UROPATHOGENS: ISOLATION AND ANTIBACTERIAL SUSCEPTIBILITY PATTERN

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ABSTRACT

Objective: To find the antibiotic sensitivity pattern of uropathogens.

Methods: A total of 100 urine samples of clinically suspected urinary tract infection were collected from May 2016 to July 2016. The samples were inoculated on cystine lactose electrolyte deficient agar and incubated at 37°C for 24 hrs.

Results: A total of 77 (77%) samples were positive showing microbial growth. Among all isolates, Escherichia coli was 36.36%, followed by Klebsiella spp. (35.06%), Citrobacter spp. (6.49%), Staphylococcus aureus (6.49%), Pseudomonas spp. (5.19%), Enterococcus faecalis (3.90%), and Acinetobacter spp. (1.30%). For Gram-positive isolates, the most effective antibiotic was nitrofurantoin followed by sulphafurazole. For Gram-negative isolates, the most effective antibiotic was nitrofurantoin followed by gentamicin and piperacillin/tazobactam.

Conclusion: In this study, nitrofurantoin was the most effective antibiotic for Gram-positive and Gram-negative uropathogens.

Keywords: Urinary tract infection, Escherichia coli, Klebsiella spp., Nitrofurantoin.

INTRODUCTION

Urinary tract infection (UTI) is one of the most common types of bacterial infection in humans [1]. The infections may be symptomatic or asymptomatic, and either type of infection can result in serious sequel if left untreated [2]. Urine is a favorable medium for growth of bacteria due to its enriched chemical composition [3]. UTI is the bacterial infection which is generally associated with minimal morbidity except among specific subpopulations [4].

The clinical manifestations of UTI depend on the part of the urinary tract involved, the etiologic organisms, the severity of the infection, and the patient’s ability to mount an immune response to it [5]. UTI is classified into two types, uncomplicated and complicated infections. Uncomplicated UTI occurs due to bacterial infection, most often by Escherichia coli. Women are frequently affected by uncomplicated UTI than men. Complicated infections, which occur in men and women of any age, are also caused by bacteria, they tend to be more severe and more difficult to treat [6]. Signs and symptoms may include fever, chills, dysuria, urinary urgency, frequency, and cloudy or malodorous urine. The symptoms of a person with UTIs depend on the age and the location. Chronic and acute infection of urinary tract leads to high blood pressure, kidney damage, and results in death. Gram-negative bacteria (80-85%) are the primary organisms that cause UTI. Gram-positive bacteria also account for 15-20% cases of UTI [7,8].

The occurrence of antibiotic resistance in the management of UTIs is a severe public health issue, mostly in the developing world where apart from increased level of poverty, ignorance, and poor hygienic practices, there is also the high occurrence of fake and spurious drugs of questionable quality in circulation. Understanding of etiological agents of UTIs and their sensitivities to available drugs is of immense value to the rational selection and use of antimicrobial agents and to the development of appropriate suggesting policies. Antibiotic choice should be based on local circulating bacterial strains and resistance profiles, which vary between countries [9].

The purpose of this study was to summarize the laboratory diagnosis of routine UTI and the antimicrobial susceptibility pattern of isolates in the Department of Microbiology, MM Institute of Medical Science and Research, Mullana, Ambala, Haryana, India.

METHODS

A total of 100 samples were processed as per standard operating procedures from May 2016 to July 2016. Each sample was examined for the presence of pus cells, red blood cells, epithelial cells, casts, and crystals.

Isolation and identification of organisms

A standard loop technique was used to place 0.01 ml of urine for inoculation on cystine lactose electrolyte deficient agar, and these plates were incubated at 37°C for 24 hrs. The number of colonies was...
counted to quantify the organism. The diagnosis of UTI was made based on the significant colony count of >10⁶ CFU/ml for the isolates as per “Kass phenomena.” Isolates were identified by different biochemical tests as per standard operating procedures.

Antimicrobial susceptibility testing
Antimicrobial susceptibility testing was performed by Kirby–Bauer method as recommended by the Clinical and Laboratory Standard Institute (2015). Following antibiotics were used: Gentamicin (10 mcg), co-trimoxazole (25 mcg), norfloxacin (10 mcg), sulphafurazole (300 mcg), piperacillin+tazobactam (100/10 mcg), and nitrofurantoin (300 mcg).

RESULTS
A total 100 urine samples were processed in this study, out of which 77 samples were culture positive (Table 1). Out of 77 positive samples, 50 (64.93%) were from female patients and 27 (35.06%) were from male patients (Chart 1). Most commonly isolated organism was E. coli (36.36%) followed by Klebsiella spp. (35.06%) (Table 2). Antibiotic sensitivity testing was done for 73 bacterial isolates only. Nitrofurantoin was the most effective antibiotic for gram positive as well as gram negative isolates (Charts 2 and 3; Table 3).

DISCUSSION
This study included a total of 100 samples of urine collected from May 2015 to July 2016 from patients suspected of UTI. Overall positivity of total samples was 77% (Table 1 and Chart 1) which was higher than prevalence rate of 66.78% as recorded by Mahesh et al. [10]. Females (64.94%) were more prone to UTI than males (35.06%) which is supported by a study of Maji et al., [4] who showed a higher prevalence of UTI in female (54.68%) in comparison to male (45.31%).

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