

Analysis of Antibiotic Resistance in *Escherichia Coli* Strains, Isolated from Urine Cultures in Laboratories of Kashmar, Iran

M Zare¹, MR Bayhaqi², R Zare³

ABSTRACT

Background and Aims: Resistance of bacteria, causing urinary tract infections, is increasing with indiscriminate prescription of antibiotics. Such resistance has even emerged in stronger antibiotics. This study was performed to evaluate the antibiotic resistance pattern in *Escherichia coli* (*E coli*) isolated in laboratories of Kashmar, with particular attention to nalidixic acid (NA) and co-trimoxazole (SXT).

Materials and Methods: A total of 50 samples of positive *E coli* strains were collected in Kashmar laboratories and confirmed by the standard biochemical method (Gallery). Evaluation of antibiotic susceptibility and resistance was performed by Mueller-Hinton agar for disk diffusion.

Results: Out of 50 samples, resistance to co-trimoxazole and nalidixic disks was higher, considering the curves.

Conclusion: The obtained curves related to the studied antibiotics show that in this region, due to indiscriminate use of antibiotics and lack of restrictions in using antibiotics, resistance of some bacteria has increased.

Keywords: Antibiotic resistance, *Escherichia Coli*, urinary tract infection

Análisis de resistencia a los Antibióticos en las Cepas de *Escherichia Coli*, Aisladas de Cultivos de Orina en los Laboratorios de Kashmar, Irán

M Zare¹, MR Bayhaqi², R Zare³

RESUMEN

Antecedentes y objetivos: La resistencia de las bacterias que causan infecciones del tracto urinario, está aumentando debido a la prescripción indiscriminada de antibióticos. Esa resistencia ha surgido incluso con los antibióticos más fuertes. Este estudio fue realizado para evaluar el patrón de resistencia a antibióticos en *Escherichia coli* (*E coli*) aisladas en los laboratorios de Kashmar, con especial atención al ácido nalidíxico (NA) y al cotrimoxazol (SXT).

Materiales y métodos: Un total de 50 muestras de cepas de *E coli* positivo fueron recogidas en los laboratorios de Kashmar y confirmadas por el método bioquímico estándar (Gallery). La evaluación de la susceptibilidad y resistencia a los antibióticos fue realizada mediante la difusión de disco Agar Mueller-Hinton.

Resultados: De las 50 muestras, la resistencia al cotrimoxazol y a los discos nalidíxicos fue mayor, considerando las curvas.

Conclusión: Las curvas obtenidas en relación con los antibióticos estudiados muestran que en esta región, debido al uso indiscriminado de antibióticos y la falta de restricciones en el uso de antibióticos, ha aumentado la resistencia de algunas bacterias.

From: ¹Golestan University of Medical Sciences, Gorgan, Iran, ²Nursing Department, Mashhad University of Medical Sciences, Iran and ³Nursing Department, Infectious Disease Specialist, Golestan University of Medical Sciences, Iran.

Correspondence: Dr MR Bayhaqi, Laboratory Expert, Kashmar, Iran. Fax: +9838414499, e-mail: telehealth.ir@gmail.com.

Palabras claves: Resistencia a los antibióticos, *Escherichia Coli*, infección del tracto urinario

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INTRODUCTION

Clinically, urinary tract infection presents with a range of symptoms including dysuria, frequent urination, fever, flank pain and pain in the upper part of the pelvis (1); this condition is diagnosed based on the presence of infectious agents and laboratory confirmation [by urine cultures] (2–3).

From the experimental standpoint, urinary infection is confirmed by the separation of at least one pure bacteria (in some cases, two or more) from urine samples, cultured by standard methods, with colony count of more than 20 000; biochemical tests were performed for confirmation of bacteria strains and in some cases, serotype was required (4).

Treatment of urinary tract infection varies with regard to age, gender, underlying diseases and whether the infection is found in the upper or lower urinary tract (5). Considering the spread of infectious diseases in every country, antibiotics used to treat *E coli* urinary tract infections include nitrofurantoin, cephalothin, nalidixic acid, co-trimoxazole, ciprofloxacin, gentamicin, norfloxacin and the cephalosporins (6).

Recently, according to several studies, with the increase of antibiotic resistance in *E coli*, treatment of urinary tract infections has been quite challenging (7). Since *E coli* was the predominant pathogenic agent, this study was performed to evaluate the antibiotic resistance pattern in laboratories of Kashmar, Iran.

SUBJECTS AND METHODS

Fifty samples of *E coli* were isolated from urine cultures of patients with urinary tract infection. Their demographic characteristics are listed in the Table.

Table: Age and gender distribution

Gender	Number of patients	Age (1 – 18 years)	Age (18–50 years)
Male	13 (26%)	3 (17%)	10 (73%)
Female	37 (74%)	7 (22%)	30 (78%)

Samples were collected from all city laboratories and all *E coli* samples were separated and confirmed by biochemical tests including methyl red, Voges-Proskauer (MRVP), triple sugar iron (TSI), simmon citrate and sulfur indole motility media (SIM). The difference in resistance to different antibiotics was evaluated.

Bacterial resistance and susceptibility tests

Susceptibility and bacterial resistance patterns were evaluated by placing the antibiotics on Mueller-Hinton agar medium one by using disk diffusion method and [0.5 McFarland] (8).

Disks of ciprofloxacin (5 µg), gentamicin (10 µg), nalidixic acid (30 µg), cephalothin (30 µg), nitrofurantoin (300

µg), norfloxacin (10 µg) and trimethoprim/sulfamethoxazole (23.75/1.25 µg), made by Padtan-Teb Co. Two were used for antibiogram evaluation (Fig. 1).

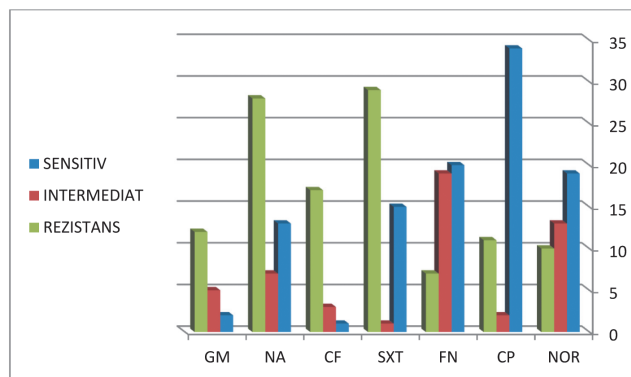


Fig. 1: Diagram of antibiogram in *E coli* infection.

RESULTS

In this study, resistance to co-trimoxazole (SXT) and nalidixic acid (NA) was higher than resistance to other agents (Fig. 2). According to the chart, rate of urinary tract infection was lower in men, compared to women, and higher in the age group of 18–50 years.

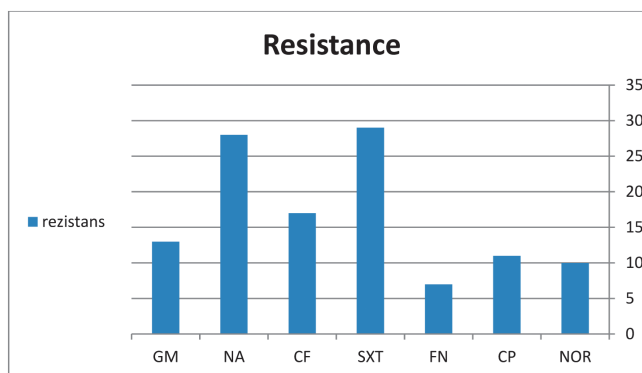


Fig. 2: Diagram of antibiotic resistance in *E coli* urinary tract infections.

DISCUSSION AND CONCLUSION

Over-time, antibiotic treatment has become a challenging issue for public health authorities with the emerging resistance to antibiotics due to indiscriminate use of these agents. To resolve this problem, the following measures can be taken: 1) indiscriminate use of antibiotics should be limited; 2) restriction rules should be legislated; 3) antibiotics without performing antibiogram should not be administered; and 4) treatment recommendations, particularly for full consumption of antibiotics, should be provided (9).

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