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Prevalence and Antibiogram Pattern of Salmonella Causing UTI Infection

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ABSTRACT

The aim of this study was to determine the prevalence of Salmonella in the urine of UTI patient. Salmonella species are a rare cause of urinary tract infections and it also associated with food-borne gastroenteritis. Salmonella UTI is uncommon and is reported more often in patients with a predisposing factor, such as immune deficiency or a structural abnormality. Total 100 samples of urine were collected from hospitals. A very small percentage of Salmonella was found in urine of UTI infected patient. In the present study the prevalence of Salmonella was 5%. Antibiotics gentamycin, ceftizoxime, chloramphenicol & ceftriaxone are sensitive and penicillin, streptomycin are resistant to Salmonella. It concluded that, the antibiotics gentamycin, ceftizoxime, chloramphenicol and ceftriaxone are effective and are used to cure the infection because of Salmonella. Antibiotics such as penicillin, streptomycin are resistant they have no effect or minute effect.

KEY WORDS*: UTI, Salmonella, Antibiotic susceptibility, UT, Nosocomial infection.*

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INTRODUCTION

Urinary Tract Infections (UTIs) are the most common infectious diseases and nearly 10% of people will experience a UTI during their life time. It is serious ailment in human due to the frequency, recurrence and difficulty in eradication UTI poses stiff challenge to the medical professionals. UTI is much more common in women than in men, due to anatomic and physiological reasons. By virtue of its position urinogenital tract is more vulnerable to bacterial infections caused by both internal and external flora [1].

Urinary tract infection (UTI) is also one of the most common types of nosocomial bacterial infection and because its high incidence, it is responsible of enormous aggregate burden of morbidity, mortality and increased health care cost. The most frequent organisms causing UTI are E.Coli and less common are Salmonella spp., Enterobacter spp., Proteus spp., Streptococcus spp., Enterococci spp., Shigella spp., Anerobes, Yeast and Mycobacteria are rare. Risk factors for UTI includes males, elderly persons, previous or actual hospitalization, pregnancy duration of symptoms seven days, presences of stones, in dwelling catheters, recent instrumentation, anatomical abnormalities, history of UTI in childhood, immune suppression, or recent use of antibiotics. These types of infection need a prolonged antibiotic treatment to be cured. Anti microbial agents are among the most frequently prescribed drug in nursing home is most commonly for UTI [2]. Salmonella urinary tract infections (UTIs) are uncommon. Fifty four cases of culture proven symptomatic Salmonella UTIs during the antibiotic era have been reported. The mean age was 41 years and a male predominance was observed. Most of the infections were located in the upper urinary tract (infection is defined as culture – positive urine obtained from ureters or kidneys) [3]. Urinary tract infection (UTI) due to nontyphoidal strains of Salmonella is uncommon and usually developsin an individual with a predisposition. Salmonella species heretofore reported to cause UTI include S. typhimurium, S. typhi, S. manhattan, S. oranienburg, S. saint-paul, S. heidelburg, S. infantis,S. enteritidis, S. newport, S. agona, S. thompson, S. montevideo, S. anatum, S. derby, S.javiana, S.panama and S. blockley. Salmonellae infect the urinary tract either by directurethral invasion followed by ascending infection orby hematogenous spread.The most common route outside of the neonatal period is presumed to beascending infection [4]. Non-typhoidal Salmonella are important foodborne pathogens that also cause gastroenteritis, bacteremia, and subsequent focal infection. These hardy bacteria are especially problematic in a wide variety of immunocompromised individuals, including (but not limited to) patients with malignancy, human immunodeficiency virus (HIV) infection, or diabetes, and those receiving corticosteroid therapy or treatment with other immunosuppressive agents. The progressive cellular immune defects associated with human immunodeficiency virus infections have led to an increased frequency of opportunistic infections with intracellular bacterial pathogens, such as non-typhoidal Salmonella species Salmonella bacteremia is one manifestation of immunosuppression in patients with human immunodeficiency virus infection, and the development of bacteremia represents a frequent and severe complication in AIDS patients. Persons with HIV infections have an estimated 20 to100 fold increased risk of salmonellosis compared with the general population [5]. Salmonella organisms are widely distributed in the animal kingdom, including livestock, pets, wild mammals, poultry and other birds, reptiles, and amphibians. Most infected animals are chronic carriers. In contrast, Salmonella typhi has only human reservoirs as does Salmonella paratyphi. Salmonella paratyphi and other serogroups can occur in the urine as a rare route of transmission [6]. Salmonella UTIs are unusual and occur most often in infants and those over 60 years. Species most frequently isolated from urine include Salmonella typhimurium, heidelberg, enteritidis, infantis, newport and typhi. Salmonella has been postulated to enter the

urinary tract either hematogenously or by direct invasion of the bladder via the urethra [7].

MATERIALS AND METHODS

A total of 100 samples of urine were collected from different hospitals of different locations of Paonta sahib. The samples were inoculated in Nutrient Broth for 24 hrs for enrichment. 1ml of each sample was added to 9 ml of Nutrient Broth for sufficient enrichment and incubated at 37^0 C. The enriched urine samples were streaked on selective media Bismuth Sulfite Agar (BSA) with the help of calibrated loop and incubated at 37^0C for 24 hrs for recovery of isolates of Salmonella. Morphological characteristics and biochemical reactions of recovered isolates were studied. The biochemical tests carried out were urease, citrate utilization, catalase, indole, hydrogen sulphide production, methyl red Voges-Proskaeur (MRVP) sugar fermentation tests.

Antibiotics susceptibility test. Antibiotics susceptibility was carried out on Salmonella positive isolates using Kirby-Bauer disc diffusion method. The resistance and sensitivity of isolates toward all the antibiotics were studied by using triplicate plates of MHA. Results were interoperated by measuring the zone of inhibition in mm. Following antibiotics were used to check the antibiotics susceptibility of Salmonella: Gentamycin, Ceftizoxime, Ceftriaxone,Streptomycin,Ciprofloxacin,Chloramphenicol,Penicillin,Oflaxacin,Levofloxacin, and Amoxycillin.

RESULT AND DISCUSSION

A total 5 isolates were recovered from 100 urine samples of UTI patient.

Prevalence of Salmonella in urine of UTI patient and Prevalence of Salmonella in urine of UTI patient collected from different locations of Paonta valley is 15%.

Table 1 Prevalence of Salmonella in urine of UTI patient.

Total samples	Total isolates	Percentage
100	15	15%

Antimicrobial susceptibility of isolates was tested by the Kirby Bauer disk diffusion method. A total of 10 antibiotics were tested against Salmonella among which gentamycin, ceftizoxime, chloramphenicol, ceftriaxone were sensitive than other antibiotics such as penicillin, streptomycin. Infection of the urinary tract is one of the most common infectious diseases and it would affect all age groups peoples including men, women and children in worldwide[1]. Salmonella has been postulated to enter the urinary tract either hematogenously or by direct invasion of the bladder via the urethra. In women, the short urethra is considered to be a primary risk factor [8]. UTI due to Salmonella is uncommon. Saphra and Winter, in a large review of 7,779 Salmonella infections in adults, found only 49 cases (0.63%) of UTI [9]. In this study, 100 patients' urine samples were taken, and the prevalence of Salmonella was 5%. This is possibly because UTI symptoms are not a reliable indicator of infection. Early diagnosis and timely and appropriate antimicrobial treatment are considered key factors for eliminate the pathogen, to prevent urosepsis and to reduce the risk of renal scarring. Urinary Tract Infection (UTI) can be either symptomatic or asymptomatic [10]. According to Tsao CH, after E. coli, Salmonella was the second most common pathogen [11]. Hasham AI et al. concluded that the pre-existence of stones, deformities or local tissue damage predisposed to the development of chronic Salmonella infection of the kidney [12] .In our case infectious calculi was the result of Salmonella typhi UT. Buchta and Dunn reported three healthy children aged 8, 12 and 16 years of age, respectively, who had UTI due to Salmonella. We agree with Buchta and Dunn that although rare, Salmonella UTI do occur in

healthy children and adolescents, especially in the presence of gastroenteritis [13]. In the previous study that was conducted by Fawzia E. Al-Otaibi Salmonella was sensitive to ampicillin (Amp), cotrimoxazole (Cot), ceftriaxone (CRO), cefuroxime (CXM), ciprofloxacin (Cipro) and chloramphenicol (CHL)(5) but in our study Salmonella was sensitive to gentamycin, ceftizoxime, chloramphenicol and ceftriaxone. Localized Salmonella typhi infections and especially urinary tract infections are rare.

CONCLUSION

Care must be taken when a patient exhibits the following combined elements: Salmonella urinary tract infection, ureteral obstruction, Salmonella sepsis. UTI due to nontyphoidal Salmonella species should be treated regardless of whether there is associated toxicity or other systemic symptoms. Among commonly used antimicrobial agents for the treatment of UTI because of Salmonella, the antibiotics gentamycin, ceftizoxime, chloramphenicol and ceftriaxone are effective and are used to cure the infection. Antibiotics such as penicillin, streptomycin are resistant they have no effect or minute effect.

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