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# EMERGENCE OF SENSITIVITY OF CO-TRIMOXAZOLE IN URINARY TRACT INFECTION

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## ABSTRACT

Antibiotic cycling is a process of planned antibiotic restriction, which improves antibiotic effectiveness. Limited use of co-trimoxazole in clinical practice is responsible for increased effectiveness of cotrimoxazole in Escherichia coli and Klebseilla spp in urinary tract infections. The retrospective study supports this concept. This study concludes that sensitivity of Escherichia coli and Klebseilla spp to co-trimoxazole has been increased.

**KEY WORDS** : Urinary tract infection, co-trimoxazole, sensitivity

## INTRODUCTION

Bacteria are champions of evolution and a few microbes have adopted to a point to here they pose serious clinical challenges for humans.Resistance to the most potent antibiotics has recently extended to members of the Enterobacteriaceae family, including strains of Klebsiella spp, Escherichia coli, and Enterobactor spp. Faced with this gloomy picture, 21st Century clinicians must turn to compounds developed decades ago and previously abandoned because of toxicity or test everything they can think of and use whatever looks active. [1] Previously co-trimoxazole was highly effective in urinary tract infection. A dose of 800 mg of sulfamethoxazole plus 160 mg of trimethoprim every 12 hours for 10 days produces cure in vast majority of cases. The combination appears to have special

efficacy in chronic and recurrent infections of the urinary tract [2] but bacterial resistance of trimethoprim-sulfamethoxazole is a rapidly increasing problem [3] and this resistance is not uniform in all parts of the world. There is significant variation in the susceptibility of Enterobacteriaceae to trimethoprim in different geographical locations because of the spread of resistance mediated by plasmids and transposons.[4] The aim of this study is to investigate the prevalence and susceptibility pattern of pathogens causing urinary tract infections (UTIs) to co-trimoxazole. There is a decline in the use of cotrimoxazole for the last 10-20 years due to development of resistance and use of newer antibiotics in UTI. It may cause emergence of sensitivity of cotrimoxazole in urinary tract infection. To evaluate emergence of sensitivity of co-trimoxazole in UTI, sensitivity pattern of urine of indoor and out-patients of UTI was studied

## MATERIAL AND METHODS

The retrospective study was conducted at department of microbiology, G. R. Medical College, Gwalior. Uropathogenic strains of bacteria from indoor and out-patients were included in the study. Patients came to know sensitivity of UTI in 1994 and 2008 were observed. The study population included hospitalized and outdoor patients of all age groups at J. A. groups of Hospital, Gwalior; M.P. The specimen collected was urine, using standard sterile procedures.[5] The samples were inoculated on blood agar, MacConkey agar, and glucose broth which were aerobically incubated for 24 hours at 35°C. Subcultures from the liquid media on to solid media were carried out after incubating for18-24 hours. The plates were read the following day but extended to 48 hours if there was no bacterial growth within 24 hours. Isolated colonies were subjected to identification by colony morphology, gram staining and standard biochemical tests.[6] The antibiotic sensitivity testing was done using Kirby disc diffusion method.[5,7]

### Statistical Analysis

The chi square test was used to compare the sensitivity. P value less than 0.05 was considered significant.

## RESULTS

A total of 1,558 and 1,544 urine samples received in laboratory in the year 1994 and 2008 respectively. We found that the 1,110 and 1,064 urine culture was sterile in the year 1994 and 2008 respectively. There were 448 and 480 samples showed growth in year 1994 and 2008 respectively. Among them, commonest isolates was Escherichia coli followed by Klebsiella

spp., Staphylococci spp., Streptococci spp., and Proteus spp. respectively. In the present study, we found that out of 382 cases of E. coli infection, 27 cases were sensitive to cotrimoxazole in 1994, whereas out of 437 cases of E. coli infection, 184 cases were sensitive to cotrimoxazole in 2008, which is highly significant (P<.0001). Similarly sensitivity of Klebsiella to cotrimoxazole has been increased significant in last 15 years (P=.0127). Sensitivity of staphylococci to co-trimoxazole did not change significantly. The result showed that sensitivity of E. coli and Klebsiella spp to cotrimoxazole has been increased in last 15 years.

**Table 1: Comparative Sensitivity of Co-trimoxazole in Urinary Tract Infection**

| Urine Isolates | Year 1994 | | | Year 2008 | | |
|---|---|---|---|---|---|---|
| | Sensitive | Resistant | Total | Sensitive | Resistant | Total |
| Escherichia coli | 67 | 315 | 382 | 184 | 253 | 437 |
| Klebsiella species | 8 | 45 | 53 | 11 | 14 | 25 |
| Staphylococcus aureus | 1 | 10 | 11 | 2 | 12 | 14 |
| Streptococcus species | 0 | 1 | 01 | 0 | 3 | 3 |
| Proteus species | 0 | 1 | 01 | 0 | 1 | |
| **Total** | **36** | **412** | **448** | **197** | **283** | **480** |

## CONCLUSION

Bacterial infection of the urinary tract is one of the common causes for seeking medical attention in the community.[8]. Effective management of patients suffering from bacterial UTIs commonly relays on the identification of the type of organisms that caused the disease and the selection of an effective antibiotic agent to the organism in question .[9] In our study the sensitivity pattern of E. coli and Klebsiella spp to co-trimoxazole is changing. In 1994, both these bacteria were highly resistant to cotrimoxazole but in 2008, their sensitivity to cotrimoxazole is returning gradually. This return of sensitivity is due to restricted use of cotrimoxazole in clinical practice. Clinicians are now increasingly using antibiotic cycling which is a process of planned antibiotic restriction, introduced through the cycling of drug selection which is based on local surveillance, with a plan drawn up for the scheduled rotation of one class of antibiotics and the cycle repeated. The introduction of such a system can have the benefit of improving the effectiveness of antibiotic prescribing.[4] Restricted use of co-trimoxazole leads to improvement in its effectiveness. It may be predicted that in future, co-trimoxazole may become highly sensitive in E. coli and Klebsiella spp infection because of limited use of this drug in clinical practice.

**REFERENCES**

1. Arias CA, Murray BE. Antibiotic Resistant Bugs in the 21st Century - A Clinical Super-Challenge. N Eng J Med 2009; 360: 439-443.
2. Mandell GL, Sande MA. Antimicrobial agents. In : Gilman AG, Goodman LS, Gilman A, editors. Goodman and Gilmans The Pharmacological basis of therapeutics. 6th ed. New York : Macmillan; 1980: 1106-1125.
3. Petri WA. Sulfonamides, Trimethoprim sulfamethoxazole, Quinolones and agents for Urinary Tract Infections in Brunton LL, Lazo JS, Parker KL, editors. Goodman and Gilmans The Pharmacological basis of therapeutics. 11th ed. New York : McGraw-Hill; 206: 1111-1126.
4. Masterton R. Antibiotic breakthrough. Practical patient care 2009; 4: 26-29.
5. Central Laboratory Standards Institute (CLSI). Performance standards for antimicrobial disc susceptibility tests, Approved standards 10th ed (2010). CLSI document M02-A10;vol 29:1
6. Forbes BA, Sahm DF, Alice S, Weissfeld. Infections of the urinary tract in Bailey and Scott's. Diagnostic Microbiology. 11th ed. St.Louis USA: Missouri Mosby; 2002: 927-38
7. Ranjan KP, Ranjan N, Gandhi S. Surgical site infections with special reference to methicillin resistant Staphylococcus aureus: experience from a tertiary care referral hospital in North India. Int J Res Med Sci 2013;1:108-11.
8. Kebira AN, Ochola P, Khamadi SA. Isolation and antimicrobial susceptibility testing of Escherichia coli causing urinary tract infections. J Appl Biosci. 2009:1320–1325.
9. Water G, Harrison B, Kunin G. Urinary tract infection. N Eng Med J. 1996:248–250.