney.

U.T.I were common in females than in makes since the shorter, wider female urethra appears to be effective in preventing access of the bacteria to the Bladder other cases of U.T.l was urinary stagnation that may predispose to U.T.I include urethral obstruction, urinary stones, congenital malformations and neurological disorders, since most U.T.I were thought to be caused by organisms originating from the patient's own bowel, possible transmitted in contaminated foods, were able to colonize the bond and individuals with predisposing factors may acquire U.T.I

Bacteria were most frequent group of organisms causing U.T.I, but the pattern of bacterial agents depends on a large extent, wither infections were acute or recurrent and wither they were outside or inside of hospital. Different bacterial species have one time or another [2].

Material and Methods

I was collected the urine samples by manual methods and examine the samples by routine examination and culture.

Materials

Urine Samples, Containers, Swab, Test Tubes, Glass Slides, Cover Slides, Inoculating Loops and Forceps, Bunsen Burners, Petridis, Non Autoclave, and Antibiotic Disc.

Instruments

Centrifuge, Microscopic, Autoclave, Incubator, Refrigerator, Staining, Balance

Methods

Collection and Transport of Urine: Wherever possible, the first urine passed by the patient at the beginning of the day should be sent for examination.

Examine the Specimen Microscopically: Bacteria, White Cells (Pus Cells), Red Blood Cells (RBC), Yeast Cells, Epithelial Cells.

NOTE: If the urine was hypertonic, i.e. more concentrated than the fluid inside the red cells, fluid will be drawn out of the cells and they will appear smaller than normal and often created if, however, the urine was hypotonic, i.e. less concentrated than the fluid inside the red cells, fluid will be drawn into the cells and they will appear larger than normal such swollen cells were easily ruptured.

Haematuria (red cells in urine) may be found in urinar schistosomiasis ,bacterial infections, acute glomerulonep- hritis, sickle cell disease, leptospirosis, infective endocarditic, calculi (stones) in the urinary tract, malignancy of the urinary tract, and hemorrhagic conditions .

Summary of the Microscopically Features Of Common Pathogens:

Organism	Wet - Preparation	Gram Smear
Escherichia- coli	Usually Motile Nods	Gram-negative rods
Pseudomonas aeruginoa	Motile Rods	Gram negative rods
Protease *species*	Motile Rods	Gram negative rods
Klebsiella strains	Non-Motile Rods	Negative Capsulated

Culture:

Culture techniques were used to Psalter pathogens in pure culture so that they can be identified, and if indicated, tested for then-sensitivity [susceptibility] to antimicrobials. Culture media prepared carefully-Each of the following must be performed correctly:

- Weighting and Dissolving
- Addition of Heat
- Sensitive in Gradients
- Dispensing
- Sterilization and Sterility Testing.
- PH Testing.
- Quality control.
- Storage.
- Nutrient Agar and Nutrient Broth
- Blood Agar
- Mac Conkey Agar
- Triple sugar iron Agar

Note: Contaminating organisms usually produce a few colonies of mixed growth. Most urinary infections show growth of a single type of organism although mixed infection can occur especially after catheterization or gynecological surgery.

Results

Table 1: Urine Samples Positive for Gram Negative Bacteria.

No. of Urine Samples Processed	No. of Samples Culturally Positive on Macconkeys	Significant Colonies
250	100	40%

Table 2: Types of Gram Negative Organisms Isolated From U. T.I in Females.

Types of Bacteria	Number of Urine Samples Positive	Percentage
E. Coli	62	62%
Klebsialla	21	21%
Proteus	15	15%
'Psendomonas	1	1%
Sallmonella	1	1%
Total	**100**	**100%**

Table 3: Distribution of Wine Specimen as Per Marital Status of the Patients.

Marital status	Number of Patients	%
Married	65	65%
Unmarried	35	35%
Total	**100**	**100**

Table 4: Number of Urine Specimen collected form females from Al-Wahada and poly clinic Hospitals.

Age	Number of Patients	%
15-25	41	41%
25-35	40	40%
35-45	11	11%
45-55	7	7%
55-65	I	1%
Total	**100**	**100**

Table 5: Distribution of Urine Samples Positive for Gram Negative Bacteria.

Times of Onset	Number of Patients	%
Non- pregnant /married women	22	22%
Pregnant	17	17%
Pre-Surgical (operation)	11	11%
Post — Surgical (operation)	IS	18%
Other ‘s	32	32%
Total	100	100

Table 6: Frequency of Symptoms in U. T. I.

Sign and Symptoms	No of Patients		%		Total
	Yes	No	Yes	No	
Flank Pain	97	3	97%	3%	100
Dysuria	73	27	73%	27%	100
Frequency of Urination	72	28	72%	28%	100

Table7: Results of physical examination of urine samples from woman.

	Number of Patients		%		Total
	Yes	**No**	**Yes**	**No**	
Presence of Hematuria	46	54	46%	54%	100
Presence of Sediment	57	43	57%	43%	100
Presence of Turbidity	73	27	73%	27%	100
Acidic	85	15	85%	15%	100
Alkaline	15	85	75%	85%	100

Table 8: Results of Chemical Examination of Urine Samples from Women.

Chemical Examination	Number of Patients		%		Total
	Yes	**No**	**Yes**	**No**	
Albumin	29	71	29%	71%	100
Sugar	35	65	35%	65%	100

Table 9: Presence of Cell Inure Positive for Gram Negative Bacteria as Detected Under Wet Preparation.

Cells Present in Urine	Rang	Number of Patients	%	Rang	To-tal
RBC`s	0-5 5-10 10-full	64 30 6	64% 30% 6%	$>^{3}10$ $>^{4}10$ $>^{5}10$	100
Puss Cell`s	0-5 5-10 10-full	70 26 4	70% 26% 4%	$>^{3}10$ $>^{4}10\text{-}^{5}10$ $>^{5}10$	100
Epithelial Cell`s	0-5 5-10 10-full	51 45 4	51% 45% 4%	$>^{3}10$ $>^{4}10\text{-}^{5}10$ $>^{4}10\text{-}^{5}10$	100

Table 10: Association of the Number of the Bacteria in Urine with Symptomatology.

No of Bacteria	Number of Patient 's	%
Lass then ^{3}10Uf/ml	11	11%
$^{3}10\text{-}^{5}10$/ml	48	48%
More than ^{5}10 (f/ml	41	41%
Total	**100**	**100%**

Table 11: Recurrence of Urinary Tract Infection after Antibiotic.

Number of Patients with Gram Negative U'TI	First Time Line Recurrence	Second Time Recurrence	More than Two Times	
100	**26 \ 26%**	**56 \ 56%**	**18**	**18%**

Table 12: Relationship between the presences of negative bacteria I wine for married woman in UTI.

Number of Patients Positive for Gram Negative UTI	Presence of Gram Negative Bacteria in Urine in Married Women		Presence of Gram Negative Swab in Married Woman	
100	65	65%	35	35%

Discussion

A total of 250 urine samples from female's patients was transport to Al-wahada- polyclinic hospitals Derna were examined for the presence of gram negative bacteria in significant numbers. 40% samples yielded Gram negative bacilli in significant numbers [3].

The results also indicated that the females in the age group of 15 to 55 years were most susceptible to gram negative urinary infection. About 40% females of 15-25 and age group were showing urinary symptoms, whereas only 11% females of 35-45. Year's age group and 7% of the females of 45-55 years age group had urinary symptoms. Only 1% of the females of 55 to 65 years group U.T.I. were found culturally positive (Table I).

The results of cultural isolation indicated that 62% of U.T.I in females is due to E-coli followed by *Klebsialla* 21%, *Proteus* 1 5%. *Pseudomonas* 1% similar findings here been repeated earlier by [4] (Microbial and parasitic infection) one of the samples yielded salmonella but it has role in U.T.I. Of the

Table 13: Antibiotic susceptibility of Gram negative Bacteria Isolated form UTI Females.

Name of Antibiotic	SENSITIVE								RESISTANAT	
	I	**%**	**II**	**%**	**III**	**%**	**VI**	**%**	**R**	**%**
A mpicillin (amp)	10 4	10%	3	3%	3	3%	7	7%	77	77%
Amaxycillin (aml)	4	4%	1	1%	2	2%	5	5%	**88**	**88%**
Amoxycillin Clavuianic acid(amc)	2	2%	1	1%	24	20%	**62**	**62%**	11	11%
Cephaloridine (CR)	3	3%	5	5%	10	10%	39	39%	43	43%
Corbenicilline (C)	3	3%	2	2%	5	5%	**67**	**67%**	23	23%
Chlorumphenicol(CAR)	12	12%	8	8%	13	13%	15	15%	52	52%
Erythromycin (E)	18	18%	10	10%	10	10%	21	21%	41	41%
Fusidic acid p (Fd)	25		**18**	**18%**	3	3%	3	3%	51	51%
Gentamycin (GN)	2	2%	2	2%	10	10%	**60**	**60%**	26	26%
Kanamycin (K)	3	3%	4	4%	13	13%	**70**	**70%**	7	7%
Methicillm (NET)	14	14%	1	1%	1	1%	2	2%	**8 2**	**82%**
Neamycin (N)	15	15%	3	3%	12	12%	48	48%	22	22%
Novomycin (MV)	22	22%	6	6%	4	4%	18	18%	50	50%
Nalidixic acid (NA)	6	6 %	3	3%	19	19%	**60**	**60%**	12	12%
Nitrofurantoin (F)	5	5%	7	7%	**33**	**33%**	**53**	**53%**	2	2%
Oxytetracyclin (OT)	4	4%	8	8%	**32**	**32%**	31	31%	25	25%
Polymixin-B(PB)	2	2 %	12	12%	**36**	**36%**	33	33%	17	17%
Pentdllin-G (P)	**24**	**24%**	13	13%	4	4%	7	7%	7	7%
Tetracyc/in (TE)	**32**	**32%**	9	9%	10	10%	18	18%	31	31%
Sulpa-trimeth (SRT)	10	10%	14	14%	15	15%	13	13%	47	47%

gram negative bacteria patients 60% were married women. Therefore, it may be considered that women may be more prone to U.T .1 as repeated by earlier workers, "Microbial and parasitic infection". Were found culturally (Table 2)

Of the 39 married women positive for Gram negative urinary tract infection only 17 were pregnant and 22 were non-pregnant. Therefore, probably pregnancy has no much role the causation of gram negative tract infection. However out of 29 per and post surgical cases of gram negative urinary tract infection only 11 had urinary infection pre-surgically and 1 8 post- surgically. This indicates that surgical operation might be having same position rule in the causation of Gram negative urinary tract infection. The presence of Gram negative bacteria in vaginal swabs of married women at least in 35% of cases indicates that, this site may be a source of infection of U.T.I. The most common symptoms observed in urinary infection in females were flank pain 97% followed by dysuria73% and frequency of urination 72%. In females, the presence of less than 10^3 organisms per ml of urine was mm significant as these had no symptoms, where as more than 10 organisms till 10 per ml 48% had symptoms of U.T.I. were found culturally (Table 3) [5-9].

This indicates that in females 10 "organisms /ml or more in urine was considered significant as reported by earlier workers "Medical laboratory manual for tropical countries ".

Presence of pus cells and epithelial cells were correlated with the urine samples having bacterial infection. Most of the urine samples with U.T.I, having more than 10 organisms per ml of urine had the presence of pus cells and epithelial cells were found culturally (Table 9).

No condition could be established with physical examination of urine of Gram negative bacteriuria patients with Haematuria , presence of sediment, and acidic or alkaline pH.

However 73% of (lie patients had turbid urine and this criterion may be positively correlated, similarly presence of albumin on chemical examination probably had no positive or negative correlation were found culturally (Table 7).

In Gram negative urinary tract infection the observation indicated that (26%) of females had recurrence of infection for first time and (56%) second time and (18%) more than twice, it means that, recurrence was very common in Gram negative U.T.I, after antibiotic treatment. This may be due to the development of antibiotic resistance by the causation bacteria or the regime of antibiotic treatment has not been well followed by the patient.

The antibiotic indicates that most of the Gram negative bacteria encountered in U.T.I was resistant to one or the other antibiotics of choice usually used for the treatment. About half of the strains were resistant to chloram-phenicol, sulphamethoxzol, trimethoprine and several to nalidixic acid, neomycin, noromycin, kanamycin, gentamycin and others. This may be the reason of more and more recurrence of infection in Gram negative U.T.I. was found culturally (Table 13).

UTI was usually treated empirically without culture but it contributes for about 10–15% prolongation of hospitalization due to the emergence of antimicrobial resistance among the causative bacteria, particularly UPEC isolates. This may result in the spread of antibiotic resistant bacteria in the hospital and therefore, it has been suggested that more powerful antibiotics might better eliminate UPEC reservoirs and consequently reduce the incidence of chronic and recurrent UTIs among hospitalized and outpatients.

In a research by Moreno *et al.* (2006), *E. Coli* isolates obtained from 150 patients presenting with acute uncomplicated cystitis, acute pyelonephritis and urinary-source bacteraemia, revealed 21% and 18% resistance to quinolones and fluoroquinolones, respectively.

Recently, Shigemura *et al.* (2008) has reported the emergence of fluoroquinolone resistant *E. Coli* responsible for UTI among patients attended at Kobe University Hospital, Japan.

In those studies a higher resistance to quinolones (27%) than to fluoroquinolones (5%) was observed among commensal *E. Coli* isolates. However, they found that resistance to the two mentioned antibiotic classes were nearly the same among UPEC (9% and 8% respectively) [10].

About 70 to 95% of community-acquired and 50% of all hospital acquired infections was caused by E. coli. The

molecular biology details of extra intestinal *E. Coli* were poorly understood. Uropathogenic *E. Coli* (UPEC) can grow extra intestinally and this enables them to cause a variety of diseases. It is now demonstrated that there are a subset of fecal *E. Coli* containing some virulence factors which can colonize in periurethral area, enter to the urinary tract and cause symptomatic disease such as UTI. The mentioned pathotypes were named "UPEC", that studied phylogenetic and pathotypic comparison of concurrent urine and fecal *E. Coli* isolates from children in 2010. They analyzed the urine samples and found that the prevalence of phylogenetic group B2 was dominant. In this study, *E. Coli* isolates from urine samples dramatically differed from fecal *E. Coli* isolates with regards to some virulence factors such as specific pathogenicity island markers and phylogenetic group B2 and D (15-17) [11].

E. Coli and K. pneumoniae were the most important causative agents of nosocomial infections. In our study resistance to third generation of cephalosporins among isolates of these microorganisms was prevalent and impanel was the most effective antibiotics against above mentioned organisms. Our study revealed that the prevalence ESBLs production was higher in our country in compassion with developing countries, since the most frequent Enterobacteriaceae strains which are usually isolated from the patients in Mofid Children's Hospital were E. *Coli* and K. pneumonia, they selected these two types of bacteria for their study [12].

The purpose of this study was to determine the presence of integrons in Escherichia coli, which cause urinary tract infections, and to define the association between integrons and antimicrobial susceptibility. Susceptibility of 200 isolates from urine samples of patients suffering from urinary tract infections to 13 antibiotics was determined by the Kirby-Bauer disk diffusion method [13].

The existence of class1 and 2 integrons in resistant isolates was assessed by polymerase chain reaction-restriction fragment length polymorphism and sequencing. Antibiotic resistance patterns were observed as follows: amoxicillin 78%, tetracycline 76.1%, co-trimoxazole 67.7%, cephalotin 60%, nalidixic acid 57.4%, chloramphenicol 49%, gentamicin 46.4%, ceftazidim 38.1%, ciprofloxacin 36.2%, nitrofurantoin 33.5%, amikacin 32.1%, norfloxacin 36.1%, and imipenem 27.1%. Of 200 isolates, 155 (77.5%) were multidrug resistant (MDR). The existence of integrons was confirmed in 50.3% of isolates [13].

Three class 1 integron types, aadA2 being the most frequently found, and four class 2 integron types were described. Significant association between resistance to gentamicin, co-trimoxazole, cephalotin, ceftazidim, imipenem, chloramphenicol, and nalidixic acid with the existence of integrons was observed. Multidrug resistance suggests that the strategy for treatment of patients with *E.Coli* infections needs to be revised. Furthermore, it was shown that integrons may be partly responsible for multidrug resistance. Imipenem and norfloxacin were the most effective antibiotics against isolates [13].

Recommendations

This small piece of research work indicates mat more and more research attempts be made on urinary tract infection in females and the aspect of recurrences after antibiotic treatment be investigated in future

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