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A PROSPECTIVE MICROBIOLOGICAL STUDY OF URINARY TRACT INFECTION

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ABSTRACT

Urinary tract infections is the third most common infection experienced by humans after respiratory and gastro-intestinal infections and can occur at any time in the life of an individual. It is distressing and occasionally life threatening. Microorganisms called Chlamydia and Mycoplasma may also cause urinary tract infection in both men and women. Unlike *E.coli* , Chlamydia and Mycoplasma may be sexually transmitted and infections required treatment of both partners. Signs and symptoms of UTI vary depending upon on age of the patient and on which part of the urinary tract is infected. Out of all the cases studied 30 % were case were responsible for causing UTI in hospitalized patients. Thirty one percent of ambulatory patients were found to be positive for UTI. Various bacteria colonize the urine and E.coli was the most predominant bacteria. The E.coli isolated from Hospital admitted patients were found to be more resistant against the drugs as compared to bacteria isolated from ambulatory patients.

KEYWORDS : Urinary Tract Infection, *E.coli*, Mycoplasma

Urinary tract infections is the third most common infection experienced by humans after respiratory and gastro-intestinal infections and can occur at any time in the life of an individual. It is distressing and occasionally life threatening.

(Place, 1986), (Stamm, 1989), (Wong, 1983) It has been estimated that more than 7 million outpatient visits , I million visits to the emergency department and 100,000 hospital stays every year in the United states are due to UTIs. According to (Najar et al., 2009),bacterial infections of the urinary tract are the most common cause of both community acquired and nosocomial infections for patients admitted to hospitals in U.S. Almost 95% of cases of UTI are caused by bacteria that typically colonize at the opening of the urethra and travel up to the bladder. Stamm and(Norrby) estimated that 150 million patients are diagnosed with UTI yearly.

UTI occurs more frequently in women than in men since women have a short distance between the urethral opening and the anus (where bacteria commonly live) and a urethra. Both factors make it easier to enter the bacteria to bladder and cause infection. UTIS are common in children, By the age of 5 years about 8% of girls and about 1-2 % of boys have had at least one episode of UTI.

Classification of Urinary Tract Infection

Urinary tract infections are classified according to site of infection.

Lower Urinary Tract Infection

1. Urethritis
2. Cystitis
3. Prostatitis

Upper Urinary Tract Infection

1. Acute pyelitis
2. Acute pyelionephritis

Using urethral catheterization, it has been shown that approx 50% of women with asymptomatic bacteriuria had infection in their upper tracts.

Types of Urinary Tract Infection

1 Primary or Recurrent infection
2 Community acquired urinary tract infection
3 Hospital acquired urinary tract infection
4 Uncomplicated and complicated UTI

The presence of stones or high pressure vesico-ureteric reflux, perinephric abscesses, life threatening septicemia or a combination of these predispose to kidney damage.

Causes of Urinary Tract Infection

Commonest bacteria causing UTI are

1 *E. coli*
2 *Klebsiella*
3 *Enterococcia* e.g. *Faecalis*
4 *Proteus*
5 *Pseudomonas aeruginosa*
6 *Enterobactor*
7. *Staphylococcus epidermis*

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Microorgansims called Chlamydia and Mycoplasma may also cause urinary tract infection in both men and women. Unlike *E.coli*, Chlamydia and Mycoplasma may be sexually transmitted and infections required treatment of both partenrs.

Other risk factors that increase a chance of developing UTI include

- An abnormality in the structure or function of the urinary tract.
- An abnormal backward flow (reflux) of urine from the bladder up the ureters and towards the kidney. This condition known as vesicoureteral reflex (VUR) is present at birth, and about 30-50% of children with UTI are found to have it.
- Poor toilet and unhygienic conditions.
- Use of bubble baths or soaps that irritate the urethra.
- Family history of UTI

Urinary tract infections are highly treatable, but it is important to catch them early. Undiagnosed infections can lead to kidney damage in children, especially in children younger than 6yrs.

Signs and Symptoms

Signs and symptoms of UTI vary depending upon on age of the patient and on which part of the urinary tract is infected. Younger Children may be irritable, may vomit or feed poorly. However in older children and adults, signs and symptoms can reveal which part of urinary tract is infected. In bladder infection, the patient may have:

- Pain, burning, stinging sensation while urinating.
- An increased urge to urinate or frequent urination.
- Fever (though it is not always present).
- Frequent night awakening to go to bathroom.
- Wetting problems, even though the child is toilet taught.
- Low back pain or lower abdominal pain.
- Foul smelling urine that may look cloudy or contain blood.

Many of these symptoms are also seen in kidney infections, but the patients appear more ill with fever with chills, pain in the side or back, severe fatigue or vomiting. Burning with urination can also occur in patients with vaginitis or urethritis. Presence of blood in urine is common in cystitis but not in vaginitis or urethritis.

MATERIALS AND METHODS

A total of 100 samples each were collected from Hospital admitted patients and community acquired UTI. These isolates were grown on CLED agar. Then bacteria were identified on the basis of gram staining Sample were collected in two ways.

1. Mid stream urine sample
2. For catheterized patients directly from catheter.

Lab Diagnosis

- A naked eye examination of the specimen
- Culturing on blood agar plates, on Mackonkey agar and nutrient agar plates.
- Microscopy examination and Gram staining

OBSERVATION AND RESULTS

During the study of 200 samples 61 cases were infected and 139 were srerile.

Table 1 : Distribution of Various Bacteria Isolated From Urine of Ambulatory Patients

Bacteria	Number	Percentage (%)
E. coli	16	51.61
Enterococcus sp.	2	6.45
Klebsiella sp.	3	9.67
Staphylococcus aureus	6	19.35
Pseudomonas	1	3.23
Proteus mirabilis	1	3.23
Candida	1	3.23
Acinetobacter	1	3.23

Table 2 : Biochemical Tests for Gram Positive Bacteria

Sr.No.	Biochemical Tests		Bacteria
	Catalase	Coagulase	
1.	+	+	*Staphylococcus aureus*
2.	-	-	*Streptococcus* sp.

Table 3 : Biochemical Tests for Gram Negative Bacteria

Sr. No.	Biochemical Tests						Bacteria Identifies
	Catalase	Urease	Oxidase	Indole	Citrate	TSI L DS	
1	+	-	-	+	-		*E.coli*
2	+	+	-	-	+		*Klebsiella pneumoniae*
3	+	-	+	-	+		*Pseudomonas aeruginosa*
4	+	+	-	-			*Proteus mirabilis*

l- Lactose, D-Dextrose, S-Sucrose

Out of all the cases studied 30 % were case were responsible for causing UTI in hospitalized patients. Thirty one percent of ambulatory patients were found to be positive for UTI.

The Most Common Bacteria in UTI was *E. coli* and Least Common Was Proteus.

DISCUSSION

The study of Urinary tract infections implies both the gram positive and gram negative bacteria are responsible for causing urinary tract infection and similar results were found in the laboratory diagnosis of urine samples of hospitalized patients. Organisms belonging to Enterobacteriaceae are responsible for many serious infections causing high morbidity and mortality, because gram negative bacteria have several mechanisms for resistance against antibiotics (Table 2 and 3).

This study was planned with the aim to determine the prevalence of bacteria causing urine infection.

A total of 200 samples of urine were collected. Out of them 100 were hospitalized patients and 100 from ambulatory patients.

(Walter E. Stamm and Norrby, 2001 and Stamy et al., 1965) investigated that different organisms can infect the urinary tract, but by far the most common agents are the gram negative bacilli. *Escherchia coli* causes about 80% of acute infections in-patient without cathetars, urologic abnormalities or calculi. Other Gram negative rods, especially *Proteus* or *Klebsiella* and occasionally *Enterobacter*, account for a small proportion of uncomplicated infections. These organisms, plus Serratia and *Pseudomonas*, assume increasing importance in recurrent infections and in infections associated with urologic manipulation, calculi or obstruction. *Proteus* sp. by virtue of urease production and *Klesiella* sp. through the production of extracellular slime and polysaccharides, predispose to stone formation and are associated more frequently from patients with calculi.

In our study of 200 urine samples 30.5% are found to be infected. Out of them 31% were isolated from ambulatory patients and 30% were found to be infected in hospitalized patients.

Higher percentages of *E.coli* were found in our study. Same was true in study done by (Orskov et al 1982) where *E.coli* was responsible for 80% of uncomplicated cystitis and pyelonephritis Other bacteria isolated were *Enterococcus* sp., *Klebsiella, Staphylococcus aureus, Pseudomonas*, *Candida, Proteus* sp. Hospital admitted patients were found to be more resistant against the drugs used for cases of UTI .

The antimicrobial sensitivity test was done for all the pathogens isolated. Out of 200 samples 61(30.5%) samples were reported positive for various pathogens.

One hundred thirty nine samples were sterile. It may be due to anaerobes, tuberculosis or other bacteria which we have not looked for.

E.coli was the predominant pathogen isolated in 32 (16%) samples in the present study (Table 1).

Enterococcus was the second predominant pathogen isolated.

The other bacteria isolated in our study were *Klebsiella, Staphlocooccal aureus, Pseudomonas, candida* and *proteous sp.*

CONCLUSION

Therefore we conclude that various bacteria colonize the urine and *E.coli* was the most predominant bacteria. The *E.coli* isolated from Hospital admitted patients were found to be more resistant against the drugs as compared to bacteria isolated from ambulatory patients.

REFERENCES

Huland H. and Busch R., 1984. Pyelonephritis scarring in 213 patients with upper and lower urinary tract infections:long term follow up. J Urol., **132**: 936-9.

Najar M. S., Saldsnha C. L. and Banday K. A., 2009. Approach to urinary tract infections. Indian J Nephrol, **19**(4):129-139.

Orskov et al., 1982. O, K, H and fimbrial antigens in *Escherchia coli* serotypes associated with pyelonephritis and cystitis. Scand J Infect Dis Suppl., **33**:18.

Palac D. M., 1986. Urinary tract infections in women: a physician's perspective, Lab Med **17**:25.

Stamm W. E. and Norrby S. R., 2001. Urinary tract Infections : disease Panorama and challenges.J Infect Dis., **183**:S1

Stamm W. E., Hooton T. M., Johnson J. R., Johnson C. and Stapleton A., 1989. Roberts PLUrinary tract infection from pathogenesis to treatment.J Infect Dis., **159**:400-6.

Stamy T. A., Govan D. E. and Palmer J. M., 1965. The localizations and treatment of urinary tract Infections.The role of bactericidal urine levels as opposed to serum levels.Medicine., **44**:1-36.

Walter E., 1992. Stamm Criteria for diagnosis of urinary tract infection and for the assessment of therapeutic effectiveness, Infection, 20 (suppl 3): S151.

Wong E. S., 1983. Guidelines to prevention of catheter-assosiated urinary tract infections. Am J Infect Control, 11:28.