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### Original Article

# Spectrum of Non fermenting gram negative bacilli infection (excluding Pseudomonads) in tertiary care hospital.

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#### ABSTRACT

During the one year period of a total number of 15435 samples like urine, blood, sputum, wound swabs, catheter tips were processed for culture and sensitivity tests. Among the total 9261 pathogenic isolates, only 110 were reported as NFGNB. The prevalence among the culture positive infections being 1.18%. Among 110 isolates strains, 100 strains have been *Acinetobacter*s (90.91%), 6 strains of *Alkaligenes faecalis* (5.45%) and 4 strains *Stenotrophomonas maltophilia* (3.64%) were identified. 40 isolates from blood (85%) were *Acinetobacter* spp. *Acinetobacter baumannii* has been the predominant isolate (47.27%) in particular among those from blood, urine and sputum. The three most commonly recovered clinical genera are *Pseudomonas*, *Acinetobacter*, *Stenotrophomonas*. *Acinetobacter* spp. Play significant role in the colonization and infection of hospitalized patients. This organism causing variety of nosocomial infections including bacteremia, UTI, secondary meningitis particularly ventilator associated pneumonia (VAP) in ICU patients. In recent years multidrug resistance strains of NFGNB isolates studied, showed high level antibiotic resistance pattern in particular routinely used antibiotics. Resistance to Aminoglycosides and meropenam are alarming facts, lowest resistance was noticed for cefaperazone+sulbactam combination among all the genera.

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### 1. Introduction

The non fermenting gram negative bacilli (NFGNB) are a group of aerobic non spore forming bacilli that either do not use carbohydrates as a source of energy or degrade them through metabolic pathways other than fermentation. The NFGNB is used to mean clinical isolates of all aerobic gram negative rods that show abundant growth within 24 hrs on the surface of TSI medium, but neither grow in nor acidify the butt of this medium. The three most commonly recovered clinical genera are *Pseudomonas*, *Acinetobacter* and *Stenotrophomonas*. *Pseudomonas aeruginosa* can be identified easily by observing the typical large colonies with a blue green discoloration on primary isolation media and further confirmed by detecting a typical grape like odor, fluorescent pigment and cytochrome oxidase activity [1]. It is the most clinically significant bacteria among the NFGNB [2].

It is now recognized that *Acinetobacter* Sps Play a significant role in the colonization and infection of hospitalized patients. It is caused by variety of nosocomial infection including bacteremia, UTI, secondary meningitis, VAP in patients confined to hospital ICU. These species tend to be resistant to a variety of antibiotics. *Stenotrophomonas maltophilia* is the most frequently nonfermenter in clinical laboratories. It is typically resistant to most antibiotics but susceptible to Trimethoprim-Sulfamethoxazole and Colistin. Importance of *A. faecalis* bacteraemia was reported from United Kingdom (U.K), by Bizete J and Bizete C, in 2004. They reported about the importance of isolation of *A. faecalis* from clinical material [3,4].

Identification of non fermenters devised by Paul Schreckenberger is simple and uses biochemical formulations that are conventional and available commercially at many places (5). People who have weekend immune system, chronic lung or kidney diseases or diabetics are usually more susceptible to infections. Very ill patients and those with a prolonged hospital stay, cancer patients receiving treatment and those with open wounds are at high risk of developing hospital acquired infections (HAI) in

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particular with NFGNB. These category patients are the bulk at tertiary care hospitals. Adding to the problem of methicillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant enterococcus (VRE), extended spectrum beta-lactamases (ESBLs) producing gram negative bacilli have recently emerged out as the major causes of HAI in intensive care units (ICU) of tertiary care hospitals. The present study under taken is to know the prevalence of such infections at this place.

## 2. Material and Methods:

Non repetitive clinical isolates of NFGNB from various clinical samples like urine, blood, sputum, wound swabs, catheter tips etc collected during the one Year period (Table 1) were studied to identify and differentiate the species following standard methods and also their antibiogram as per NCCLS guidelines [6,7]. Materials used to perform this laboratory study were procured from standard manufactures like Himedia. Thus a total no of 110 non repetitive isolates were studied, one approach to studying the non fermenter is to group them on the basis of the presence or absence of motility and cytochrome oxidase reaction. The capability of an organism to reduce nitrates to nitrites is an important characteristic used in the identification, and species differentiation of many group of organisms.

## 3. Results

In the present study also among 110 NFGNB isolates, 100 isolates were Acinetobacters, 52(36.36%) were identified as a *A.baumannii*, 10 were *A. Iwoffii*, 38 belong to other Acinetobacter sps., other NFGNB like *Alkagenesis faecalis*, and *Stenotrophomonas maltophilia* (Table2) were infrequent being only 6 and 4 strains respectively.

**Table:1 Clinical samples that yielded growth of NFGNB**

Specimens	No. of isolates	Percentage(%)
Blood	40	36.36
Urine	28	25.45
Pus	14	12.72
Sputum	04	3.63
Body fluids	06	5.45
Catheter tips	18	16.36

**Table:2 Distribution of 110 isolates among various genera and species**

Name of isolates	No. and Percentage(%)
<i>A.baumannii</i>	52(42.27)
<i>A. Iwoffii</i>	10(9.10)
Other Acinetobacters	38(34.55)
<i>Alkaligenes faecalis</i>	06(5.45)
<i>Stenotrophomonas maltophilia</i>	04(3.64)

## 4. Discussion

Acinetobacter spp. Plays a significant role in the colonization and causing infections in hospitalized patients. It causes nosocomial infections including bacteraemia, UTI, and secondary meningitis. Patients in ICUs have nosocomial infection rates that are 5-10 times greater than those in the general wards. In ICU patients these infections more common. It is a predominant pathogen in nosocomial pneumonia particularly ventilator associated pneumonia (VAP). People who have compromised immune system, chronic disease of lung, kidney, and prolonged hospital stay and diabetics are usually more susceptible to these infections. HAI is particularly high with NFGNB among them.

Larson et al 1986 [8] reported that the Acinetobacter are most common nonfermenting organisms carried on the skin of hospital personal as commonsals. Brooks et al [9] they have been isolated from axilla, groin, digit webs other external fossa of about 25% of the population. In 1989 Tjenberg and ursing [10] detected three additional DNA groups coded as 13 through 15. Bouvet and Jean jean [11] described 5 DNA groups proteolytic Acinetobacter Sps., that numbered 13 through 17. Currently several molecular methodological have been developed, that includes cell envelope and outer membrane protein profiles ribotyping, plasmid profile analysis, restriction endonuclease digestion and pulse field gel electrophoresis of total chromosomal DNA random amplified polymorphic DNA profiles and multi locus enzyme electrophoretic typing [12]. Strain specificity has been demonstrated for various Acinetobacters against numerous bacteriophages [13].

NFGNB isolates studied showed high level antibiotic resistance pattern in particular routinely used antibiotics. Aminoglycosides resistance and resistance to meropenam are alarming facts. Lowest resistance was noticed for cefepazone+sulbactam combination among all the genera. Unfounded trust in antibiotic prophylaxis, improper use of powerful antibiotic for prolonged periods added to the compromised host conditions might be responsible for this situation. The Borneleit and Kleber research [14], on the matrix of the cell wall and outer membrane, demonstrated special properties capable of influencing colonisation. The fimbriae are potentially capable of facilitating adhesion to human epithelial cells. Some of the strains have been shown to produce siderophores (eg: aerobactin) and iron-repressible outer membrane receptor proteins which are important virulence determinants [15]. Slime produced by the Acinetobacter strain was considered to be the main factor responsible for the enhancement of virulence in mixed infections. Obana(16) studied, A combination of control measures is often required to contain these organisms continued awareness of the need to maintain good house keeping and control of the environment including equipment decontamination, strict attention to hand washing and isolation procedures and control of antibiotic usage in high risk areas like ICUs a continuation of all these measures is necessary to control the previously unabated spread of these organisms in particular Acinetobacter sps. in tertiary care hospitals.

## 5. Conclusion

Unfounded trust in antibiotic prophylaxis, improper use of powerful antibiotics for prolonged periods added to the compromised host conditions might be responsible for this situation. A combination of control measures is required to contain these organisms. Continued awareness of the need to maintain good housekeeping and control of the environment, include equipment decontamination, strict attention to hand washing and isolation procedures and control of antibiotic usage in high risk areas like ICUs, a combination of all these measures is necessary to control the previously unabated spread of these organisms, in particular *Acinetobacter* Sps. In tertiary care hospitals.

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