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Short Communication

Evaluation of antimicrobial resistance of urinary tract isolated *Esherichia coli* from Omdurman Teaching Hospital in Sudan

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Infections caused by *Escherichia coli* have become a significant worldwide public health problem. The antibiotic resistance of *E. coli* isolated from the urine of patients of Omdurman Teaching Hospital, Sudan was investigated. The aim of this study was to evaluate the antimicrobial sensitivity of all the non serotyped urinary isolated *E. coli*. The antibiotic sensitivity test was carried out using antibiotic impregnated multi disc containing eight different antibiotics (Amikacin, Ciproflaxacin, Ceftriaxone, Co-amoxiclav, Imipenem, Norfloxacin and Cotrimoxazole). A total of eighty-six *E. coli* isolates were tested during the investigation. The *E. coli* isolated exhibited variations in their resistance pattern to the various antibiotics. Generally, no *E. coli* was resistant to all tested antibiotics, no *E. coli* isolate was also resistant to only one or a single antibiotic and only two isolates were completely sensitive to all the antibiotics used. The *E. coli* showed the highest resistance to Cotrimoxazole, Co-amoxiclav, Ciprofloxacin and Norfloxacin. Antimicrobial resistance is a local as well as a global problem and the emergence of multidrug resistance will hinder the therapeutic options, hence monitoring resistance is of paramount importance. The indiscriminate use and misuse of antibiotics should therefore be discouraged. The future usefulness of these drugs will however depend on effective interventions to halt the selection and spread of resistance among enteric organisms.

Key words: *Escherichia* coli, antimicrobial sensitivity, emergence of resistant strains.

INTRODUCTION

Antibiotic resistance is a worldwide problem, and strains are commonly seen to be resistant to more than one drug (Carter, 1985).

Bacteria can acquire resistance to antibiotic as a result of chromosomal mutation, expression of a latent chromosomal gene, by exchange of genetic material through transformation, transduction or conjugation by plasmids (Neu, 1992). Resistant mutants may emerge during treatment. The occurrence and establishment of resistance mutants vary with different drugs. Selection of mutants is favored by under dosage, prolonged administration of an antibiotic and the presence of a closed focus of infection such as in abscesses (Carter, 1985).

Bacteria can be resistant to more than one antimicrobial agents (Jacoby, 1991). These highly multi-resistance bacteria have made many currently available antimicrobial drugs ineffective, also in certain instances, have already posed an important public health problem. Emergence of resistance to many antibiotics in Sudan and other developing countries can be traced to the random prescription of antibiotics by physicians who solely depend on clinical diagnosis; this may lead to

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Table 1. Sensitivity test of *Escherichia coli* isolated from urine samples to different antibiotics.

Antibiotic	Amikacin (%)	Ciprofloxacin (%)	Co-amoxiclav (%)	Ceftriaxone (%)	Cotrimoxazole (%)	Imipenem (%)	Norfloxacin (%)
Resistance percentage of *Escherichia coli*	18	62	64	42	66	24	56

prescription of wrong antibiotics and also may result in emerging of resistance bacterial strains. Moreover, the overuse and mass use of antibiotics by the public who can purchase it easily from pharmacy without prescription make the condition worst.

Now, many antibiotics are less effective in compacting bacterial infection in the Sudan. *Escherichia coli* are Gram negative bacteria that are normally found in the gastrointestinal tract of the human and animal, it is a common cause of urinary tract infections.

MATERIALS AND METHODS

Samples collection

Patients who visit Omdurman Teaching hospital for routine checkup were asked to submit samples of urine. They were instructed to collect mid-stream specimen of urine properly in sterile universal bottles, total of hundred samples were tested.

Cultivation and isolation

Streaking and swabbing were done using sterile loop and swab and inoculated onto solid media set of Blood agar, McConkey agar and Cysteine lactose electrolyte deficient agar (CLED). Cultivated plates were incubated for 18 h at 37°C ambient air. Mueller Hinton agar was used for *in vitro* antibiotic sensitivity test using standard disc diffusion method.

Identification of isolates

Identification of bacteria was carried out using different tests as described by Cowan.

In vitro antibiotic sensitivity test

Antimicrobial sensitivity test was carried out by the standard disk diffusion method. The isolated *E. coli* were cultivated in Muller Hinton agar medium, commercially prepared antibiotic disks were placed in the agar surface using sterile forceps, and pressed gently to ensure full contact with the surface of the culture medium (Table 1). The plates were then incubated at 37°C for 24 h; the antibiotics used were: Amikacin, Ciproflaxacin, Ceftriaxone, Co-amoxiclav, Imipenem, Norfloxacin and Cotrimoxazole.

RESULTS AND DISCUSSION

The result of sensitivity test show variety in resistance to the different antibiotics and this is probably due to conditions of antibiotics use among the patients.

The antibiotics which show high resistance percentage were Cotrimoxazole, Co-amoxiclav and Ciprofloxacin, and they are the most randomly used antimicrobial drugs. Long term antibiotic use and under dosage cause the organism to develop resistance to them.

Amikacin show low resistance because of limited use. It is used only when it is prescribed by a physician, this support the theory that the use of antibiotics without doctor supervision and sensitivity test will lead to high resistance of antibiotics.

Conclusion

Isolated *E. coli* showed variety degrees of resistance to the tested antimicrobial agents, the most common resistance were encountered for Cotrimoxazole, Co-timoxazole followed by Ciprofloxacin, respectively which are the most commercially used antibiotics by the public. This study explains the fact that antimicrobial resistant microorganisms are in progress and support the need for establishment of new health regulations regarding random antibiotic use, prescription and purchase.

Recommendations

When clinical diagnosis is established, bacteriology laboratory should be consulted to determine the most effective antibiotic. However, when treatment has to be started before the laboratory report is received; it should be modified if report is indicated. When antimicrobial drugs are administrated, they should be given in full therapeutic doses for adequate period. When laboratory facilities are not available, combination of two or more antibiotic therapy is advisable to lessen the frequency of emergency of antibiotics resistance by mutation and other genetic variation mechanisms. Antibiotic which became less effective or not effective should be withdraw from medical uses for some time. Purchase of antibiotic from pharmacy without prescription should be prohibited by law.

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