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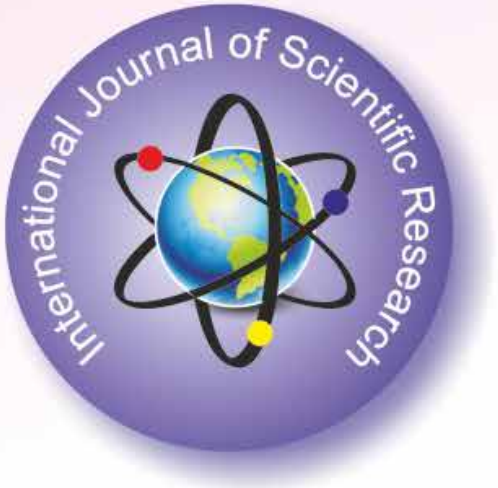

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Research Paper

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Isolation And Antibiotics Susceptibility Patterns Of Acinetobacterbaumannii From Various Clinical Samples In Tertiary Care Hospital, Jamnagar , Gujarat.

Medical Sciences

KEYWORDS :Acinetobacter baumannii, Antimicrobial resistance, Nosocomial infection

Dr. Hiral Y Shah	MBBS ,MD-Microbiology, Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat
Dr. Viral P Shah	MBBS ,MD-Microbiology, Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat
Dr. Hiral MGadhavi	MBBS ,MD-Microbiology, Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat
Dr. NeetuA Mundra	MBBS, Resi.Microbiology, Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat
Dr. Hitesh K Singala	MBBS,MD-Microbiology Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat
Mala sinha	MBBS,MD-Microbiology Department of Microbiology, M.P Shah Medical College, Gurugobindsingh Hospital, Jamnagar, Gujarat

ABSTRACT

New organisms have attained an increasingly greater attention of microbiologist and clinicians. Acinetobacter baumannii is known to have more importance because of their role in wide spectrum of nosocomial infections like; Bacteremia, Ventilation associated pneumonia, UTI, wound infections, secondary meningitis etc. Antimicrobial resistance studies are world-wide necessity to assist local physicians in prescribing empirical therapy. In this study various clinical samples like Pus, Blood, Urine and Endotracheal tube secretion were plated on MacConkey agar and Blood agar plates. Acinetobacter baumannii were detected on basis of pale colony on MacConkey agar, Gram negative coccobacilli on smear, Non-motile, Oxides negative, non glucose fermenter in Hugh & leifson test (O-F test) and growth at 37c and 44c. A total of 123 strains of A. baumannii from total 4033 positive samples (3.05%) were isolated. Antibiogram results to 12 antimicrobials showed that A. baumannii is maximum sensitive to Imipenem(84%) which is followed by Ciprofloxacin(70%), Ticarcillin-clavulanate(66%), Amikacin(62%), Tobramycin(61%), Netilmycin(58%), Piperacilin(53%), Gentamicin(44%), Ceftazidime(43%), Cefotaxime(36%), Cefoperazone(33%) and least sensitive to Cefepime (27%) .

INTRODUCTION

Acinetobacter species are Gram negative nonfermentative bacteria commonly present in soil and water as free living saprophytes(1). Acinetobacter baumannii is able to survive on various surfaces in the hospital that are abiotic, wet, or dry. A. baumannii is capable of forming biofilm on glass and plastic surfaces via pili formation. The production of biofilm may explain how A. baumannii can survive in different types of conditions in the hospitals, including static conditions such as bed sheets and furniture while also capable of living in harsh conditions such as catheters and respiratory tubes(5,9). Acinetobacter baumannii is the second most frequent nonfermenter encountered in clinical laboratories(10). Acinetobacter baumannii tend to be resistant to a variety of antibiotics. There is almost universal resistance to penicillin, ampicillin and cephalothin and most strains are resistant to chloramphenicol(10,2). Antibiotics susceptibility testing for Acinetobacter species is problem-prone.

MATERIAL AND METHOD

This study was conducted in the department of Microbiology, of Guru- Gobindsingh Hospital, Jamnagar from January 2010 to June 2011.Various clinical samples received in Microbiology department of Guru- Gobindsingh Hospital, Jamnagar during January 2010 to June 2011 were tested to isolate Acinetobacter baumannii to detect antibiotic sensitivity pattern.

Specimen Collection, Culturing and Identification:

In this study various clinical samples like Pus, Blood, Urine and Endotracheal tube secretion were taken with aseptic precaution and transport to laboratory as soon as possible without delay. All the samples were plated on MacConkey agar and Blood agar plates. The culture plates were incubated aerobically for 24 hrs at 37°c and 44°c. After overnight incubation at 37^0c and 44^0c, on MacConkey media, non-lactose fermenting, pale colonies were observed & On Blood agar, it produced small gray, smooth, opaque, convex and creamy colonies were observed. On next day gram negative coccobacilli, Non-motile, Oxidase negative, in TSI test alkaline slant and butt reaction and non-glucose fermenter in Hugh & leifson test (O-F test) were considered as Acinetobacter baumannii isolates.

Antimicrobial Susceptibility Testing:

Antimicrobial susceptibility of the isolates was determined by means of the Kirby-Bauer disc diffusion method, according to guidelines established by Clinical and Laboratory Standards Institute (CLSI). The following antimicrobial agents were used in this study (Table-1). The diameter of inhibition zone were measured by placing the plate against a ruler and report the result as “sensitive”, “intermediate sensitive” or “resistant” .

Table-1

Antibiotics	Disc content	Zone diameter (in mm)		
		Resistant	Intermediate	Susceptible
Amikacin (AN)	30µg	≤10	15-16	≥17
Gentamicin (G)	10 µg	≤12	13-14	≥15
Piperacillin (PIP)	100 µg	≤17	18-20	≥21
Imipenem (I)	10 µg	≤13	14-15	≥16
Netilmycin (NET)	30 µg	≤12	13-14	≥15
Cefoperazone (CFP)	75units	≤15	16-20	≥21
Ticar+ Clavulenic acid (TR)	30 µg	≤14	15-20	≥21
Cefepime (CPM)	30 µg	≤14	15-17	≥18

Cefotaxime (CF)	30 µg	≤14	15-22	≥23
Ciprofloxacin (CIP)	5 µg	≤15	16-20	≥21
Ceftazidime (CPZ)	30 µg	≤14	15-17	≥18
Tobramycin (TB)	10 µg	≤12	13-14	≥15

RESULT & ANALYSIS

Out of total 4033 positive samples, 123 Acinetobacter baumannii isolates (3.05%) were recovered during the study period. The distribution of the isolates is shown in table-2 and table-3

Table-2
Isolation of A.baumannii from different clinical samples

Type of samples	No. of A.baumannii isolated	Percentage
Pus	67	54.47%
Blood	26	21.14%
Urine	17	13.82%
ET	08	6.50%
Sputum	03	2.44%
Others	02	1.63%
Total	123	100%

Table-2 shows that maximum clinical isolates of A.baumannii were isolated from Pus samples 67 (54.47%) , followed by Blood - (21.14%) ,urine -13.82% ,ET -6.50% ,sputum-2.44% & minimum from others (Tracheal aspiration, central line) were 1.63% .

Table-3
Isolation of A .baumannii from different wards

Ward	No. of A.baumannii isolated	Percentage
Surgical ward	69	56.10%
Medical ward	14	11.38%
Peadiatric ward	30	24.39%
I.C.U	01	0.81%
TB & Chest ward	02	1.62%
Orthopaedic ward	01	0.81%
Obs & Gynac ward	06	4.89%
Total	123	100%

Table-3 shows highest percentage (56.10%) of A.baumannii infections were observed in surgical ward, followed by pediatric ward – 24.39%, medical ward 11.38%, obs & gynac ward -4.88% and minimum from TB & Chest -1.62% and orthopaedic ward -0.81% .

Table-4
Sensitivity of Tested Antibiotics for A.baumannii isolates.

Name of Antibiotics	Sensitivity (In percentage)
Amikacin (AN)	62%
Gentamicin (G)	44%
Piperacillin (PIP)	53%
Imipenem (I)	84%
Netilmycin (NET)	58%
Cefoperazone (CFP)	33%
Ticar + Clavulenic acid (TR)	66%
Cefepime (CPM)	27%
Cefotaxime (CF)	36%
Ciprofloxacin (CIP)	70%
Ceftazidime (CPZ)	43%
Tobramycin (TB)	61%

Table -4 shows that A. baumannii (total-123) isolated from various clinical samples ,maximum sensitive to Imipenem (84%) , followed by Ciprofloxacin (70%) ,TR-66% ,AN-62% , TB-61% ,NET-58% ,PIP -53% ,G -44% , CPZ-43% ,CF -36% , CFP -33% and least sensitive to CPM -27% .

DISCUSSION

Nonfermenter gram-negative bacilli that were considered to be contaminant in the past have now emerged as important health care associated pathogens. Acinetobacter baumannii are being recovered with increasing frequency from clinical specimens and must be considered as important agents for many infectious diseases.[10] The aim of this study was to assess the isolation frequency of Acinetobacter baumannii from various samples and to study the antibiogram of those isolates. In this study, the isolation rate of Acinetobacter baumannii was 3.05% which was comparable with the study of Mindolli PB et al(6) (3.32%) and Lone et al(8) (3.47%). In this study, maximum clinical isolates of A. baumannii were isolated from pus samples (54.47%) and from surgical ward (56.10%) Which were in line with study Mindolli PB et al [6] and study Lahiri et al [4] respectively. In present study, isolates of A.baumannii from ET, tracheotomy tube and central line are 8.13%, which suggest that infection was from hospital environment. In this study, total isolates of A.baumannii (123) were maximum sensitive to Imipenem (84%) and Antibiotics like Ciprofloxacin (70%), Ticarcillin-clavulanic acid complex (66%) and Tobramycin (61%) had also good sensitivity against A.baumannii. Over all, all cephalosporins like Ceftazidime, Cefotaxime, Cefoperazone and Cefepime had lower sensitivity against A.baumannii 43%, 36%, 33%, 27% respectively. This may be due to β-lactamases production, Chromosomally encoded Cephalosporinase (AmpC type) which is common to all strains of Acinetobacter spps. [7,3]

CONCLUSIONS

A strict attention to maintain and control of the environment and of the antimicrobial use, appears the measures most likely to control the spread of this organism in hospitals. Regular monitoring of the antibiogram of hospital pathogen is also recommended to keep physician updated on the proper empirical treatment of such rapidly evolving resistant pathogens.

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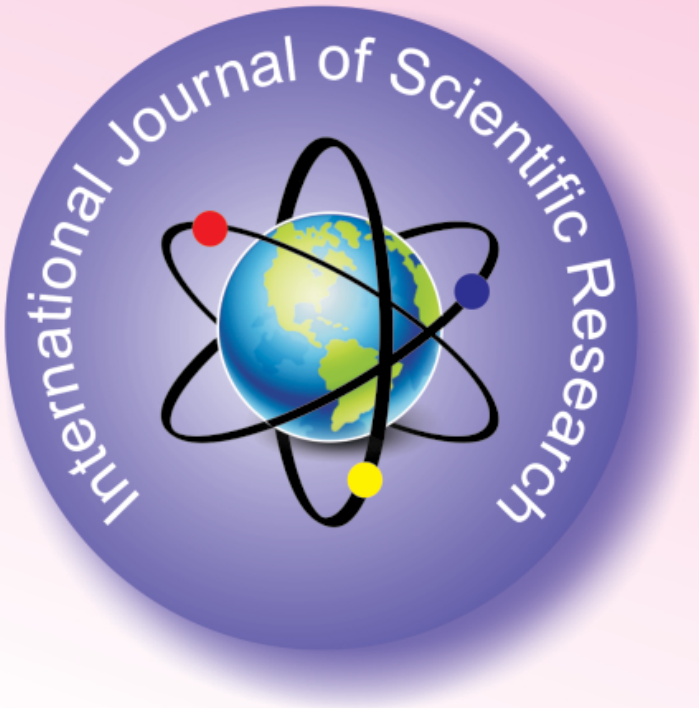

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