PREVALENCE OF MBL AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF ACINETOBACTER ISOLATES FROM A TERTIARY CARE HOSPITAL, ASSAM, INDIA

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ABSTRACT

BACKGROUND

Acinetobacter infection have been clinically prominent pathogen in tropical countries have caused recurrent problems during wars and natural disasters and have recently caused multihospital outbreaks. Rational use of antimicrobial agents is clinically important to prevent Acinetobacter infections as well as to avoid poor outcomes.[1]

The aim of the study is to see the prevalence of Acinetobacter as a pathogen in this tertiary care hospital, their susceptibility pattern along with prevalence of metallo-beta-lactamase.

MATERIALS AND METHODS

The samples were processed for a period of one year. Samples were collected from ICU including urine, sputum, endotracheal aspirate, BAL, blood, pus, body fluids (pleural fluid, CSF, etc.) and the stool specimens were plated using appropriate culture media (MAC, BA, CLED, XLD).

RESULTS

Shows Acinetobacter baumannii is the significant species isolated is ICU among 700 cases, which yielded only 100% sensitivity to commonly used antibiotics. So, it is the need of the hour to implement infection control measures in a serious and intensive way.

CONCLUSION

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KEYWORDS

Acinetobacter, MIC, Metallo-Beta-Lactamase, Antimicrobial Susceptibility.

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BACKGROUND

Acinetobacter is an opportunistic pathogen associated with a wide spectrum of infection including nosocomial pneumonia, meningitis, endocarditis, soft tissue infections, UTI, conjunctivitis, burn, wound infection and bacteraemia. Acinetobacter infection has been clinically prominent in tropical countries have been recurrent problems during wars and natural disasters and have recently caused multihospital outbreaks in temperate climates.

In the hospital environment, Acinetobacter baumannii can colonise the respiratory, urinary and the GI tract and wound of patients can cause infections in trauma, fever, mechanically ventilated and immune compromised patients. It shows special prediction for the ICU.[2] The epidemiological, clinical, prognostic and therapeutic characteristics of Acinetobacter baumannii isolated from infected patients have been studied widely in the last decade. The most alarming problems encountered during this period are the organism ability to accumulate diverse mechanisms and the emergence of strains that are resistant to all commercially available antibiotics coupled with the lack of newer antimicrobial agents in the pipeline. This has resulted in a limited choice of antibiotics for treatment of multidrug-resistant isolates of A. baumanni.[3]

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MATERIALS AND METHODS

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Standard culture methods were used and isolates with gram-positive and gram-negative characteristics were processed for identification.[3,4] The Acinetobacter isolate were thus identified for their antibiotic sensitivity patterns in the VITEK-2 compact. The antibiotics tested against the organism were amikacin, gentamicin, netilmicin, tobramycin, ceftazidime, cefepime, cefoperazone-sulbactam, piperacillin and tazobactam, imipenem, meropenem, colistin, polymyxin B and tigecycline. MBL detection was done by identification

strip obtained commercially, their antibiograms studied for their susceptibility patterns with special reference to MIC. Clinical correlation was determined as criteria to establish it as a pathogen. Analysis of A. baumannii was done by CDC guidelines as a role in the causation of hospital-acquired infection.[5]

RESULTS AND OBSERVATION

A total of 700 clinical specimens from varied clinical samples and department were screened. Following observations were made from the study.

Age and Sex Distribution of Total Cases

About 60% were males and 40% were females with a male and female ratio of 2:1. Majority of cases belong to the age group of 20-40 years. Highest number of specimen belong to the age group of 20-40 years. Highest rate of specimens belong to respiratory samples 30% followed by blood 15%, urine 12%, wound swab 10% and body fluid 10%.

Acinetobacter	
Total number of cases	**Number (%)**
700	28 (4%)

Table 1. Acinetobacter

As can be seen from literature, Acinetobacter baumannii was predominant Acinetobacter spp. (90%) followed by Acinetobacter lwoffii. Acinetobacter species isolated from ICU was 80%, but other hospitalised patients showed lower isolation rates. Acinetobacter baumannii complex was the predominant isolate in wound swab and urine also.

No MBL producers were isolated. Sex distribution of total cases showed most of the cases 60% were males and 40% were females with a male:female ratio of 2:1. The majority of cases belong to the age group of 20-40 years. Highest number of specimens belong to respiratory samples 35% followed blood 15%, urine 12%, wound swab 10% and body fluid 10%.

The results of the sensitivity tests showed that all were sensitive to polymyxin B (100%) followed by colistin 85%. Tigecycline and minocycline were the next most effective antibiotics followed by amikacin and cefoperazone-sulbactam.

The highest resistance was seen in piperacillin and tazobactam about 60% followed by aztreonam and doxycycline.

Antibiotics	Sensitive %	Int. Sensitive %	Resistant % (No.)
COT	57.14% (16)	0	42.85% (12)
LE	28.57% (8)	25% (7)	46.43% (13)
CIP	46.43% (13)	3.57% (1)	50% (14)
AK	71.93% (20)	3.57% (1)	42.85% (12)
GEN	57.14% (16)	0	42.85% (12)
DOX	42.86% (12)	0	57.14% (16)
CAZ	53.57% (15)	0	46.43% (13)
CPM	53.57% (15)	0	46.43% (13)
AMP+S	64.85% (18)	0	46.43% (13)
CPZ+S	28.57% (8)	21.43% (6)	14.29% (4)
PIT	82.14% (23)	0	71.93% (4)
MC	82.14% (23)	14.29% (4)	3.57% (1)
AZT	10.71% (4)	3.57% (1)	14.29% (4)
IPM	53.57% (15)	25% (7)	60.71% (17)
MPM	53.57% (15)	3.57% (1)	42.85% (12)
PB	100.00% (28)	3.57% (1)	42.85% (12)
COLISTIN	92.85% (26)	0	42.85% (12)
DPM	57.14% (16)	0	0

Table 2. Antibiotic Sensitivity of 28 Acinetobacter Baumannii Complex

DISCUSSION

Acinetobacter baumannii was isolated in 4% of cases out of 700 samples. In sputum samples, highest isolation rates of 35%. Studies similar to this were carried out by Pederson et al where the maximum isolates were obtained from sputum as 26.3%. Villers et al have also reported a predominance of A. baumannii in tracheobronchial secretions as 24.8 to 48.8% and Serviat et al as 95.6%.[6] The ICU also showed the maximum yield of A. baumannii from the respiratory samples 59.6% followed by blood 25.2%. Siar et al reported in their ICU isolates that respiratory tract was the most common site from which Acinetobacter was isolated. The result corroborates the fact that a lot of risk factors associated with Acinetobacter infection exists in the ICU like potential environmental resource for A. baumannii, opportunities for cross-transmission, sick, immunocompromised patients who are colonised, patients having multiple wounds and indwelling devices, heavy use of broad-spectrum antibiotics and frequent contamination of the hands of healthcare workers. An attempt was made in this study to distinguish clinical infection from colonisation. Out of 28 isolates, 24 proved to be pathogenic.(7) This was done by correlating various clinical and lab parameters and discussion with the clinician. Similar isolation rates were made by Sivaranjani V et al.[8] The most common source of isolation of Acinetobacter was found to be wound swabs. Acinetobacter species associated infections in urine and pus by Nazmul MHM et al in 2010 in Malaysia shows a similar observation. In our study, A. baumannii was the commonest species isolated. A study in North India by Sinha et al reported similar observation. In our study, A. baumannii complex were sensitive to polymyxin B followed by colistin. Tigecycline and minocycline were the next most effective antibiotics followed by amikacin and cefoperazone-sulbactam. Similar observation was seen in study done by Biglari S et al and R.B. Patwardhan et al (2008) reported Acinetobacter spp. were 100% (36) sensitive to polymyxin B.

CONCLUSION

The study provided us with the information that Acinetobacter constitute the highest isolation from ICU. Its ability to survive in a hospital milieu and its ability to persist for extended periods of time on surfaces makes it a frequent cause for healthcare-associated infections particularly seen

in patients who undergo invasive procedures. So, an effective empirical drug regime can be tailored to prevent drug resistance and thus the mortality and morbidity in hospital-acquired infection.

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