International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 12, December 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.12.2024.33

Original Research

Prevalence of *Acinetobacter baumannii* and its antibiogram from various clinical specimens at tertiary care hospital

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Received Date: 30 October, 2024 **Accepted Date**: 26 November, 2024

ABSTRACT:

Introduction: *Acinetobacter species* is a leading cause of nosocomial pathogen in hospital set up worldwide. *Acinetobacter baumannii* is responsible for an increasing number of cases of blood stream infections, urinary tract infections, wound infections, health care & ventilator associated pneumonia. Due to surfacing of multidrug resistant strains in recent era, there is rising of morbidity and mortality rates particularly in developing countries.

Material and methods: A retrospective study conducted for 6 months period. Total 17680 samples received from various departments were included. Among total samples 2598 samples showed culture positive. *Acinetobacter baumannii* were identified by using standard operating procedures. Kirby Bauer Disc Diffusion Method was performed as per Clinical Laboratory Standards Institute (CLSI) guidelines.

Results: Out of 2598 (14.69%) culture positive samples, *Acinetobacter baumannii* were 129 (4.97%). No gender preponderance was observed. *Acinetobacter baumannii* was isolated maximum from blood (9.20%), followed by urine (5.90%), pus (4.90%), fluids (4.20%), sputum (2.10%) and cervical/vaginal swabs (0.90%). Highest sensitivity has been observed to Imipenem, Amikacin and least sensitivity for Cotrimoxazole, Fluroquinolones.

Conclusion: High frequency of drug resistance to commonly used antibiotics was observed. Surveillance should be done periodically in hospitals and their antibiotic policy should be updated at regular intervals. Infection and Prevention Control measures such as hand hygiene & strict standard precautions shall be implemented to prevent nosocomial infections.

Introduction:

Acinetobacter baumannii globally recognized as a major nosocomial pathogen, causing life threatening infections in critically ill patients especially in Intensive care units (ICUs). International studies have shown that *Acinetobacter spp* infection represent 7.9% of ventilator associated pneumonia and 5.7% to 15.7% of blood stream infections in the ICUs.(1) Many studies showed that *Acinetobacter baumannii* infections may be associated with significant morbidity and mortality in healthcare set up. However, clinical course of debilitating patients can be influenced by multiple factors that subsequently the infection with *Acinetobacter baumannii* may lead to crucify the results.

Acinetobacter spp has also become a great concern due to its resistance pattern to commonly used antibiotics.(2) Carbapenems would be the antibiotic choice for treatment of life threatening infections caused by Multidrug resistant(MDR) *Acinetobacter baumanii*. Despite, incidence of Carbapenem resistant *Acinetobacter baumannii*(CRAB) are emerging worldwide and limiting the therapeutic choice.(3) Although many studies conducted regarding *Acinetobacter spp* infections in healthcare set up, only few studies are available on Carbapenem resistant *Acinetobacter baumannii* infection.

Materials& Methods:

The study was conducted in Sri Venkateswara Medical College, Tirupati. A retrospective study was conducted after obtaining ethical approval. The study included all samples from patients of all age group admitted in various departments. *Acinetobacter baumannii* was identified as per standard operating procedures (SOPs) and performed Kirby Bauer disc diffusion test as per CLSI guidelines. The clinical and

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demographic data was collected such as Age, Gender, Patients Co morbidities.

Results:

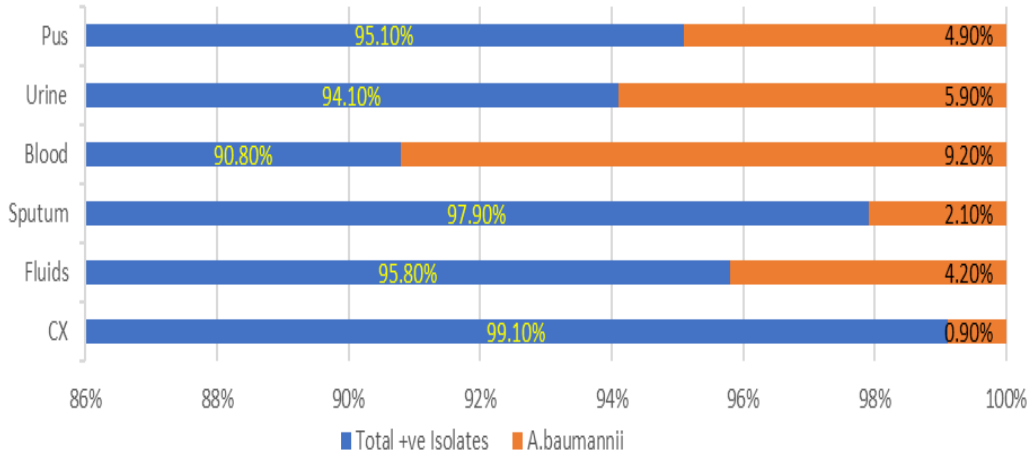
Out of the 17680 various samples, 2598 samples (14.69%) showed culture positive. Among culture positive samples, *Acinetobacter baumannii* were 129 (4.97%). No Gender preponderance was observed. The age group most frequently impacted was under 10 years old (25.6%, n=33), followed by 21–30years (20.16%, n=26), over 60 years (13.19%, n=17), 31–40 years(10.85%, n=14), 11–20 years (10.85%, n=14), 31–40years(10.85%, n=14), and 41–50years (9.30%, n=12). (Table 1)

Table 1: Age distribution of Acinetobacter baumannii isolates

Age (years)	No. of isolates	Percentage (%)
<10	33	25.6
11-20	14	10.85
21-30	26	20.16
31-40	14	10.85
41-50	12	9.30
51-60	13	10.05
>60	17	13.19

In pediatric departments, *Acinetobacter baumannii* was most frequently isolated from blood (9.20%), followed by urine (5.90%), pus (4.90%), fluids (4.20%), sputum (2.10%), and cervical/vaginal swabs (0.90%). (Fig.2)

Fig.2: Sample wise distribution of Acinetobacter baumannii isolates



Isolates showed Imipenem (89.14%, n=115) and Amikacin (77.5%, n=100) had the highest sensitivity, while Cotrimoxazole (28.68%, n=37) and Fluroquinolones (13.2%, n=17) have the lowest sensitivity. The majority of the isolates had multidrug resistance, as evidenced by MBL (8.0%), ESBL (30.0%), MDR (53.1%), and XDR (9.0%).

Discussion:

Acinetobacter infections have emerged as nosocomial pathogen and a major cause of hospital acquired infections worldwide.[4]Among all species, *Acinetobacter baumannii* is the most clinically significant pathogen that responsible for the transmission and antimicrobial resistance. The *Acinetobacter* species is able to survive on inanimate surfaces for prolonged time periods and accelerates its transmission in health-care set up. Hence, it can be easily detected on health care set up items like sinks, floors, cupboards, bed linens, mattresses, bed rails, curtains, hospital trolleys, and ventilation equipment such as respirators and AMBU bags.[5]

The MDR *Acinetobacter spp.* are emerging as a severe nosocomial infection particularly in the ICUs. The multidrug-resistant (MDR) *Acinetobacter spp.* usually shows resistant to Penicillin, Cephalosporins, Fluoroquinolones, and Aminoglycoside. The extensive drug resistant (XDR) *Acinetobacter spp.* shows resistant to Beta lactams and Beta lactamase inhibitors and Carbapenems (IPM and MRP).

In present study, 129 *Acinetobacter baumannii* were isolated from all samples. And no gender preponderance was observed. Most of the *Acinetobacter* were observed in patients with severe illness. Highest antibiotic resistance was observed in Ciprofloxacin (86%, n=112) followed by Cotrimoxazole (71%, n=92). In present study, Carbapenem resistance among *Acinetobacter spp* was 10% (n=14). Among 14 Carbapenem resistant Acinetobacter baumannii, 9 (64%) organisms isolated from samples of ICUs. MDR Acinetobacter

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baumannii were 53% and Metallo-beta-lactamase organisms were 8%.

A study by Jean Uwingabiye et al observed that among 964 patients hospitalized in the ICUs, 81 developed *Acinetobacter baumannii* infections and septic shock and older age was significantly associated with mortality risk in patients with *Acinetobacter baumannii* infections.(1) Another study by Vikas Manchanda et al on MDR *Acinetobacter* stated that prolonged hospital stay, mechanical ventilation, recent surgery, invasive procedures, underlying illness could be the commonest risk factor for developing CRAB infection.(6) A study by Tanvir Kaur et al noticed that out of 298 clinical samples from ICU patients, *Acinetobacter species* were 42% and more than 95% of *Acinetobacter species* were CRAB.(7) A Study published by Ajay Kumar et al observed that out of 474 newborns admitted in neonatal ICU, *Acinetobacter baumannii* were 65(13.7%); 33(7%) of these were CRAB.(8) And A study by C Routsi et al stated that among 842 consecutively admitted ICU patients with an ICU stay of more than 48 hours, 96 developed *Acinetobacter baumannii* infections, 66 due to Carbapenem sensitive *Acinetobacter baumannii* and 34 due to Carbapenem resistant *Acinetobacter baumannii*. And the mortality rate for patients with CRAB infection was 45.8%. Patient who dies were older and were more likely to have additional intravascular devices than patients who survived. (3)

In present study, MDR *Acinetobacter baumannii* were 53% and extended spectrum beta lactamase (ESBL) were 30%. Metallo beta lactamases (MBL) and XDR organisms were minimal. In a study by Ruturaj M Kolhapure noted that 91.6% and Najir et al study noted that 95.9%. This variation could be due to sample size, hospital set up, infection control measures and antibiotic usage for longer time.(9,10)

Conclusion:

High frequency of drug resistance to commonly used antibiotics is observed. Surveillance should be done periodically in hospitals and their antibiotic policy should be updated at regular intervals. Hospital Infection prevention control measures which includes hand hygiene & strict standard precautions shall be implemented to prevent nosocomial infections. And high end antibiotic audits shall be included in hospitals to curtail the resistance among organisms.

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