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RESEARCH

ANTIBIOTIC SUSCEPTIBILITY PATTERN OF DIFFERENT PATHOGENS TO ANTIBIOTICS IN RURAL AREA, INDIA.

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ABSTRACT

Introduction: Antimicrobial resistance(AMR) has emerged as a major public health problem all over the world. Infections caused by resistant microbes fail to respond to treatment, resulting in prolonged illness and greater risk of death. Treatment failures also lead to longer periods of infectivity, with increased numbers of infected people moving in the community. This in turn exposes the general population to the risk of contracting a resistant strain of microorganisms. Thus antibiotic susceptibility patterns were conducted.

Material And Methods: One hundred and eighty four samples obtained from sputum, throat, blood, urine, pus, stool and ear swab. Among them 84 were reported the presence of bacterial infection. Culture examination was carried out using blood agar and MacConkey's medium, followed by inoculation by four flame streak method. Antibiotic susceptibility was confirmed by disk diffusion technique on Muller-Hinton medium, performed according to the Clinical Laboratory Standard Institute (CLSI) guidelines.

Results And Discussion: E.coli and Klebsiella were completely(100%) susceptible amikacin and levofloxacin. Thus Levofloxacin, much safer drug was used as first line drug. The alternative drug was amikacin, because of its adverse effects. Second line drug was ciprofloxacin. Cefotaxime can be use for bacteremias. Urinary tract infections were caused by E.coli, Klebsiella. Thus were susceptable to Nitrofurantoin completely.

Conclusion: Thus antibiotic sensitivity pattern is intended to provide, clinicians and surgeons, valuable information upon which empiric antimicrobial therapy of infection can be predicted.

INTRODUCTION

Antimicrobial resistance(AMR) has emerged as a major public health problem all over the world. Infections caused by resistant microbes fail to respond to treatment, resulting in prolonged illness and greater risk of death [Shahin Shadnia and Fiona M.Garlich, 2011]. Treatment failures also lead to longer periods of infectivity, with increased numbers of infected people moving in the community[Deurden BI et.al,1987; Editorial Nosocomial infections part II,1992]. This in turn exposes the general population to the risk of contracting a resistant strain of microorganisms[Balows A et.al.,1991]. When these become resistant to first-line antimicrobials, the prohibitive high cost of the second line drugs may result in failure to treat these diseases in many individuals[O.M.Olabemiwo et.al.,2011]. Most alarming of all are the diseases caused by multidrug-resistant microbes, which are virtually non-treatable and thereby create a "post-antibiotic era" scenario.

Antimicrobial resistance has assumed greater importance in health-care settings[Hughes JM et.al.,,1983]. The presence of compromised individuals in an environment with a variety of infectious agents which are continuosly under heavy antibiotics pressure results in the emergence and spread of resistant organisms to other patients in the form of cross-infection[Vol.II Microbiology Cambridge University Press, 1984]. The size of the ageing population is also on the rise, leading to an increasing number of individuals living with immunocrompramised states. Such people spend more and more amounts of time in hospitals or long term care facilities. These patients will be at risk for morbidity and mortality associated with acquired infections. Further, there is an association between the development of resistance in Staphylococcus aureus, enterococci, and gram-negative bacilli and an increase in mortality, length of hospitalization, and the cumulative cost of health care. This attributes to inappropriate, adequate or

delayed therapy. Strategies to prevent the emergence and spread of health-care associated antimicrobial-resistant organisms are essential.

METERIAL AND METHODS

It is prospective cohort study undertaken at Bhaskar Medical College, Andhra Pradesh, India between January 2011 to November 2011. One hundred and eighty four samples obtained from sputum, throat, blood, urine, pus, stool and ear swab. Among them 84 were reported the presence of bacterial infection.

Bacterial growth was identified based on colony characteristics, gram's stain and biochemicall reactions. Culture examination was carried out using blood agar and MacConkey's medium, followed by inoculation by four flame streak method. Antibiotic susceptibility was confirmed by disk diffusion technique on Muller-Hinton medium[Sneh Goyal and S.S.Sindhu.2011], performed according to the Clinical Laboratory Standard Institute (CLSI) guidelines[Bauer AW, et al.1966; NCCLS documents M2-A6,Approved Standard 6th edition;1997]. Paper disks were impregnated with antibiotics. Third generation cephalosporins: Cefotaxime, ceptazidime, cefoprazone, ceftriazone and cefadroxil[O.P.Jangu and S.S.Sindhu,2011]. They were incubated at 37^0C and also 5-10% CO_2 enriched environment (candle jar). With these sensitive and resistance pattern were identified based on CLSI guidelines[O.A.Oyewole,et.al.,2011].

Susceptibility data were compared by using percentages, mean$\pm$SD

RESULTS

A total of 84 patients are included in study, 44 were males and 40 were females. The study group had mean age of 35.12$\pm$8.15 years. The commonest isolates were E.coli, and Klebsiell (These represented 69% and 31% of isolates respectively)

Table 1.

Organism	Amikacin	Levofloxacin	Nitro Furantoin	Ciprofloxacin	Ofloxacin	Cefotaxime	Gentamicin	Cefixime	Trimethoprim
Pus									
E.coli S	100%	100%	-	50%	50%	0%	0%	0%	100%
R	0%	0%	-	50%	50%	100%	100%	100%	0%
Urine									
E.coli S	100%	100%	100%	0%	0%	0%	0%	0%	0%
R	0%	0%	0%	100%	100%	100%	100%	100%	100%
Urine									
Klebsiella									
S	100%	100%	100%	33.33%	0%	-	0%	66.67%	0%
R	0%	0%	0%	66.67%	100%	-	100%	33.33%	100%
Blood									
E.coli S	100%	100%	-	50%	50%	100%	80%	0%	0%
R	0%	0%	-	50%	50%	0%	20%	100%	100%
Sputum									
Klebsiella									
S	100%	100%	-	50%	50%	50%	100%	0%	0%
R	0%	0%	-	50%	50%	50%	0%	100%	100%

E.coli and Klebsiella were the major causative organism in all infections. Sensitivity of E.coli in pus samples was in the order of 100% sensitivity with Amikacin, Levofloxacin, and Trimethoprim and 50% sensitivity with Ciprofloxacin and Ofloxacin. E.coli in pus was resistant to Gentamicin and Cefixime by 50%.

Sensitivity of E.coli in urinary samples was 100% for Amikacin, Levofloxacin and Nitrofurantoin. E.coli in urinary samples was 100% resistant to Ciprofloxacin, Ofloxacin, Cefotaxime, Gentamicin, Cefixime and Trimethoprim.

Sensitivity of Klebsiella in urinary samples was 100% for Amikacin, Levofloxacin and Nitrofurantoin, 66.67% for Cefixime and 33.33% for Ciprofloxacin. Klebsiella in urine was resistant by 100% with Ofloxacin, Gentamicin and Trimethoprim, 66.67% with Ciprofloxacin and that of 33.33% with Cefixime.

E.coli in blood was 100% sensitive to Amikacin, Levofloxacin and Cefotaxime, 80% sensitive to Gentamicin and 50% sensitive to Ciprofloxacin and Ofloxacin. E.coli in blood was resistant by 100% to Cefixime and Trimethoprim, 50% to Ciprofloxacin and Ofloxacin, and 20% to Gentamicin.

Klebsiella in sputum was 100% sensitive to Amikacin, Levofloxacin and Cefotaxime, and 50% sensitive to Ciprofloxacin, Ofloxacin and Cefotaxime. Klebsiella in sputum was 100% resistant to Cefixime and Trimethoprim.

DISCUSSION

The common pathogens isolated in Odelowo EOO et al. were Staph.aureus(35.8%), Pseudomonas spp(21.8%), E.coli(15.3%), and Klebsella spp(13.4%)[Odelowo EOO, Onile BA 1990; Castiglia M, Smego RA jr.1995]. In our study, isolated organisms are restricted to E.coli(69%) and Klebsiella(31%). 83.5% of wound swabs in study cultured was positive for bacterial pathogens[A.C.L.Batista, G.C.Dantas et.al.,2011;Elsayed Aboulmagd, I et.al.,2011, V.Bali,P.et.al.,2011]. The low rate of request and isolation rate in intensive care unit as against the normal trend may be due to the fact that this unit is quite small and requests are therefore correspondingly small[Ogunsola FT et al.1998; Ayliffe GAJ et.al.,1992; Dixon RE,1978; Couper RG, Summer C;1970].

E.coli and Klebsiella were completely susceptible amikacin and levofloxacin. Thus Levofloxacin, much safer drug was used as first line drug. The alternative drug was amikacin, because of its adverse effects. Second line drug was ciprofloxacin. Cefotaxime can be use for bacteremias.

Uropathogens are bacteria with specific virulence factors that facilitate their invasion of the urinary tract[John L Brusch]. Urinary tract infections were caused by E.coli, Klebsiella. Thus were susceptable to Nitrofurantoin completely[Mirbagheri Maryam, Nahvi Iraj and Emtiazi Giti,2011].

E.coli are reservoirs of resistance genes. The prevalence of resistance in E.coli is a useful indicator of antibiotic resistance to bacteria in the community[Iruka N. et al.2000].

In one study, susceptibility pattern of organisms heavily favoured the Quinolones, particularly Ciprofloxacin, and new Macrolides, Azithromycin, which were effective but expensive antibiotics in the treatment of wound

infections in this environment. 60% of gram negative organisms were sensitive to Gentamicin[Taiwo.S.S,et.al.,2002].

CONCLUSION

Thus antibiotic sensitivity pattern is intended to provide, clinicians and surgeons, valuable information upon which empiric antimicrobial therapy of infection can be predicted. Bacteria were susceptible to Levofloxacin and Amikacin.

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