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FAECAL CARRIAGE OF ANTIBIOTIC RESISTANT ESCHERICHIA COLI AMONG HEALTHY INDIVIDUALS AND HOSPITAL PATIENTS.

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Abstract

Background: Microbial resistance to drugs has become a global public-health problem compromising the efficacy of antimicrobial chemotherapy. The phenomenon of drug resistance is not restricted to pathogenic bacteria; it also involves the commensal microbiota of humans. There is worldwide concern about the spread of antibiotic resistant microbiota causes of community as well as hospital acquired infections. **Methods**: This prospective study comprising of 100 faecal samples were processed and the isolates were identified by using standard microbiological techniques and antibiotic sensitivity was determined by Kirby Bauer disc diffusion method. **Result**: Out of 100 samples 50 were from community and 50 from hospital patients. In this study it was noted that the antibiotic resistance was more in hospital patients than in healthy individuals of community. The resistance patterns of hospital patients and healthy individuals of community as follows ampicillin, 68% and 36%; amoxyclav, 66% and 18%; ciprofloxacin, 56% and 18%; co-trimoxazole, 54% and 22%; cefotaxime, 50% and 10%; gentamicin, 30% and 4%; piperacillin-tazobactum, 30% and 0%; cefaparazone-sulbactum, 24% and 0%; amikacin, 14% and 0%; imipenem, 12% and 2% of the tested isolates, respectively. **Conclusion:** It can be concluded that faecal carriage of antibiotic resistant *E. coli* can causes of hospital-acquired infections and occasionally causes community-acquired infections. So, it is recommended that it necessitates prevention of infections by conducting the infection control programmes and implementation of surveillance for this emerging antibiotic resistance phenomenon.

INTRODUCTION:

Microbial resistance to drugs has become a global public-health problem compromising the efficacy of antimicrobial chemotherapy. The magnitude of this problem has recently been acknowledged by the world health organization, which has launched a global strategy for the containment of antimicrobial resistance.[1] The emergence and spread of resistance are universally acknowledge to be associated with heavy consumption of antimicrobial agents in clinical practices, and the prudent use of antibiotics is considered to be mandatory for preservation of therapeutic effectiveness for as long as possible. No doubt that the growing problem of antimicrobial resistance has become a significant public health concern worldwide and especially in developing countries. Consequently, antibiotic resistance presents a great challenge to the treatment of infections.[2]This problem was more complicated through the emergence of multidrug resistant (MDR) strains to 3 or even more classes of antibacterial agents belonging to different chemical classes by using various mechanisms. The occurrence of MDR is very common and mainly in Gram negative bacteria.[3]

The phenomenon of drug resistance is not restricted to pathogenic bacteria. It also involves the commensal microbiota of humans and animals, which although not specific targets are continuously exposed to the selective pressure generated by antimicrobial chemotherapy and may become a major reservoir of resistant strains and resistant determinants. For this reason some commensal microbiota, such as faecal *Escherichia coli* have been exploited as sensitive indicators in surveillance regarding antimicrobial resistance.[4] The commensal *E. coli* can be pathogenic and cause different infections when it acquires different virulence factors and/or when the immune status of an individual is compromised. *E. coli* also cause hospital acquired infections and occasionally cause community-acquired infections. The incidence of community acquired infections and hospital acquired infections with bacteria resistant to multiple antibiotics of common use has been observed. There are few studies addressing this issue, and they have shown a high prevalence of commensal faecal coli forms resistant to various antibiotics.[5] In the present study we have

to investigate antimicrobial resistance in the commensal *E. coli* microbiota of Tirupati community and hospital patients which are attending in the SVIMS Hospital.

MATERIALS AND METHODS:

Study Design: The present study was carried out from October 2012 to March 2013 for a period of 6 months during the study period we examined a total of 100 faecal samples. In these 50 samples are from healthy individuals of Tirupati community. The precautions taken before collection of the faeces, the person should not have received certain medications such as bismuth, mineral oil, anti-diarrheal agents and antibiotics during the period of 15-30 days before the collection of faecal specimens. 50 samples were obtained from patientswho are attending the hospital outpatient department and inpatients samples ofSVIMS Hospital. A written informed consent was taken from all the subjects who participated in this study.

Sample collection and processing: Freshly passed stool specimens were collected in clean, wide mouthed containers supplied with a plastic spoon that is attached to the inside of the screw cap, precaution taken that specimen should not be contaminated with water that may contain free-living organisms and with urine, and transported to the laboratory at the Institute within 3 hours after collection. Stool samples were inoculated onto MacConkey agar plate and incubated in ambient at 35°C for 18-24 hours before initial examination. The plates were examined for growth, the microorganisms that grew were identified by standard techniques and testing.

Screening for Faecal Carriage of Antibiotic resistant *E. coli*:Antimicrobial susceptibility was determined by the Kirby Bauer's disk diffusion test in accordance with guidelines from Clinical Laboratory Standards Institute (CLSI). Isolates were screened with 10 different antibiotics. Quality control was performed by use of *E. coli* strain ATCC 25922. [6]

RESULTS:

Antibiotic resistance was studied in the commensal *E. coli* microbiota of Tirupati community and hospital patients who were attending the SVIMS hospital. Out of 100 samples 50 from community and 50 from hospital patients were collected and processed in the Microbiology department. In this the age of the youngest individualis 5 years and the

oldest is 86 years, sex ratio is female 46 and male 54. In this study we observed that faecal *E. coli* isolates of hospital patients showed more resistance percentage when compared with healthy individuals of Tirupati community. (Table-1)

The healthy individuals from community of Tirupati showed low resistant percentages. Among the 50 healthy individuals of Tirupati community, the resistant patterns were observed as ampicillin 36% (18), Co-trimoxazole 22% (11), amoxyclav and ciprofloxacin 18% (9), cefotaxime 10% (5), gentamicin 4% (2), imipenem 2% (1) and amikacin, cefaparazone-sulbactum, piperacillin-tazobactum showed no resistance. Among 50 hospital patients showed the predominant resistant to ampicillin 68% (34), amoxyclav 66% (33), ciprofloxacin 56% (28), co-trimaxazole 54% (27), cefotaxime 50% (25), gentamicin and piperacillin-tazobactum 30% (15). In this cefaparazone –sulbactum, amikacin and imipenem showed less resistant percentage i.e., <24% (12).

DISCUSSION:

There is worldwide concern about the emergence of antibiotic resistance in common pathogens of community as well as hospital acquired infections. Normal non-pathogenic floras of ambulatory and hospitalised individuals may represent an enormous and constant reservoir of resistant genes, potentially transferable to virulent microorganisms. Yet, data on the frequency of antibiotic resistant bacteria colonization the bowels of healthy individuals are scare. The present study was under taken to find out the prevalence of antibiotic resistance in faecal carriage of *E. coli* in the hospital patients and healthy individuals by using standard methods.

A total number of 100 samples were included in the study. In this study it was noted that resistance patterns of hospital patients and healthy individuals of community was different.

The comparison of resistance patterns of hospital patients and healthy individuals of community as follows ampicillin, 68% and 36%; amoxyclav, 66% and 18%; ciprofloxacin, 56% and 18%; co-trimoxazole, 54% and 22%; cefotaxime, 50% and 10%; gentamicin, 30% and 4%; piperacillin-tazobactum, 30% and 0%; cefaparazone-sulbactum, 24% and 0%; amikacin, 14% and 0%; imipenem, 12% and 2% of the tested isolates,

respectively. In this it was noted that hospital patients were showed more resistance than healthy individuals, these results are close to the rates of faecal carriage of antibiotic resistant *E. coli* in hospital patients and healthy individuals of that were reported in a study done in Saudi Arabia by Abdulla kadar A et al. 2007. [7]In our study isolation of faecal carriage of antibiotic resistance *E. coli* was more in hospital patients then in community due to the excessive use of these antibiotics could explain the higher prevalence of faecal carriage of antibiotic resistant *E. coli* was more in the hospital compared with the rates of the community. The spread of antibiotic resistant organisms to the community could be related to previous nosocomial acquisition, as some hospital inpatients continue to carry resistant bacteria over prolonged periods, and such carriage may contribute to propagation outside the hospital.

Bortoloni A. et al. 2006 Reported that the highest rates of antibiotic resistance to ampicillin 58% and co-trimoxazole 30% among 108 individuals of Bolivian community. [8] But in our study showed that resistance to ampicillin 36% and co-trimoxazole 22% of tirupati community. In their study the reason of high resistance to antibiotics, due to use of antimicrobial agents has been claimed to the driving force in the emergence and diffusion of bacterial resistance, their findings were quite unexpected: even if we cannot consider the study population as virgin in terms of antimicrobial use, antimicrobial consumption seems to be for too low to account for the high prevalence of antimicrobial resistance in the resident microbiota, especially when compared with the prevalence measured in settings characterized by over use of antimicrobial agents. In our present study low resistance rates observed in our community due to may be the reason of that they were not recently exposed to antimicrobial agent.

CONCLUSIONS:

It can be concluded that faecal carriage of antibiotic resistant *E. coli* can causes of hospital-acquired infections and occasionally causes community acquired infections. It necessitates prevention of infections by conducting the infection control programmes and implementation of surveillance for this emerging antibiotic resistance phenomenon. To control or reduce the rate of carriage for these organisms, effective measures should be

taken to prohibit the scale of antibiotics without medical consultation. Every hospital should monitor the antibiogram profile of organisms time to time to serve as a basis for empirical therapy in emergency situations.

TABLES:

TABLE 1

ANTIBIOTIC RESISTANCE IN COMMUNITY AND HOSPITAL PATIENTS

S.NO	ANTIBIOTICS	COMMUNITY No. (%)	HOSPITAL PATIENTS No (%)
1	Amikacin	0 (0)	7 (14)
2	Amoxyclav	9 (18)	33 (66)
3	Ampicillin	18 (36)	34 (68)
4	Cefaparazone-sulbactum	0 (0)	12 (24)
5	Cefotoxime	5 (10)	25 (50)
6	Ciprofloxacin	9 (18)	28 (56)
7	Co-trimoxazole	11 (22)	27 (54)
8	Gentamicin	2 (4)	15 (30)
9	Imipenem	1 (2)	6 (12)
10	Piperacillin-Tazobactum	0 (0)	15 (30)

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