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ORIGINAL ARTICLE

Antimicrobial Sensitivity Trends of Carbapenem Resistant *Acinetobacter Baumanii* in Convalescents of Ventilator Associated Pneumonitis and other Specimens

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ABSTRACT

Aim: To assess the antimicrobial sensitivity trends of carbapenem resistant *Acinetobacter baumanii* in convalescents of ventilator associated pneumonitis and other specimens.
Methods: In collaboration with Combined Military Hospital of Lahore a sum up of 47 hospital isolates of carbapenem resistant *Acinetobacter baumanii* were congregated**.** The microbial isolates re-confirmation was underwent by the morphological, cultural and biochemical approaches such as Grams method, inoculation on blood agar, oxidase reaction, mobility of organism, Analytical profile strips-20 NE.
Result: Amongst 47 multidrug resistant isolates *Acinetobacter* microbes, it was found out that majority of specimens 38(81%) were from cases of ventilator associated pneumonitis, 3(6.3%) bacterial strain were from suppuration, 3(6.3%) from bloodline, 2(4.2%) were from urinary culture, in addition 1(2%) from bodily tissue. All the strains (n=47) were found to be Carbapenem resistant. *Acinetobacter* exhibited utmost opposition to number of antimicrobials, it was put on view that insensitivity levels equal to 100% (n=47) towards Cephems and the very closely related Carbapenems, microbicides such as Fluoroquinolones and Tazobactam group of ant microbes. One thing to be recorded was that the only drug of choice which showed least hostility against *Acinetobacter* was Tigecycline.
Keywords: (API) analytical profile index, Carbapenem, (VAP) ventilator associated pneumonia.

INTRODUCTION

In gram negative family, carbapenem-resistant *Acinetobacter* is the most lethal microbe and enjoys pivotal role in treatment of septicemia. In recent years there is rapid decline in surveillance, amongst *Acinetobacter* infected patients due to pressure from antimicrobial resistance[1]. The mortality rate in *Acinetobacter* infection is at an alarming level from 26% to 68% as the bacteria in habitats the intensive care patients or those with extensive hospitalization[2,3,4,5,6].

Emergence of resistance arouse from factor such as prolong hospitalization, poor compliance from undue drug use worldwide[7,8,9]. There is widespread transmission between inanimate objects, respiratory devices and the nosocomial *Acinetobacter* ailments[10]. Although in one of the study not much association was found out amongst the morbidity and extensively hospitalized patients of ventilator-associated pneumonia[11]. In contrast, various other studies have proven strong interdependence bond between *Acinetobacter* septicemia and substantially increased mortality[12]. Multidrug-resistant *Acinetobacter* infection has been frequently reported among patients residing in rehabilitation centers, as well as in acute care hospitals[13,14].

The objective of the study was to assess the antimicrobial sensitivity trends of carbapenem resistant *Acinetobacter baumanii* in convalescents of ventilator associated pneumonitis and other specimens.

METHODOLOGY

Disk diffusion: In order to analyze the antimicrobial susceptibility a wide array of antibiotics were incorporated and tested in accordance with CLSI benchmark. Antimicrobials namely amikacin (AK), gentamicin (CN), cefuroxime (CXM), cefixime (CFM), cefepime (CPM), ceftazidime (CAZ), ceftriaxone (CRO), sulbactam/ cefoperazone (SCF), ciprofloxacin (CIP), levofloxacin (LEV), doxycycline (DO), Meropenem (MEM), aztreonam (ATM) and piperacillin/tazobactam (TZP)[15,16] were utilized. The zone of complete inhibition of *Acinetobacter* for tigecycline was also bring off by the help of disk diffusion method by incorporating tigecycline disk 15ug. However, the point of reference for tigecycline was enacted by evaluated by food and drug susceptibility benchmark[17].
Outcome: To bring to a figure of 47 stains of extensively drug unaffected *Acinetobacter* were acquired. Amongst them, the distribution was such that 38(81%) prevails from convalescents of ventilator associated pneumonitis, 3(6.3%) from suppurates samples, 3(6.3%) from bloodlines, 2(4.2%) were from urinary growths and 1(2%) from bodily tissue.
Antibiotic susceptibility testing: *Acinetobacter* undertaken executed great hostility towards a trio of antibacterial including carbapenem. It was analyzed 47(100%) hostility towards B-lactam group of antibiotics, the quinolones group and Tazobactam drug. Tetracycline once susceptible also revealed insensitivity borderline of 45(96%). Amongst the entire antimicrobials count on, Tigecycline display great efficacy against *Acinetobacter baumanii* 20(43%) strains showed responsiveness in regards to Tigecycline.

Amongst the 47 isolates, it was figured out that all of them showed aversion to carbapenem (XDR), meanwhile 57% were declared as pan-drug resistant as it was figured out that hostility towards all the group of bactericidal medicines.

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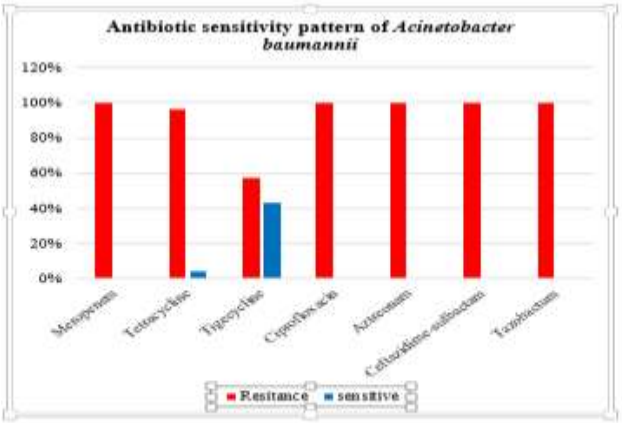

Figure VII: Resistance pattern of *Acinetobacter baumanii* to various antibiotics. Meropenem 100% (n=47), tetracycline 96% (n= 45), tigecycline 57% (n= 27), aztreonam 100% (n=47), ceftazidime-sulbactam (CZC) 100% (n=47), ciprofloxacin 100% (n=47), tazobactam 100% (n=47).

DISCUSSION

In our study, the strain were recovered from patients of ventilator associated pneumonitis, similarly studies of Gupta *et* al., exhibited great number of *Acinetobacter* collected from cultures of upper respiratory tract in health care insitutes[18]. Although the underlying modes of drug insusceptibility for *Acinetobacter* species are almost identical to the other *non-enterobacteraciae*, *Pseudomonas*, still room for researchers to come forth and predicts indicators of *Acinetobacter* infections[19,20]. Regardless of the fact that, tetracycline (both minocycline and doxycycline) have been used as empirical therapy for VAP caused by MDR *baumanii* [21] 100% insusceptibility against tetracycline was observed in our study. Moreover, 100% resistance was shown against aminoglycosides by *Acinetobacter* in contrast to study of Lisa *et al* in whose work showed moderate resistance against aminoglycoside group[22.] In our work, *Acinetobacter baumanii* put on view high point insusceptibility, nearly 100% against ceftazidime-sulbactam, carbapenems, tazobactam and aztreonam. In contrast the studies of LI Kaung *et al*., showed, 84% were resistant to cephalosporins, 17% were sensitive to tigecycline, 39% were sensitive to aminoglycosides 50% were sensitive to quinolones[23].

It is probably due to the fact that *Acinetobacter* possess β-lactamase enzyme that hydrolyzes the β-lactam antibiotics inclusive of monobactams, carbapenem, and cephalosporins[24].

Kyriakidis *et al*., in 2014 reported 97.7% *Acinetobacter* resistance against quinolones in the developing countries, similarly 100% resistance trend against ciprofloxacin shown in our study, make it unsuitable drug for treatment of *Acinetobacter* along with cephalosporins and β-lactam inhibitors[25].

In our study 20(43%) *Acinetobacter* executed sensibility in regard to tigecycline on the contrary, Li Kaung *et al*., in 2017 reported 196(83%) infected by phages and 41(17%) not infected by phages tigecycline sensitive isolates[23]. Rest of the 57% *Acinetobacter baumanii*, manifested the phenomenon of pandrug resistance.

The study of Navon *et al* in 2007 and Peleg *et al* in 2007 demonstrated that septicemia due to non-tigecycline-sensitive *baumanii* affiliated with an efflux pump mechanism[26,27].

Two parameters of responsiveness proven in our investigation: extremely drug hostile 100%, pan-drug aversion in 57%. Due to constraints regime for *Acinetobacter* septicemia, enforcement of new medicines, clinical trials of existing antimicrobial triads, precautionary measures should be kept in focus to avoid nosocomial infection[22].

CONCLUSION

In future financial burdens associated with hospital acquired infections, persuade manufacturing of other group of antibiotics, timely evaluation and finding adjuncts to traditional drug practice such as decolonization therapies[28].

Conflict of interest: Nil

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