International Journal of Life science & Pharma Research

EFFICIENCY OF ANTIBIOGRAM SENSITIVITY DETERMINATION AGAINST HUMAN PATHOGEN

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ABSTRACT

Antibiotic resistance pattern for human pathogenagainst different antibiotics was determined by the Kirby-Bauer method. The human associated pathogen wereprocured from Doctors Diagnostic Center, Trichy. Some commercial antibiotics are erythromycin (E^{10}), ciprofloxacin (CIP^{15}), polymyxin B (PB^{300}), streptomycin (S^{25}), penicillin G (P^{10}), chloramphenicol (C^{30}), gentamycin (GEN^{10}), ampicillin A (A^{25}), itraconozole (IT^{10}), rifampicin (RIF^{5}), sulphamethizole (SM^{300}) and sterile disc (as a negative control) against *B.cereus*, Coagulase negative *Staphylococcus, E.aerogenes, E.coli*, *Enterobacter* sp., *K.pneumoniae, P.aeruoginosa*, *Proteus* sp., *Pseudomonas* sp., *S.aureus* and *S.typhi.* Ciprofloxacin, chloramphenicol, gentamycin and polymyxin antibiotics are more resistance activity against pathogen. In our results were compared the Clinical and Laboratory Standards Institute (CLSI) guides.

KEYWORDS: *Antibiotics, human pathogen, Muller Hinton agar*

INTRODUCTION

The word “antibiotic” refers to substances produced by microorganisms that act against another microorganism. Antibiotics do not include antimicrobial substances that are synthetic (sulfonamides and quinolones), or semisynthetic (methicillin and amoxicillin), or those which come from plants (quercetin and alkaloids) or animals (lysozyme). There are a large number of antimicrobial agents available for treating diseases caused by microorganisms. Such drugs are now an essential part of modern medical practice. The antimicrobial agents used in medical practice are aimed at eliminating the infecting microorganisms or at preventing the establishment of an infection. To be of therapeutic use, an antimicrobial agent must exhibit selective toxicity; it must exhibit greater toxicity to the infecting pathogens than to the host organism. A drug that kills the patient is of no use in treating infectious diseases, whether or not it also kills the pathogens. The new emerging pathogen with increasing antibiotic resistance, along with the susceptibility of immune compromised to common diseases has become an alarming problem worldwide. The introduction of a new class antibiotic that is efficacious and safe which leads to wide spread use and thus development of resistance to treat many disease[1]. A variety of antibiotic resistance strains were discovered by the work done[2,3]).

An antibiotic should have the following characteristics:

- It should be toxic to the infecting organism while harmless to the host cells and the microbiota of the host.
- It should stay in toxic form for a sufficient amount of time to affect the infecting microorganism. If it changes to another form or is broken down in the body, it may not be useful.
- It should be sufficient in number to be able to reach the site of infection to kill the infecting agent.
- The infecting agent should be sensitive to it.

MATERIALS AND METHODS

Collection of clinical pathogen and antibiotics

The human normal flora was procured from Doctors Diagnostic Centre, Trichy. The Hi media antibiotics discs were purchased in Ponmani & Co. Chemical center, Trichy.

India map

Tamilnadu map

Determination of antibiotic susceptibility test[4]

The bacterial pathogens were grown on nutrient broth (NB) at 37°C for 24 hours incubation. A sterile cotton wool swab dipped into the 24 hours old bacterial suspension was spread evenly on the surface of the Muller Hinton agar plates. The inoculated plates were allowed to dry before placing the diffusion discs containing antibiotics. Susceptibility of the isolates to 12 types of antibiotics was performed using the standard Kirby-Bauer method. Commercially available discs (Hi-media) containing erythromycin (E^{10}), ciprofloxacin (CIP^{15}), polymyxin B (PB^{300}), Streptomycin (S^{25}), penicillin G (P^{10}), chloramphenicol (C^{30}), gentamycin (GEN^{10}), ampicillin A (A^{25}), itraconozole (IT^{10}), rifampicin (RIF^{5}), sulphamethizole (SM^{300}) and sterile disc (as a negative control) were placed on the surface of the MH agar plates and incubated at 30°C for 24 hours. The diameter of inhibition zones formed surrounding each isolate inclusive of diameter of the discs was measured. All isolates were tested duplicate for each type of antibiotic. [5].

RESULTS AND DISCUSSION

In the present study totally eleven species of human pathogens were tested against some commercial standard antibiotics disc. Effect of commercial antibiotics against some specific pathogen bacteria was analysed. Some antibiotics such as ciprofloxacin and polymyxin were sensitive antibiotics to all the pathogen. Likewise antibacterial activities of chloramphenicol and gentamycin were also observed. At similar concentration, standard antibiotic, rifampicin showed 23mm of zone of inhibition against *S.aureus, P.aeruginosa* and *B.cereus*, but 22mm against *E.coli.* However, streptomycin showed highest zone of inhibition against *S.aereus*, (32mm) but lowest against *B.cereus* (27mm) at similar concentrations[6]. Ong*et al*.[7] evaluated that strongly susceptible to five types of antibiotics which include amikacin (AK^{30}), kanamycin (K^{30}), gentamycin (CN^{10}), norfloxacin (NOR^{10}) and tetracycline (TE^{30}). 20% of the isolates were resistant to penicillin G (P^{10}), ampicillin (AMP^{10}), streptomycin (S^{10}), chloramphenicol (C^{30}), nitrofurantoin (F^{300}), sulphanethoxazole (RL^{100}) and trimethoprim (W^{5}). Similarly in the present investigation the effect of ciprofloxacin antibiotics has been well documented in the excellent zone formation as 13, 25, 20, 08, 27, 32, 30, 07, 15, 40 and 30 mm with *B.cereus*, Coagulase negative *Staphylococcus, E.aerogenes, E.coli*, *Enterobacter* sp., *K.pneumoniae, P.aeruoginosa*, *Proteus*sp, *Pseudomonas* sp., *S.aureus* and *S.typhi*. whereas chloramphenicol antibiotics also showed very good activity against *B.cereus* (30 mm), Coagulase negative *Staphylococcus* (30 mm), *E.coli* (15 mm), *Enterobacter* sp. (30 mm), *P.aeruoginosa* (10 mm), *Proteus* sp. (30 mm), *Pseudomonas* sp. (15 mm), *S.aureus* (30 mm) and *S.typhi* (10 mm) zone of inhibition was measured. While the effect of gentamycin with moderate among the selected bacterium as 5, 27, 8, 15, 15, 4, 9, 25 and 20 mm zone of inhibition with *B.cereus*, Coagulase negative *Staphylococcus*, *E.aerogenes*, *E.coli*, *Enterobacter* sp., *P.aeruoginosa*, *Pseudomonas* sp., *S.aureus* and *S.typhi* was recorded respectively. The polymyxin antibiotics was *B.cereus* (4 mm),

Coagulase negative *Staphylococcus* (7 mm), *E.aerogenes* (5 mm), *E.coli* (3 mm), *Enterobacter* sp. (7 mm), *K.pneumoniae* (10 mm), *P.aeruoginosa* (5mm), *Proteus* sp. (4 mm), *Pseudomonas* sp. (5 mm), *S.aureus* (3 mm) and *S.typhi* (5 mm) recorded respectively when compared to sterile disc. Some of the other antibiotics also showed linear activity, which was observed by the *invitro* methods (Table 1; Fig. 1 and Plate I).*S. aureus* is a persistent nosocomial and community acquired pathogen. It became a global health concern, due to remarkable capability of developing drug resistant mechanism against most antimicrobial agents[8]. Generally, bactericidal compounds are more potent than bacteriostatic compounds. It is well established that bactericidal activity is an important determinant of clinical outcome[9]. The isolates were 100% resistant to gentamycin, streptomycin, tetracycline, and chloramphenicol. Less resistance (90.9%) was shown to ofloxin, saprofloxin and amoxycillin used. The minimum resistance was shown to ciprofloxin (63.6%) and pefloxacin (54.5%)[10]. These antibiotics seem effective against the isolated *E. coli*. This corroborates with the work done[11] on antibiotics susceptibility pattern of *Escherichia coli* isolated from well water in Afikpo south eastern Nigeria. Additionally,[12,13,14] have all previously reported bacterial resistance against ampicillin, gentamycin, erythromycin, tetracycline and ciprofloxacin at different times. The reason why some of these *E. coli* isolates showed high level of resistance to the antimicrobial agents used is an indication that these antibiotics have been abused, hence the possibility that they have acquired resistance

Table 1
Antbiotics sensitivity test against human pathogen

S.No	Name of the bacteria	Zone of inhibition (mm)											
		SM^{300}	IT^{10}	RIF^{5}	E^{10}	PB^{300}	CIP^{15}	S^{25}	P^{10}	C^{30}	A^{25}	GEN^{10}	SD
1	*B.cereus*	-	-	-	-	4	13	-	-	30	-	5	-
2	Coagulase negative *Staphylococcus*	11	-	9	12	7	25	-	2	30	-	27	-
3	*E.aerogenes*	-	-	-	-	5	20	-	-	-	-	8	-
4	*E.coli*	10	3	6	10	3	8	4	-	15	-	15	-
5	*Enterobacter*sp	25	-	10	-	7	27	-	6	30	5	15	-
6	*K.pneumoniae*	-	-	3	-	10	32	10	-	-	-	-	-
7	*P.aeruoginosa*	-	-	4	-	5	30	14	-	10	-	4	-
8	*Proteus* sp	28	-	20	15	4	7	7	-	30	-	-	-
9	*Pseudomonas* sp.	20	-	15	6	5	15	2	-	15	-	9	-
10	*S .aureus*	40	-	40	35	3	40	25	10	30	-	25	-
11	*S.typhi*	15	-	10	7	5	30	-	5	10	22	20	-

SM^{300}-sulphamethizole, IT^{10}-itraconozole, RIF^{5}-rifampicin, E^{10} - erythromycin, PB^{300}-polymyxin B, CIP^{15} - ciprofloxacin, S^{25}-Streptomycin, P^{10}-penicillin G, C^{30}-chloramphenicol, A^{25}-ampicillin A, GEN^{10}-gentamycin, SD -sterile disc
≤15 resistance, 16-20 intermediate, ≥21 sensitive

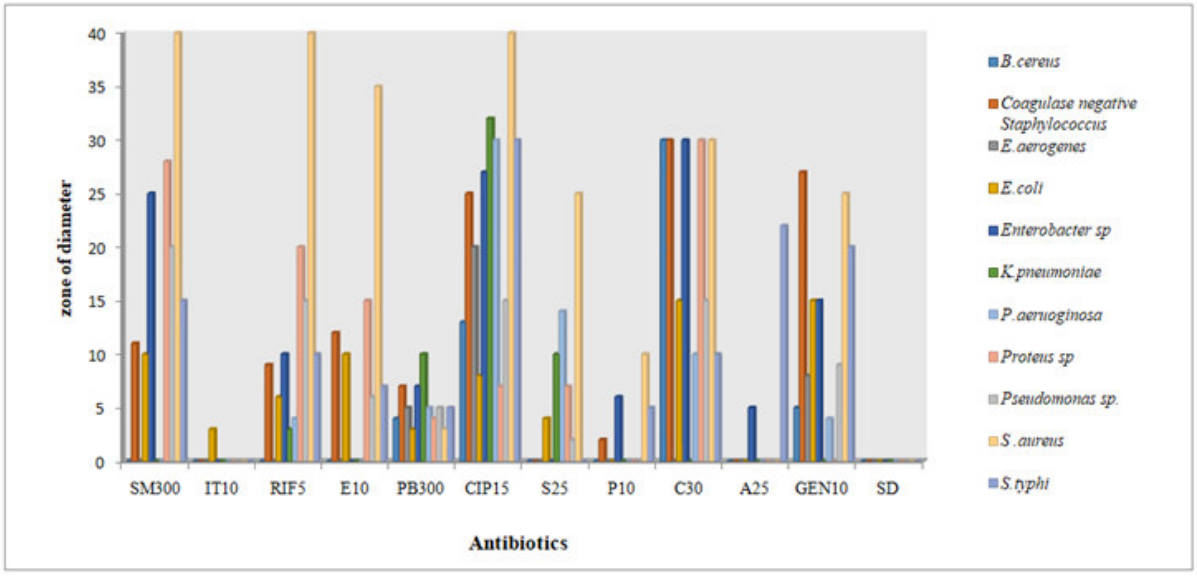

Figure 1
Sensitivity pattern of Antibiotics against human pathogen

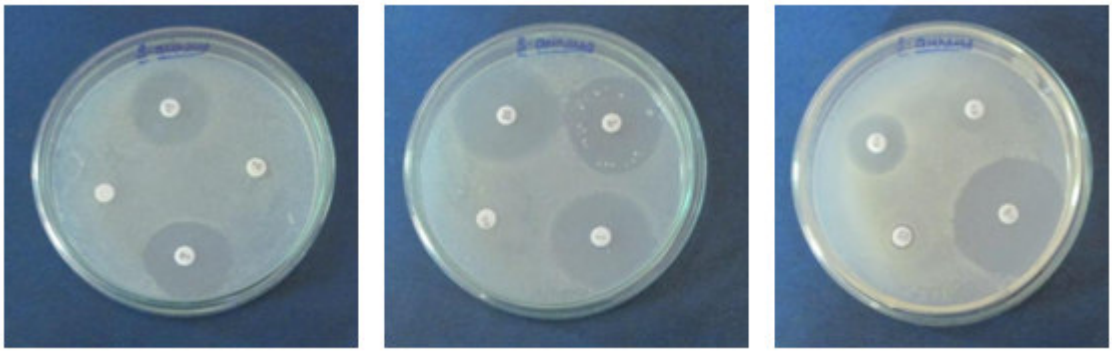

Plate I
Antibiotic susceptibility activity of S.aureus

CONCLUSION

It is concluded that the our study, the human flora are some occasional to change the pathogen to casuse disease in human beings. Some favourable condition *S.aureus* and *E.coli* are caused disease. In these times the commercial antibiotics are useful for human beings.

ACKNOWLEDGEMENT

The authors wish to thank A.V.V.M Sri Pushpam College, Poondi, Thanjavur and Indian Biotrack Research Institute, Thanjavur for extending the facilities to carry out the laboratory studies.

CONFLICT OF INTEREST

Conflict of interest declared none.

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