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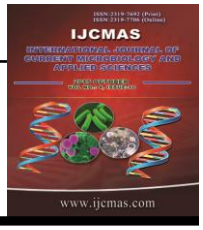

Original Research Article

Characterization and Antibiotic Sensitivity Pattern of *Acinetobacter* Species from Various Clinical Samples in a Tertiary Care Hospital

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A B S T R A C T

Acinetobacter spp has emerged as an important nosocomial pathogen. Although frequently considered as contaminants, the pathogenic potential has been proved beyond doubt by their frequent isolation from clinical sample and their association with disease. They exhibit resistance not only to beta lactamase and cephalosporins but also to carbapenems. Objectives of the study are: to isolate and characterize the *Acinetobacter* spp from various clinical samples and to know their antimicrobial sensitivity pattern. The present study was conducted from May 2013 to April 2014 at S N Medical College, Bagalkot. The *Acinetobacter* spp were identified using a standard protocol. Antimicrobial sensitivity testing was done by Kirby bauer disc diffusion method. The predominant isolate was *Acinetobacter baumanii* followed by *Acinetobacter lwofii*, *Acinetobacter haemolyticus* and *Acinetobacter junii*. Most of the strains were sensitive to imipenem (85%) and least sensitive ceftazidime (20%) and Co-trimoxazole (20%). *Acinetobacter* spp are involved in wide spectrum of diseases and development of resistance to commonly used antimicrobials has further worsened the situation. Therefore it is essential to identify *Acinetobacter* spp and to know their trends in sensitivity.

Introduction

Acinetobacter spp play a significant role in the colonization and infection of patients admitted to hospitals. They have been implicated in a variety of nosocomial infections. Of all the infections, nosocomial pneumonia is the predominant infection. Infections caused by Acinetobacter are extremely difficult to treat because of the widespread resistance of these bacteria to major groups of antibiotics (Bergogue-Berezin *et al*., 1996; Prashanth, *et al*., 2006; Prashanth, *et al*., 2004).

Despite the increasing significance and frequency of multiresistant Acinetobacter infections, many clinicians and microbiologists still lack an appreciation of the importance of these organisms in hospitals (Prashanth, *et al*., 2006; Prashanth, *et al*., 2000).

Knowledge of the distribution of various species in relation to the variety of infection in hospital setup and their antimicrobial profile is of utmost importance for effective

treatment of infection caused by the pathogen (Mindolli *et al*., 2010; Capoor *et al*., 2005; Anupurba *et al*., 2005). Therefore the study was undertaken to characterize Acinetobacter isolates and to determine their antimicrobial susceptibility pattern.

Materials and Methods

The study was carried out in the department of microbiology, S N Medical College, Bagalkot from May 2013 to April 2014. One hundred and twenty isolates were obtained from different clinical samples.

All the samples were inoculated on to Blood, Mac-Conkey agar and incubated at 37^0c for 24 – 48 hours. Urine was plated on to CLED medium. For the blood samples, brain heart infusion broth was used as a primary culture medium. All non lactose fermenting colonies were subjected gram staining, oxidase test, hanging drop and catalase test. Gram negative bacilli or coccobacilli, that were oxidase negative, nonmotile and catalase positive were identified as Acinetobacter species. Characterization of the isolates was done using standard methods (Gerner-Smidt p *et al*.,1993).

Antimicrobial susceptibility testing was done by Kirbybauer disc diffusion laboratory standards institute. Antibiotics used were Amikacin (30g), Ceftazidime (30g), Ciprofloxacin (5g), Co – trimoazole (1.25/23.75g), Gentamicin (10g), Meropenem (10g), Piperacillin – tazobactum (100/10g).

Results and Discussion

A total of 1600 samples were processed during the study period. Acinetobacter species accounted for 7.5% of total number isolates.

In our study 40 isolates were from surgical wards followed by ICU 32, paediatric ward 38, medical ward 20 and 6 isolates were from burn ward.

Acinetobacter spp were most commonly isolated from pus samples (46) followed by urine (32), sputum (14), ET tube (14), Blood (12) and 2 from pleural fluid as shown in table no 1.

Out of 120 isolates of Acinetobacter species 60 were *Acinetobacter baumanii*, 26 *Acinetobacter lwofii*, 20 *Acinetobacter haemolyticus* and 14 *Acinetobacter junii* as shown in table 2.

Most of the isolates were sensitive to imipenem (85%) followed by Amikacin (54%) and Ofloxacin (51%) as shown in table 3 and 4

Acinetobacter has gained clinical importance because of their capacity to cause nosocomial infections particularly outbreaks in Icu's. They are often multidrug resistant and associated with life threatening infections especially in patients with factors that impair normal host resistance.

In our study maximum number of isolates were from pus samples (46) followed by urine sample (32), sputum (14), ET tube (14) and blood (12). Most of the isolates were from patients admitted in surgical wards and ICU, who have undergone invasive procedure or surgery or on higher generation antimicrobial drugs. Around 26% strains were isolated from ICU in our study, which is similar to the study conducted by Mindolli *et al*., 2010

All the 120 isolates of *Acinetobacter spp* in the present study were characterized and antibiotic susceptibility pattern was determined. *Acinetobacter spp* accounted for 7.5% of total positive culture. *Acinetobacter*

baumanii strains were 60, *Acinetobacter lwofii* 26, *Acinetobacter haemolyticus* 15 and 06 were *Acinetobacter junii*.

In general, *Acinetobacter spp* appear inert in the typical tests used for fermentative gram negative bacilli. Phenotypic methods for *Acinetobacter spp* characterization are not totally reliable. New molecular methods have come up for speciation, but these techniques will not be available in all the clinical microbiology laboratories.

Table.1 Acinetobacter isolates from different clinical specimens

Specimens	No	%
Pus	46	38.3
Urine	32	26.6
Sputum	14	11.6
ET tube	14	11.6
Blood	12	10
Pleural fluid	2	1.6

Table.2 Acinetobacter identification scheme

	Growth at		Haemolysis	Gelatin hydrolysis	OF dextrose	Citrate	Arginine	Malonate	C
	37°c	44°c							
A baumanii	+	+	-	-	+	+	+	+	-
A haemolyticus	+	-	+	+	V	+	+	-	-
A junii	+	-	-	-	-	+	+	-	-
A lwofii	+	-	-	-	-	-	-	-	+

Table.3 Acinetobacter bacilli in clinical specimens n=120

Isolate	No	%
A. baumanii	73	60.8
A. lwofii	26	21.6
A. haemolyticus	15	12.5
A. junii	06	05

Table.4 Antibiotic sensitivity pattern of *Acinetobacter spp* n= 120

Antibiotic	No.sensitive	% sensitive
Imipenem	102	85
Amikacin	65	54
Ofloxacin	61	51
PIT	49	41
Gentamicin	34	29
Ceftazidime	24	20
Co-trimoxazole	24	20

So the laboratories with limited resources can rely on the phenotypic tests described by Gerner-Smidt *et al*., 1993 which are almost as accurate as that of the genotypic methods except for few species. All the isolates were subjected to simplified tests as described by Gerner-Smidt *et al*. Tests for growth at 37^0c & 44^0c were performed in brain heart infusion broth in a water bath. Sheep blood agar plates were used to detect haemolysis. Glucose oxidation was determined in OF medium. The assimilation tests were performed in a liquid medium containing mineral base with appropriate carbon source.

Acinetobacters are known to possess a low potential for virulence. It is their resistance to various antimicrobials, that limits the selection of appropriate drugs for the effective managemnet, thus allowing themselves as a difficult organism to control and treat. In our study most of the strains were sensitive to Imipenem (85%) followed by Amikacin (54%), Ofloxacin (51%) and Piperacillin tazobactum (41%). The isolates were least sensitive to Gentamicin (29%), Ceftazidime (20%) and Co-trimoxazole (20%). This susceptibility pattern conforms to the recent introduction of these antibiotics in our hospital. Increasing resistance to cephalosporins was observed in our study. This is similar to the study conducted by Mindolli *et al*., 2010 and K Prashant *et al*., 2004.

Acinetobacter baumanii and *Acinetobacter lwofii* were the commonest species isolated in our study. Their role as nosocomial pathogen is well established. Acinetobacter species will have varying resistance patterns depending upon the hospital antibiotic policies. Therefore identification of *Acinetobacter spp* and monitoring their susceptibility pattern are important for proper management of these infections caused by them.

Reference

Anupurba S, Sen MR. Antimirobial resistance profile of bacterial isolates from ICU: changing trends. J Commun Dis 2005; 37(1):58-65.

Bergogue –Berezin E, Towner KJ.Acinetobacter species as nosocomial pathogen: Microbiological, Clinical and epidemiological features. Microbiol Rev 1996; 9:148-65.

Capoor MR, Nair D, Srivastava L, Gupta B, Aggarwal P. Characterization and changing minimum inhibitory concentration of Acinetobacter species from a tertiary care set up. J Commun Dis 2005; 37(2): 99-107.

Gerner- Smidt P, Tjernberg I, Ursing J. Reliability of phenotypic tests for identification of Acinetobacter species.J ClinMicrobiol 1991; 29: 277-282.

Gerner- Smidt P, Frederiksen W. Acinetobacter in Denmark: Taxonomy, antibiotic susceptibility and pathogenecity of 112 clinical strains. APMIS 1993; 101: 815-825.

Mindolli PB, Salmani MP, G Vishwanath and AR Hanumanthappa. Identification and Speciation of AcinetobacterAnd Their Antimicrobial Susceptibility Testing. Al Ameen J Med Sci 2010; 3(4): 345-49.

Prashanth K, Badrinath S. Nosocomial infections due to Acinetobacter species: Clinical findings, risk and prognostic factors. Indian J Med Microbiol 2006; 24:39-44.

Prashanth K, Badrinath S. Invitro susceptibility pattern of Acinetobacter species to commonly used cephalosporins, quinolones and aminoglycosides. Indian J Med Micobiol 2004;22(2):97-103.

Prashanth K, Badrinath S. Invitro susceptibility pattern of Acinetobacter species and their antimicrobial suceptibility status. J Med Microbiol 2000; 49: 773-8.