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Original Research Article

Prevalence and Antibiotic profile of Non fermenters at tertiary care hospital, Surat

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Abstract

Introduction: Non fermenters are omnipresent in nature like soil, water, plants, decaying vegetations, food stuffs and normal flora of human. Their pathogenic potential has been well established by their frequent isolation from clinical samples and their association with clinical diseases. In last few years problem is increased by the emergence of resistance to antimicrobial agents which are widely used against the non fermenters, making them as an important health care associated pathogen.

Objectives: To see prevalence and antibiotic susceptibility of non fermenters in tertiary care hospital, Surat to guide health care management.

Methods: It was a prospective observational analytical study in which patients with isolated non fermenters from various clinical samples received by Microbiology department were enrolled. Samples were processed according to standard guidelines. Isolates were identified with different biochemical reactions and antibiotic susceptibility testing was performed on Muller hinton agar by Kirby bauer disc diffusion method. The results were interpreted according to CLSI guidelines 2017.

Results: Total 157 isolates were obtained. *A. baumannii* was the most common organism isolated followed by *P. aeruginosa*. The mean age group was 15-29 years with male preponderance. The sensitivity showed complete sensitivity to only Polymyxin group of drugs with 2nd highest sensitive group Carbapenems.

Conclusions: The present study highlighted the fact that non fermenter gram negative bacilli are emerging as important pathogens and shows resistance to commonly used antibiotics, so rapid identification should be done for appropriate patient care.

Keywords: Non fermenters, prevalence, antibiotic susceptibility testing.

1. Introduction

The non fermentative gram negative bacilli 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 [1]. Non fermenters are omnipresent in nature like soil, water, plants, decaying vegetations, food stuffs and normal flora of human. They were considered to be a contaminant in the past but in the contemporary world, their pathogenic potential has been well established by their frequent isolation from clinical samples and their association with clinical diseases. Recent literature review shows that these organisms are now associated with different life threatening infections. They have become more clinically significant because of increasing infection amongst immunocompromised patients as this group of patients has multiple risk factors for infection with these normally uncommon pathogens. Non fermenters account for around 15% of all bacterial isolates from clinical samples [2].

The most important members of this group are *Pseudomonas* followed by *Acinetobacter, Burkholderia, Stenotrophomonas, Moraxella, Alcaligenes, Flavobacterium, Achrobacterium* and more [3]. In last few years problem is increased by the emergence of resistance to antimicrobial agents which are widely used against the non fermenters, making them as an important health care

associated pathogen. Appearance of these multi drug resistant pathogens in hospital environment is increasing worldwide and limiting the therapeutic options for clinicians as well as decreasing expected outcome of the patients suffering from non fermenters infections. This extreme rapid development of resistance has caused serious pathogenic and therapeutic problems worldwide [2]. So it has become necessary to rapidly identify the causative organisms and treat the infection with appropriate prompt treatment without failure which can be done by antimicrobial susceptibility testing. Therefore, this study was planned to see prevalence and antibiotic susceptibility of non fermenters in tertiary care hospital, Surat to guide health care management.

2. Material and Methods

It was a prospective observational analytical study in which patients with isolated non fermenters from various clinical samples received by Microbiology department were enrolled. All clinical samples like swab from wound, discharge or any other site, urine, cerebrospinal fluid, pleural fluid, ascitic fluid, any other body fluid, pus, sputum, aspiration, endotracheal tube tip, blood culture etc. were included in the study. Samples were processed according to standard guidelines. Isolates were identified with different biochemical reactions and antibiotic susceptibility testing was performed on Muller hinton agar by Kirby bauer disc diffusion method. The results were interpreted according to CLSI guidelines 2017 [4].

2.1 Statistical method used:

Data were calculated and analysed using Microsoft Excel Sheet

3. Results

Total 157 isolates were obtained. *Acinetobacter baumannii* was the most common organism isolated in the study followed by *Pseudomonas aeruginosa*, *Pseudomona* species and *Burkholderia cepacia complex*. The most common sample from which non fermenters were isolated was swabs from discharging pus or sinus, wound discharge, open wound etc. followed by endotracheal tube tip and blood culture. Isolated *P. aeruginosa* and *A. baumannii* strains were completely sensitive only to Polymyxin group of drugs. *P. aeruginosa* was 60- 70 % sensitive to Carbapenems whereas *A. baumannii* was 20-30 %. *A. baumannii* showed around 50-55 % sensitivity to Tetracycline group of drugs. 2 isolates of *P. aeruginosa* were from urine samples, for that, drugs used for treatment of urinary infection were tested. The result showed 100 % sensitivity to Norfloxacin and Ofloxacin, whereas 50 % sensitivity to Lomefloxacin. Sensitivity of *Burkholderia cepacia complex* is shown in Figure 1. Overall positivity of non fermenters was in 15-29 years of age with male preponderance.

Figure: 1: Sample wise distribution of non fermenters:

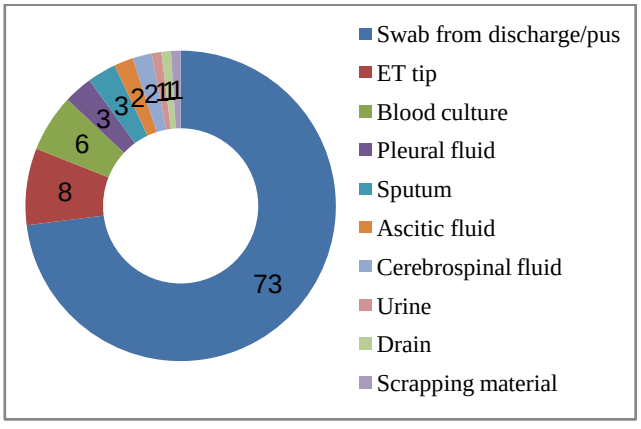
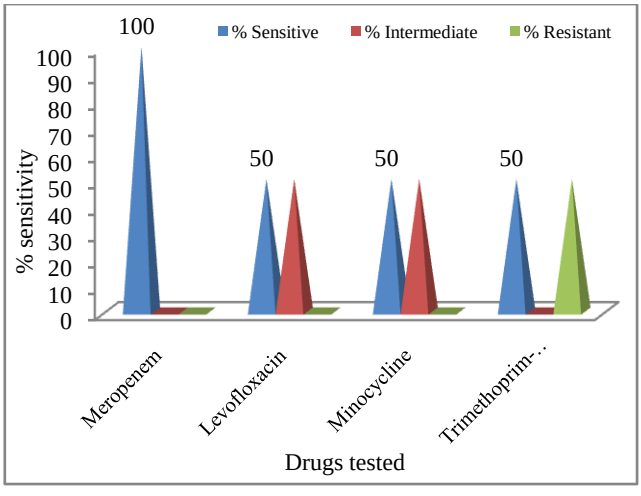


Figure: 2: Antibiotic susceptibility of *Burkholderia cepacia* complex:



4. Discussion

In the present study prevalence of non fermenters was 3.83% which shows similar results with Benachinmardi, *et al* [5], Malini, *et al* [6] and Bruno, *et al* [7] studies in which prevalence of non fermenters was 3.58, 4.5 and 2.18 % respectively. Total 157 isolates were obtained, out of which most common pathogen isolated was *A. baumannii* (54%) followed by *P. aeruginosa* (42%) followed by *Pseudomonas spp.* (3%) and *Burkholderia cepacia complex* (1%) which shows similar result with Samantha, *et al*, Gupta, *et al* [8] and Bala, *et al* [9]. the present study shows most common isolates from swabs from wound discharge or open wound or pus. The reason behind it may be trauma/ fall/ fracture which lead to open wound and delayed healing. 2nd most common samples yielding non fermenters in present study were respiratory samples including sputum, and endotracheal tube tips which shows similar results with Patel, *et al* [10] and Malini, *et al* [6].

Sensitivity of *A. baumannii* and *P. aeruginosa* shows complete sensitivity of Polymyxin group of drugs which shows similar results with Thipperudramswamy, *et al* [11] and Rit, *et al* [12]. Sensitivity of Carbapenems was

70-80 % for Pseudomonas whereas 20-30 % for *Acinetobacter*. Sensitivity of Ureidopenicillins was 15-30 %. These show similar results with Benachinmardi, *et al* [5].

Sensitivity of *Burkholderia cepacia complex* to Meropenem was 100 % whereas to Minocycline, Levofloxacin and Cotrimoxazole was 50 %. This correlates with Chawla *et al* [13] and Samantha *et al* [14]. In present study, the mean age group showing maximum number of isolates is, 15-29 years with male preponderance which correlates with Vijayalakshmi, *et al* [3] and Thipperudramswamy, *et al* [11].

5. Conclusion

The present study highlighted the fact that non fermenter gram negative bacilli are emerging as important pathogens and shows resistance to commonly used antibiotics. For prevention of high level resistant organisms, isolation policies with colonized or infected patients is mandatory. Further, appropriate precautions need to be taken while cultures of such patients are awaited.

Limitation

The most frequently prescribed empirical drug**s** like Ceftriaxone, Amikacin, Ceftazidime, Ciprofloxacin were not available during the study duration, so analysis of sensitivity of these antibiotics was not possible.

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