http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v7i9.115

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Original Research Article

Trends of Non-Fermenters (NFGNB) Isolated from Clinical Samples and their Antimicrobial Sensitivity Pattern from the Patients Attending in Tertiary care Hospital at Saharsa, North Bihar

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Abstract
Objective: *The aim of present study was to determine the spectrum of Non-fermenters in clinical sample and their antimicrobial Sensitivity pattern.*
Material and Methods: *A total of 3652 different types of clinical samples were received in our department from different OPD and IPD for culture and Sensitivity testing. Isolation, Identification and antibiogram of Isolates were performed using a standard protocols or CLSI guidelines.*
Results: *A total of 158 Non-fermenters Gram Negative Bacilli (NFGNB) was isolated from 3652 samples accounting an isolation rate of 4.32%. Psudomonas aeruginosa was the most common nonfermenters 98 (62.02%), followed by Acinetobactor baumannii 38(24.05%), Psudomonas fluorescens 16(10.12%) and Acinetobactor Iwoffii 6(3.79%). P. aeruginosa showed good sensitivity to Imipenem (97.95%), Piperacillin+Tazobactum (93.87%), cefoperazone (70.40%), Amikacin (68.38%) and Ticarcillin (64.28%). A .baumanii showed 100% sensitivity to Imipenem and 71.05% sensitivity to piperacillin+Tazobactum.*
Conclusion: *Psudomonas aeruginosa and A. baumannii were the common NFGNB isolated from the patients of Urinary tract infection (UTI), Long term care facilities (LTCF) and hospitalized patients, surgical site infection and ventilator associated pneumona. P. aeruginosa showed good sensitivity to imipenem, Piperacillin+Tazobactum, Cefoperazone, Moxifloxacin and Amikacin. While A. baumannii showed sensitivity to imipenem and piperacillin+Tazobactum.*
NFGNB are exhibiting extensively resistance not only to beta lactam and the other groups of antibiotics but also to carbapenems. Emergence of resistance among organisms against the commonly used antibiotics is largely due to their lactamase production and indiscriminate use.
Keywords: *Nonsocomial infection, Acinetobactor baumanii, imipenem, pseudomonas aeruginoa.*

Introduction

Non-fermenters are opportunistic pathogens, saprophytic in nature and are frequently present on normal skin. They are highly prevalent in the moist environment being found in most water and soil samples. Colonization of the skin, respiratory and G.I. Tracts is common among Long term care facilities and hospitalized patients. It is a common agent for hospital and hospital acquired i.e. Nosocomial infection accounting 1-3%, primarily affect immunocompromised hosts and patients with co-morbid disease, especially patient in ICU. Both sporadic and epidemic infection occurs usually after first week of hospitalization.

Non-fermenting Gram-Negative Bacilli (NFGNB) is aerobic, Nonsporing bacilli that either do not utilize glucose as a source of energy or utilize it oxidatively. NFGNB are known to account for about 15% of all bacterial isolates from clinical microbiology laboratories.

They are an important cause of health care associated infection like ventilator associated pneumonia (VAP), peritonitis associated with CAPD (Continuous ambulatory peritoneal dialysis), Meningitis, bacteremia, septicemia and UTI (Urinary tract infection). In catheterized patients, surgical site infection (SSI), burn site, biliary stents, intravascular devices site infections. They are common offender of Infection of soft tissue and bone has been common among soldiers with battlefield injuries.

The clinical significance of the isolated NFGNB was assessed by analyzing laboratory and clinical criteria. The laboratory criteria are the presence of pus cells along with Gram Negative bacilli in the stained smear from the sample, monomicrobial infection, isolation of same organism from a repeat samples, Leucocytosis and relevant radiological evidence (in case of VAP). The clinical criteria included in the presence of risk factor such as COPD, (Bronchiectasis, Chronic Bronchitis), Pneumonia, any malignancy on mechanical ventilation and other immnosuppresive conditions.

NFGNB are innately resistant to many antibiotics and are known to produce extended spectrum beta-lactamases and matallo beta-lactamase.

In view of above facts a prospective study was carried out to determine the relative frequency of aerobic microbial isolates cultured from various clinical samples and to assess their comparative susceptibility to the commonly used antibiotics.

Materials and Methods

The present study was carried out in the Department of Microbiology, Lord Buddha Koshi Medical College and Hospital, Saharsa, North Bihar, during the period of **September 2014 to April 2016**. A total of 3652 different types of clinical samples (Urine, Pus, Blood culture, sputum and body fluids) were received in our department from various OPD and IPD for culture and Sensitivity testing.

All the clinical samples were inoculated on Nutrient agar, Blood sugar, chocolate agar and Mac Conkey's agar media and incubated at 37^0C for 18-24 hours. The organism were isolated and identified, using standard biochemical tests according to CLSI guidelines. All the organism that grew on TSI agar and produced an alkaline reaction were provisionally considered to NFGNB and identified further by using a standard protocols for identification, like Gram's staining, motility, pigment production, oxidase production, oF test (Hugh-Leifson's medium) for glucose, Lactose, sucrose, Maltose, Mannitol, Xylose and lysine decarboxylase test.

The Antimicrobial sensitivity test was performed by Kirby-Bauer disc diffusion method using commercially available disc supplied by Hi-media Mumbai. The antibiotic tested were imipenem, Piperacillin+Tazobactum, Cefoperazone, Cefepime, Ceftazidime, Amikacin, Ticarcillin, Levofloxacin, Moxifloxacin, Ceftriaxone and Co-trimoxazole.

Results

A total of 158 NFGNB were isolated from 3652 specimens in which 158 specimens are significant,

accounting an isolation rate of 4.32%. 80 specimens (50.63%) showed polymicrobial infection where non-fermenters were isolated along with other organism of which E.coli and S. aureus was commonly associated. The remaining 78 specimens (49.37%) showed monomicrobial infection and 116 (73.41%) isolates follow the criteria mentioned.

Analyzed by specimens NFGN were isolated from 104(65.82%) pus sample, 16(10.12%) respiratory sample (14 sputum and 2 endotracheal tip), 31(19.62%) Urine sample, 5 (3.16%) Blood culture and 2(1.26%) body fluids samples.

Table-1 Shows various Types of clinical samples/ specimens

Clinical Sample received		
Sample/ specimens Type	**Total no. of sample**	**Percentage**
Urine	1582	43.31
Pus	1268	34.72
Body fluid	238	6.51
Blood cultures	230	6.29
Sputum	334	9.14
Total	**3652**	**100%**

Table- 2 Shows Distribution of isolates

Bacterial isolates	**No. of isolates**	**Percentage**
Psudomonas aeruginosa	98	62.02%
Acinetobactor baumannii	38	24.05%
Psudomonas fluorescens	16	10.12%
Acinetobactor Iwoffii	6	3.79%
Total no. of isolates	158	

Table-3 Shows Antimicrobial Sensitivity pattern of Isolated NFGNB

Antimicrobial agent	**P. aeruginosa n=98**	**A. baumannii n=38**	**P. fluorescens n=16**	**A. Iwoffii n=6**
Imipenam	96 (97.95%)	38 (100%)	15 (93.75%)	6 (100%)
Piperacillin+Tazobactum	92 (93.87%)	27 (71.05%)	8 (50%)	6 (100%)
Cefoperazone	69 (70.40%)	11 (28.94%)	0	4 (66.66%)
Cefepime	35 (34.69%)	4 (10.52%)	2 (18.75%)	2 (33.33%)
Ceftazidime	21 (21.42%)	12 (31.57%)	2 (12.5%)	2 (33.33%)
Amikacin	68 (69.38%)	23 (60.52%)	8 (50%)	4 (66.66%)
Ticarcillin	63 (64.28%)	20 (52.63%)	3 (18.5%)	6 (100%)
Levofloxacin	84 (85.71%)	12 (31.57%)	4 (25%)	4 (66.66%)
Moxifloxacin	85 (86.73%)	27 (71.05%)	12(75%)	6 (100%)
Ceftriaxone	32 (32.65%)	14(36.84%)	0	4 (66.66%)
Cotrimoxazole	0	8 (21.5%)	0	4 (66.66%)

Psudomonas aeruginosa was the most common isolates accounting 98 (62.02%), followed by Acinetobactor baumannii 38 (24.05%), Psudomonas fluorescens 16 (10.12%) and Acinetobactor Iwoffii 6 (3.79%), majority of nonfermenters were isolated from pus (65.82%) and urine (19.62%) samples. A. baumannii was the major respiratory pathogens.

Most of the isolates of P. aeruginosa were sensitive to imipenem (97.95%), Piperacillin+ Tazobactum (93.87%), Cefoparazone (70.40%), Amikacin (69.38%), and Ticarcillin (64.28%). A. baumannii showed 100% sensitivity to imipenem followed by piperacillin+Tazobactum (71.05%), Amikacin (60.52%) and Ticarcillin (52.63%), A. baumannii showed a higher rate of resistance than A. Iwoffii.

Discussion

NFGNB that were considered to be contaminants in the past have now emerged as important healthcare-associated Pathogens. P. aeruginosa

and Acinetobactor species are known to be the common Nosocomial Pathogens. NFGNB belonging to Psudomonas species along with Acinetobactor species accounted for 96% of the isolates. P. aeruginosa isolates in our study were highly susceptible to imipenem (97.95%), Piperacillin+Tazobactum (93.87%), Cefoperazone (70.40%) and Amikacin (69.38%). In the study from Chandigarh 42% of the P. aeruginosa isolated were found to be resistant to imipenem. Similary Acinetobactor species showed higher rate of resistance to co-trimoxazole, Levofloxacin, Cefepime, Ceftazidime, Cefoperazone and piperacillin a study at Banglore when compared to the present study.

Conclusion

P. aeruginosa and A. bumannii are the most common NFGNB isolated in our study. Their role as healthcare associated Pathogens is well established. The different species of NFGNB have shown a varied sensitivity pattern in our study. Therefore identification of NFGNB, and monitoring their susceptibility patterns, are important for the proper management of the infection caused by them. Our study high lights the facts that it is essential to establish the clinical relevance of the isolated NFGNB, before they are considered as Pathogens. This would avoid unnecessary usage of antibiotics and emergence of drug resistant strains.

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