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PREVALENCE OF *ACINETOBACTER* SPECIES AND ITS ANTIBIOGRAM PATTERN IN A TERTIARY CARE HOSPITAL, TIRUPATI, ANDHRA PRADESH

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Abstract: Background: The species belonging to the genus *Acinetobacter* are currently reported as opportunistic pathogens and shows multidrug resistance in hospitalized patients. The aim of this study was to isolate the clinical *Acinetobacter* species from NFGNB (Non Fermentative Gram Negative Bacilli) other than *Pseudomonas* and analyze their antibiogram (antibiotic susceptibility) patterns. This study helps to know the persistence of antibiotic resistance and decide the optional treatment feasible for *Acinetobacter* infections. **Materials and Methods:** *Acinetobacter* species were isolated and identified by standard methods. For isolated cultures antibiotic susceptibility pattern was determined by the standard disc diffusion method (Kirby-Bauer's disc diffusion method). **Results:** The total number of *Acinetobacter* species isolated during one year period was 235 (79.93%) from 294 NFGNB. The *Acinetobacter* species was predominant in catheter tip 95 (40.42%) followed by pus 42 (17.87%), samples. This study shows first-rate susceptibility to tigecycline (100%) and followed by imipenem 73.18%. **Conclusion:** This study states that there is an emergence of *Acinetobacter* species with increased rate of multidrug resistance in the area of study. Hence, it is important to determine *Acinetobacter* species form NFGNB in the neglected area and do further antibiotic susceptibility test for accurate treatment.

Keywords: *Acinetobacter* species, multidrug resistance, NFGNB (Non fermentative Gram Negative Bacilli)

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INTRODUCTION

The genus *Acinetobacter* is gram-negative coccobacilli, non-motile, catalase positive and oxidase negative. [1] In earlier days most clinical isolates were susceptible to commonly used antibiotics, so that infections caused by these organisms could be treated relatively easy. [2] But in the present days *Acinetobacter* infections have increased and gained more attention because of its prolonged environmental survival and tendency to develop drug resistance. In many clinical microbiology laboratories, non-fermentative gram negative bacilli (NFGNB) other than *Pseudomonas aeruginosa* are not taken seriously as a pathogen. [3] Though, this study was designed to alarming the emergence of multidrug resistant *Acinetobacter* species in our area.

MATERIALS AND METHODS:

A total of 294 NFGNB (Non fermentative gram negative bacilli) other than *Pseudomonas* species were obtained from the routine clinical microbiology laboratory during December 2012 to December 2013. Conventional bacteriological methods were used for identification of *Acinetobacter* species from reported NFGNB. Identification of the genus *Acinetobacter* was done using five preliminary tests, viz. Gram stain character, motility test, oxidase test, catalase test and capsule staining and was classified as presumptive *Acinetobacter* species and phenotypic identification was performed by biochemical tests.[4,5] Antimicrobial susceptibility testing was carried out with the disc diffusion method using current CLSI recommendations [6]. Antibiotics included were amikacin (30 µg), amoxy clav(20/10µg), ampicillin (10µg), aztreonam(30µg), cefoperazone-sulbactam(75/10µg), cefepime(30µg), cefotaxime (30 µg), ceftazidime (30 µg), chloramphenicol (30µg), ciprofloxacin (5 µg), cotrimoxazole (25µg), gentamicin (30µg), imipenem (10µg), nalidixic acid (30µg), nitilmicin (30µg), nitrofurantoin (30µg), piperacillin-tazobactam (100/10 µg), tigecycline (30µg) as well as others with known antimicrobial susceptibility pattern.

RESULTS:

From the 294 NFGNB isolates, 235(79.93%) of isolates were confirmed as *Acinetobacter* species. Catheter tip 95 (40.42%) was most common source of *Acinetobacter* species followed by pus 42 (17.87%) (Figure1). The resistance rate is high for third generation cephalosporins including, ceftazidime, cefotaxime, cefepime and monobactam includes aztreonam then second generation antibiotic (cefoxitin). Carbapenem (imipenem) resistance (16.36%) was observed (Table 1). In this study multidrug resistance is relatively very high and tigecycline is one of the efficient antibiotic followed by imipenem to treat infections caused by multidrug resistant isolates of *Acinetobacter* species.

DISCUSSION:

Acinetobacter species has become one of the significant nosocomial infectious organisms [7, 8] and fasted budding opportunistic infectious organisms in ICU patients [9] and the *Acinetobacter* spp were survive in highly prone areas.^[10] Due to inappropriate treatment of infections caused by *Acinetobacter* species the mortality rate was reported as 54.4%.[11] *A.baumannii*, has become a red alert human pathogen, because of ability to develop resistance to all currently used antibiotics.[12] *A.baumannii* is one of the predominant to cause infections and other species belonging to the genus *Acinetobacter* are comparatively remarkable and are restricted to catheter associated bloodstream infections.[13] Our study also reflects more number (40.42%) of isolates from the catheter associated infections. The resistance rate towards the third generation cephalosporins includes ceftazidime was very high 97.43%. Nidhi *et al.* [14] noticed that 100% resistance towards the ceftazidime from the lower respiratory tract of ventilated patients in the intensive care unit. Our reports are quite low while compare with Nidhi *et al* [14] and very high with the reports Nourkhoda Sadeghifard *et al.* [15] as 66% resistance to 3rd generation cephalosporins from Tehran. *Acinetobacter* species isolated from urinary tract infections 48% were resistant to nalidixic acid[16] 100% were resistant to Nitrofurantoin and this was highly sensible.[17] We found 53.12%, 50% resistance to nalidixic acid and nitrofurantoin respectively. From the Western India, 19.49% of resistance was noticed towards chloramphenicol, isolates isolated from the skin of tribal healthy population 19.49% resistance were reported against to chloramphenicol [18] and we found 78.20% resistance in infected patients. In a study from Mumbai showed 29% of clinical isolates of *Acinetobacter* species were resistant to imipenem. [19] In another study from North India, 18.5% of *Acinetobacter* species were resistant to imipenem in tertiary health care centre, [20] and 100% resistance to imipenem in a South Indian tertiary care hospital.[21] We observed 16.66% of imipenem resistance isolates, and our reports are low when compared with other studies within India.

Similar to our observations, one study was noticed that good sensitivity rate to tigecycline. [22] We detected a high level of resistance in *Acinetobacter* species to most antibiotics tested and the rate of resistance in *Acinetobacter* species to tigecycline was nil and imipenem was low.

CONCLUSION:

We concluded that *Acinetobacter* species are the most common organisms in NFGNB (other than *Pseudomonas* species). So strong need is there to identify the *Acinetobacter* species instead of NFGNB (Non Fermentative Gram Negative Bacilli) or other miscellaneous microorganisms in the neglected area and do further antibiotic susceptibility test for accurate

treatment and appropriate infection control measures is necessary to control the spread of such infections in hospital.

Tables and Figures legends

Table1: Antibiotic sensitivity pattern of *Acinetobacter* spp.

<i>S.No</i>	<i>Antibiotic</i>	<i>Sensitive N (%)</i>	<i>Intermediate N (%)</i>	<i>Resistance N (%)</i>
1.	amikacin (N= 235)	112 (47.63)	11 (4.72)	112 (47.63)
2.	amoxy clav(20/10µg) (N= 235)	33 (14.04)	0(0)	202 (85.95)
3.	ampicillin (10µg) (N= 235)	11 (4.68)	0 (0)	224 (95.31)
4.	aztreonam(30µg) (N= 78)	0 (0)	01(1.28)	77 (98.70)
5.	cefoperazone-sulbactam (75/10µg) (N= 235)	90 (38.29)	33 (14.04)	112 (47.63)
6.	cefepime(30µg) ((N=78)	01 (1.29)	0(0)	77 (98.70)
7.	cefotaxime (30 µg) (N=235)	66 (28.08)	05 (2.12)	164 (69.78)
8.	cefoxitin (30µg) (N= 78)	18 (23.07)	05 (6.41)	55 (70.51)
9.	ceftazidime (30 µg) (N=78)	02 (2.56)	00 (0)	76 (97.43)
10.	chloramphenicol (30µg) (N=78)	10 (12.82)	07 (8.97)	61 (78.20)
11.	ciprofloxacin (5 µg) (N= 235)	73 (30.06)	07 (2.97)	155 (65.95)
12.	co-trimoxazole (25µg) (N=235)	65 (27.65)	05 (2.12)	165 (70.21)
13.	gentamicin (30µg) (N=235)	98 (41.66)	16 (6.80)	121 (51.48)
14.	imipenem (10µg) (N=78)	57 (73.07)	08 (10.25)	13 (16.66)
15.	nalidixic acid (30µg) (N=32)	15 (46.87)	0 (0)	17 (53.12)
16.	nitilmicin (30µg) (N=78)	32 (41.02)	01 (1.28)	45 (57.69)
17.	nitrofurantoin (30µg) (N=32)	16 (50)	0 (0)	16 (50)

18.	piperacillin-tazobactam (100/10 µg) (N=219)	121 (55.25)	22 (10.04)	76 (34.70)
19.	tigecycline (N= 78)	(78) 100	0 (0)	0 (0)

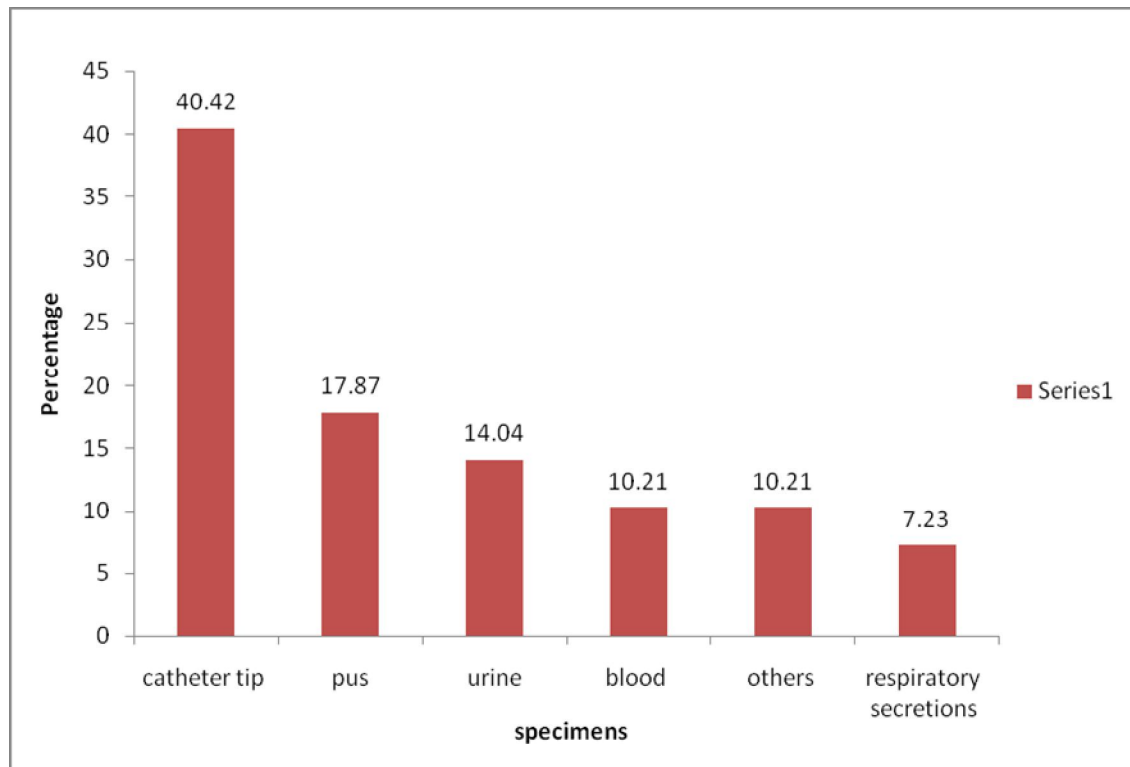


Figure1: *Acinetobacter* spp. isolated from various specimens

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