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### Original Article

# Invitro activity of combination of third and fourth generation Cephalosporins along with Beta lactamase inhibitors against *Methicillin Resistant Staphylococcus aureus* (MRSA) and Multi drug resistant Gram negative bacilli.

\*Rajendra

#### ARTICLE INFO

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#### ABSTRACT

A total 100 bacterial strains isolated from various clinical samples from the our hospital due to various infections of the patients admitted in our hospital. The species of Enterobacteria family like Escheria coli , Klebsiella sps. , Salmonella organisms and hospital acquired (nosocomial) infections causing by Pseudomonas aeruginosa . Staphylococcus aureus as a major organisms causing in surgical site infections, hospital admission patients, and immunocompromised patients. Which is mainly by Methicillin resistant staphylococcus aureus. These are all organisms like multidrug resistant strains of Enterobacteria, Pseudomonas aeruginosa and gram positive cocci as MRSA[1]. The organisms are invitroactivity of the third and fourth generation cephalosporins combination of the beta lactamase antibiotics[2]. The Himedia company available the antibiotic discs. The combination of drugs are cefeparazone+ sulbactam, piperacillin+tazobactam, ceftriaxone+tazobactam, cefepime+tazobactam tested by standard Kirby- Bauer disk diffusion technique as per CLSIs guidelines[3]. Among these four agents studied , cefeparazone+sulbactam emerged as the most useful drug against to the multidrug resistance strains of Enterobacterias, Pseudomonas aeruginosa, Methicillin Resistant Staphylococcus aureus[4]. The Piperacillin+tazobactam are moderate useful to that particular organisms. , Ceftriaxone+ tazobactam, Cefepime+ tazobactam are poorly active against the respective organisms [5].

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### 1. Introduction

The emergence of multidrug resistant strains of bacteria in our hospital patients problem for clinicians. Among the newer therapeutic drugs available are various combination of cephalosporins along with beta lactmase inhibitors are useful for clinicians.

The study was undertaken to find out the relative efficacy of four such new drugs combination against various multidrug resistance gram positive and gram negative isolates from our hospital [6]. That four such new drugs like third and fourth generation cephalosporins with combination of beta lactamases are useful for resistant strains of that particular organisms.

### 2. Materials and Methods:

A total of one hundred bacterial strains comprising of 50 are Methicillin Resistance Staphylococcus aureus and 25 of multidrug resistant strains of each of the Enterobacteria and Pseudomonas aeruginosa were taken for this study. The activity of cefeparazone+sulbactam, piperacillin+tazobactam, ceftriaxone+tazobactam, cefepime+tazobactam were tested by standard Kirby- Bauer disc diffusion technique method as per CLSIs guidelines. The Muller Hinton agar medium is used for the antibiotic sensitivity testing purpose [7]. The one hundred bacterial strains detected by from the various clinical specimens like blood, urine, pus swabs, sputum, body fluids and catheter tips of the various patients from the variety of diseases [8].

### 3. Results:

One hundred bacterial resistant strains are explained in table-1

The bacterial strains of 50% are Methicillin Resistant Staphylococcus aureus, 25% are multidrug resistant Enterobacterias and 25% are the Pseudomonas aeruginosa.

From the hospital various clinical samples containing the following organisms are seen in table-2.

\* Corresponding Author : Dr. D.Rajendra,  
Asst. Professor,  
Department of Microbiology,  
Shri Sathya Sai Medical college & Research Institute,  
Nellikupam, Thiruporur-Gudvancherry main road,  
Chengalpat (TK), Kancheepuram (DT), Chennai,  
Tamil Nadu (state).  
E Mail id: [drrajendramm@gmail.com](mailto:drrajendramm@gmail.com)

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**Results Tables:- One hundred bacterial resistant strains containing the following table-1 shows**

Organisms	Sensitive to that particular combination drugs
Methicillin Resistant Staphylococcus aureus ( MRSA)	50%
Multidrug resistant Enterobacterias (MDR Enterobacterias)	25%
Pseudomonas aeruginosa	25%

**From the hospital various clinical samples containing the following organisms are seen in table-2.**

Clinical specimens	MDR Enterobacterias(25)	Pseudomonas aeruginosa (25)	MRSA (50)
Blood	03	00	09
Urine	14	13	08
Pus	04	09	22
Sputum	02	01	05
Catheter tips	02	02	06
TOTAL	25	25	50

**Table-3 Sensitivity pattern of combination drugs**

Drug combinations	Sensitivity percentage
CFS	65%
PT	52%
CIT	29%
CPT	13%

**4.Discussion:**

In our study ,most of the organisms are Enterobacteriaceae family of the Escheria coli, Klebsiella, Salmonella , Pseudomonas aeruginosa etc. ,and gram positive organisms like Methicillin resistant Staphylococcus aureus are resistant to various drugs [2]. In this study among the the four agents used ,and observation of the sensitivity pattern. The four agents are as CFS, PT, CIT,CPT. Among the these drugs CFS emerged to be the best one with 65% of overall sensitivity. Among the other agents, PT showed moderate activity (52%), while CIT and CPT were found to be poorly active with only 29% and 13% overall sensitivity respectively. For the MRSA , CFS was found to be most useful with 80% strains sensitive to it, followed by PT (50%). Almost all the Pseudomonas aeruginosa strains were uniformly resistant to all the four agents with sensitivity ranging from 28% for PT to 4% for CPT [9].

**5.Conclusions:**

The Enterobacteria group were comparatively more susceptible to these agents with approximately 80% strains sensitive to CFS and PT [10]. Among the four agents tested CFS was found to be the most useful drug against MRSA and Enterobacteria group. None of the agents were found to be useful for Pseudomonas aeruginosa..

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