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Der Pharmacia Lettre, 2012, 4 (3):1010-1012  
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## The Sensitivity pattern of *Escherichia coli* to Amikacin in a tertiary care hospital.

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### ABSTRACT

To determine the Sensitivity pattern of *Escherichia coli* to Amikacin in a tertiary care hospital. The study was done for a period of one year from March 2011 to February 2012. A total number of 464 patients were included in the study. The culture reports of these patients were analyzed which included urine samples from patients with urinary tract infections, pus of infected wounds, and blood culture of septicemia patients. The cultures which were positive for *Escherichia coli* were identified and their sensitivity towards Amikacin was tested. 44 strains of *Escherichia coli* were obtained comprising of 36 from urine samples, 5 from pus, 3 from blood culture. Of these 40 strains were found to be sensitive to Amikacin. *Escherichia coli* was found to be sensitive to Amikacin. Amikacin is found to be very effective in controlling infections caused by *Escherichia coli*.

**Key words:** - *Escherichia coli*, Amikacin

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### INTRODUCTION

*Escherichia coli* is one of the most common etiologic agent causing diseases such as urinary tract infections, diarrhea, pyogenic infections and septicemia. *Escherichia coli* is a Gram negative rod shaped bacterium that is commonly found in the lower intestine of warm-blooded organisms. *Escherichia coli* and related bacteria constitute about 0.1% of gut flora & fecal-oral transmission is the major route through which pathogenic strains of the bacterium cause disease.[1] Inaccurate diagnosis and inappropriate treatment could result in complications like acute renal failure, thrombocytopenia & haemolytic anemia.[2]

Currently, Amikacin is the most effective of the available antibiotics against many Gram- negative bacterial species. [3] Amikacin is an aminoglycoside antibiotic used to treat different types of bacterial infections. Amikacin is most often used for treating severe hospital-acquired infections with multi drug resistant Gram-negative bacteria.

### MATERIALS AND METHODS

The study was conducted for a duration of one year from March 2011 to February 2012 at Bhaskar Medical College, India. A total number of 464 patients were included in the study. The urine, pus and blood samples of these patients were collected.

The urine and pus samples on reaching the laboratory were inoculated on Mac conkey agar, Blood agar, and Nutrient agar to isolate the organisms. The inoculated Blood agar and Nutrient agar plates were incubated aerobically at 37 C for 24 hours. After overnight incubation at 37 degrees C the Blood agar and Mac conkey agar plates were examined for evidence of growth. The colony characters were studied, smears were stained by Gram's stain and examined under the 100X objective. The bacterial species then isolated were identified by morphology, cultural characteristics and biochemical reactions according to the standard techniques. [4] The Gram negative bacilli identified were tested for motility by hanging drop and then they were subjected to other biochemical and sugar fermentation tests .the tests were read after incubation at 37 degrees C at the end of 24 hrs and 48 hrs. Gram Negative lactose fermenting bacilli were classified on the basis of motility, fermentation of sugars, indole production, methyl-red reaction, and Voges –Proskauer test and utilization of citrate in to Escherichia coli, Klebsiella. Escherichia coli produced pink, smooth, irregular colonies on macconkey agar. Klebsiella species produced pink, smooth and mucoid colonies. 44 strains of Escherichia coli were obtained comprising of 36 from urine samples, 5 from pus, 3 from blood culture. (Figure1)

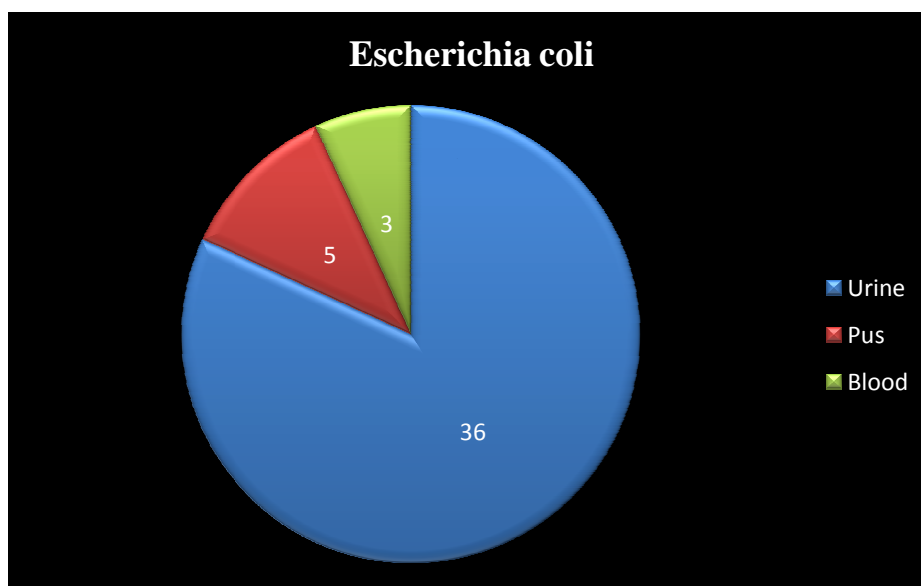


Figure 1: Escherichia coli isolates from the samples

The blood samples for blood culture were inoculated in brain heart infusion broth.

**Sensitivity tests:** The sensitivity pattern was tested using Kirby Bauer disk diffusion method. The antibiotics used were Amikacin, Levofloxacin, Nitrofurantoin, Gentamicin, Norfloxacin, Ciprofloxacin, Ofloxacin, Cefotaxime, Trimethoprim, Cefixime

## RESULTS

A total number of 464 patients were included in the study. Out of the 44 strains of Escherichia coli isolated, 40 strains were found to be sensitive to Amikacin, 29 strains to Levofloxacin . Sensitivity with other drugs like ofloxacin (24), gentamicin (17), cefotaxime (13) and ciprofloxacin (13) were found to be lesser while the sensitivity to drugs like cefixime and nitrofurantoin were negligible (4).(Figure 2)

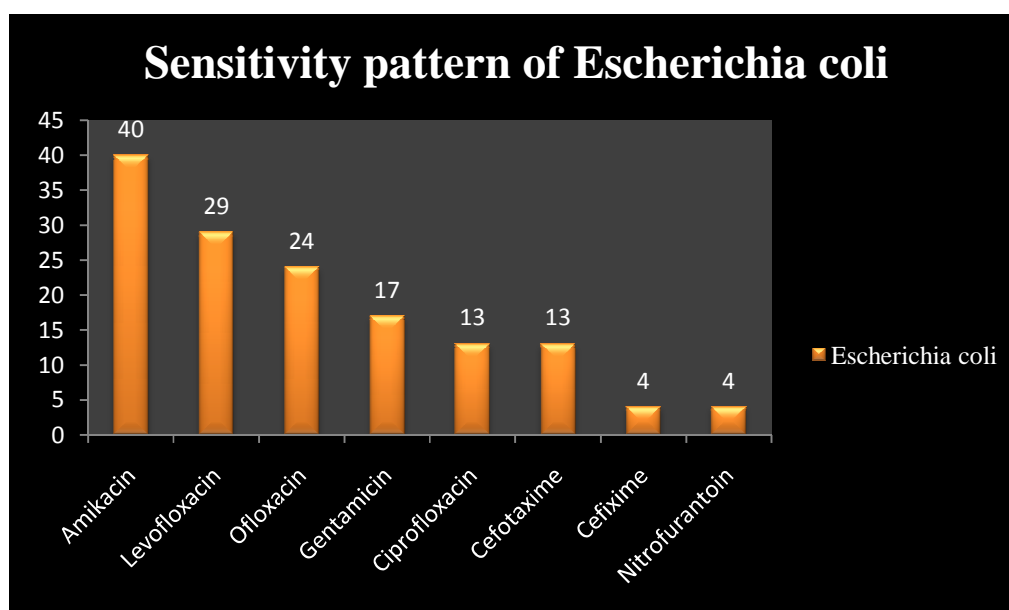


Figure 2: Sensitivity pattern of Escherichia coli

#### DISCUSSION:

Amikacin is the most effective of the available antibiotics against many Gram-negative bacterial species.[4] Amikacin is an aminoglycoside antibiotic used to treat different types of bacterial infections. Amikacin is most often used for treating severe hospital-acquired infections with multi drug resistant Gram-negative bacteria. Amikacin can also be used to treat non-tubercular mycobacterial infections & tuberculosis, when first-line drugs fail to control the infection. Escherichia coli is the most common aetiology for acute community acquired urinary tract infection with an incidence of 56-80%.[4] In a study conducted in south India, Escherichia coli was the most commonly isolated organism amongst all samples, comprising of nearly 36% of the culture positive cases followed by Staphylococcus aureus and Klebsiella pneumonia.[5]. In our study Escherichia coli was isolated in 44 samples and amongst them, the organism was isolated from urine in 36 cases emphasising the importance of Escherichia coli as aetiology for urinary tract infections (81.8%). It is usually prescribed at a dose of 15 to 22.5 mg/kg/day IV or IM in 1 to 3 divided doses, depending on severity of infection (initial maximum of 1.5 g/day, then adjust dose based on desired serum levels). In a related study, Organisms have been found to be sensitive to Amikacin in nearly 66% of cases which is followed by Azithromycin in 44% of cases. [5] In our study Escherichia coli was found to be sensitive to Amikacin in 90% of cases, thus emphasising its critical role in management of cases with Escherichia coli infections. Amikacin should be given in the correct dosage & for a full course for an effective response.

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