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Cystitis infection by *E.coli*

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Report Submitted to fulfill the requirements for Scientific Research Activity

Date of Submission: 12.../...3.../ 2020

Abstract

A urinary tract infection (UTIs) are one of the most common pathological conditions in both community and hospital settings. Among the common uropathogens cause that associated to UTIs, UroPathogenic *Escherichia coli* (UPEC) is the primary cause it is one of the most common bacterial infections, UPEC strains possess large number of both structural (as fimbriae, pili , curli, flagella) and secreted (toxins, iron-acquisition systems) virulence factors that contribute to their capacity to cause disease, although the ability to adhere to the host epithelial cells in the urinary tract represents the most important determinant of pathogenicity. On the opposite side, the bladder epithelium shows a multifaceted array of host defenses including the urine flow and the secretion of antimicrobial substances, which represent useful tools to counteract bacterial infections. A vast amount of literature regarding the mechanism through which *E.coli* induces cystitis accounts for 95% of visits to physicians for symptoms of urinary tract infection. is defined as significant bacteriuria in the setting of symptoms of cystitis or pyelonephritis, It is pathogenic inflammation of the upper or lower urinary tract. Women are more commonly afflicted with UTIs and caused by common pathogens such as *Escherichia coli* (86%).

Introduction

The urinary system is the body's drainage system for removing wastes and extra water. It includes two kidneys, two ureters, a bladder, and a urethra. Urinary tract infections (UTIs) are the second most common type of infection in the body (1).

(UTIs) are considered to be the most frequent bacterial infections and they are common in females because women have shorter urethras proximately 90% of first urinary tract infections in young women and In women the lower third of the urethra is continually contaminated with pathogens from the vagina and the rectum, and it can become a serious health problem if the infection spreads to your kidneys. Related terms include pyelonephritis, which refers to upper urinary tract infection and cystitis (bladder infection) represents the majority of these infections, cystitis occurs in late adolescence and during the second and fourth decades in females with up to 30% of females 20 to 40 years of age having a history of cystitis. Cystitis: is the medical term for inflammation of the bladder, caused by a bacterial infection, and the most common causative agent microorganism is *Escherichia coli*, *E.coli* is a bacterium commonly found in the gut of warm-blooded organisms most strains of *E.coli* are not harmful but are part of the health bacterial flora in the human gut (2).

And it is described as a Gram-negative, rod shaped bacterium, motile . have an additional outer membrane that is composed of phospholipids and lipopolysaccharides, the presence lipopolysaccharides on the outer membrane of bacteria gives it an overall negative charge to the cell wall. (3)

And the main cause of these bacteria is main common in cystitis because the exit of urinary tract is near to the anus, so the bacteria can spread from the GI Tract to the urinary tract. Urine is an aqueous solution of greater than 95% water. The Risk factors Some people who are more likely to be affected by *E.coli* related illness, People with weakened immune system are more prone to complication, Patients with decreased stomach acid, Young children and older people have a higher risk .Cystitis usually occurs when the urethra and bladder which normally sterile, or microbe-free become infected with bacteria, common signs and symptoms of cystitis are: Traces of blood in the urine (hematuria), Dark cloudy or strong smelling urine , Low-grade fever, Pain in the

abdomen (Pelvic discomfort feeling of pressure in the lower abdomen), Burning sensation when urinating, Feeling that need to urinate frequently, when children have cystitis they may have any of these symptoms plus vomiting and general weakness (2) .

Aim of study : in this report is discusses the uropathogene *E.coli* and causes cystitis. Urinary tract infection. Community. Bacteria.

Materials and Methods :

A literature search was performed to discover studies reviewing the correlation between cystitis and *E.coli*. Online sites and databases include in this report are Health line, Scielo database , Medline Plus databases, Lippincott's Illustrated Reviews: Microbiology reference , Search terms include “cystitis” , “infection” , “*E.coli*” , Title and abstracts were observed for significance.

Methods: the results of urine culture was analysed, for 402 patients that had community acquired urinary tract infection [³ 10⁵ colony-forming units (CFU/mL)] and had urine sampled in the Hospital das Clínicas – FMRP-USP from January to June of 2003.(5)

Results:

The patients in this study were 242 (60.2%) females and 160 (39.8%) males. The propagation of UTI in the females was more homogenous between age groups, considering intervals of 10 years, with small difference after the third decade, and few children was diagnosed. Fifty percent of the male patients were older than 60 years and the distribution was almost constant in the younger decades .(5)

(Table1). Incidence of UTI in the sex groups, divided in decades.

Age (years)	Male (n = 160)	Female (n=242)
0 -10	12(7.8%)	19 (7.9%)
10-20	7(4.5%)	20(8.3%)
20-30	8(5.2%)	47(19.0%)
30-40	9(5.8%)	34(14.0%)
40-50	21(14.0%)	48(20.0%)
50-60	20(13.0%)	26(11.0%)
>60	77 (50%)	48(20.0%)

The most commonly isolated organism was *Escherichia coli* (58.4%). *Klebsiella species* (8.4%) and *Enterococcus species* (7.9%) they are the most common organisms.

(Table2). Micro-organism isolated in urine.(5)

Agent	Number	%
<i>Escherichia coli</i>	253	58.4
<i>Klebsiella.sp</i>	34	8.5
<i>Enterococcus sp.</i>	32	7.9
<i>Enterobacter.sp</i>	18	4.5
<i>S.aureus</i>	16	4.0
<i>Citrobactor.sp</i>	14	3.5
<i>Proteus.sp</i>	13	3.2
<i>P. aeruginosa</i>	12	3.0
<i>Acinetobacter sp.</i>	8	2.0
<i>Streptococcus sp.</i>	7	1.7
<i>Serratia sp.</i>	6	1.5
<i>Morganella sp.</i>	5	1.2
<i>Providencia sp.</i>	3	0.7

Discussion:

Urinary tract infection occurs in every age and in both genders. According to the demographic data, it is more frequent in woman.

These data are from a tertiary hospital ,the patients are screened in the primary and secondary level of healthy system and prone to associated conditions and diseases. These factors may influence the patterns of the data herein presented.

It is found that *E. coli* is the predominant bacterium in urine samples, corresponding to 58% of the cases. However in a study from (Norway (4)) *E. coli* caused 81.5% of UTI in outpatients compared to 58% in the present study. A lower proportion of UTI was caused by *Klebsiella.sp* (8.4%) and *Enterococcus.sp* (7.9%), which is in accordance to others. (5)

Naturally the urinary system is immune to infections, in ascending infections, fecal bacteria colonize the urethra and spread up to the urinary tract then to the bladder in severe conditions it is spread to the kidney (pyelonephritis), or spread to the prostate in males, (UPEC) often produce alpha-and beta-hemolysins, which cause lysis of urinary tract cells. (6) .

E.coli is part of the normal flora of the colon in humans and other animals, but can be pathogenic both within and outside of the GI tract. The differences in the degree of virulence of different *E.coli* strains are caused by the individual plasmid and integrated prophage repertoire associated with each strain. *E.coli* has fimbriae or pili that are frequently important for adherence to host mucosal surfaces, and different strains of the organism may be motile or nonmotile. Most strains can ferment lactose in contrast to the major intestinal pathogens, *Salmonella* and *Shigella*, which cannot ferment lactose. *E.coli* produces both acid and gas during fermentation of carbohydrates. (3).

Conclusion:

The most common community acquired UTI is caused by negative-Gram agents. UTIs are some of the most frequent clinical bacterial infections in women, and the causative agent *E.coli* are more commonly found in women because bacteria from the anus can easily travel to the urethral opening of the bladder.

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