



Growing Drug Resistance And Hospital Acquired Gram-Negative Bacilli Infections

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ABSTRACT

The choice of empiric antimicrobial regimen is based on susceptibility pattern of pathogens. The aim of this study was to assess drug resistance pattern of Gram-negative bacilli isolated from hospitalized patients. Samples of urine, pus and sputum, which were collected between from January 2014 to December 2014 and Gram-negative isolates were obtained using standard bacteriological techniques. Their antimicrobial susceptibility pattern was identified by using Kirby-Bauer disc-diffusion method as per clinical and laboratory standards institute guidelines (CLSI). The most common organism was *E.coli* followed by *Klebsiella*, *Pseudomonas*, *Citrobacter* and *Proteus*. The organisms showed maximum drug resistance for norfloxacin and least for imipenem.

KEYWORDS

Gram-negative bacilli, Hospital acquired infection, Imipenem, drug resistance

Introduction

Infection by Gram-negative bacilli constitutes a significant public health problem. It is an important cause of morbidity and mortality in hospitalized patients. Infections with resistant organisms represent a serious menace in critically ill patients. The choice of empiric antimicrobial regimen is based on susceptibility pattern of pathogens. As options for effective chemotherapy diminish, intensive care unit (ICU) mortality will increase. In a study [Kollef 1999], inadequate antimicrobial treatment of infection was an important and independent determinant of mortality in critically ill patients. The aim of this study was to assess antimicrobial susceptibility and imipenem resistant pattern of Gram-negative bacilli isolated from patients.

Materials and methods:

A cross-sectional study was designed and samples were collected from January 2014 to December 2014. All aseptic precautions were followed and clinical samples like urine, sputum and pus from hospitalized patients were obtained who fulfilled the inclusion criteria and consented.

Inclusion Criteria

All age group

Hospital stay of more than 48 hours

Bacterial isolates were obtained using standard bacteriological techniques by inoculating on MacConkey Agar and Blood Agar. They were identified as per standard protocol i.e. the colony character on culture media/Gram staining, motility and biochemical tests like indole test, methyl red test, voges proskauer test, urease test, citrate utilization test, triple sugar iron agar test, amino acid decarboxylation test, and sugar fermentation test.

Their antimicrobial susceptibility pattern was identified by using Kirby-Bauer disc-diffusion method as per clinical and laboratory standards institute (CLSI) guidelines [CLSI 2013; Oliveira 2003].

Results:

During the study duration 250 clinical samples like urine and

sputum etc from hospitalized patients were obtained and cultured. Of the positive cultures 100 showed the growth of Gram-negative bacilli. Of the 100 isolates of gram negative bacilli, *E. coli* was the most common organism (38%) followed by *Klebsiella* (22%), *Pseudomonas* (20%), *Citrobacter* (9%), *Acinetobacter* (7%) and *Proteus* (4%)

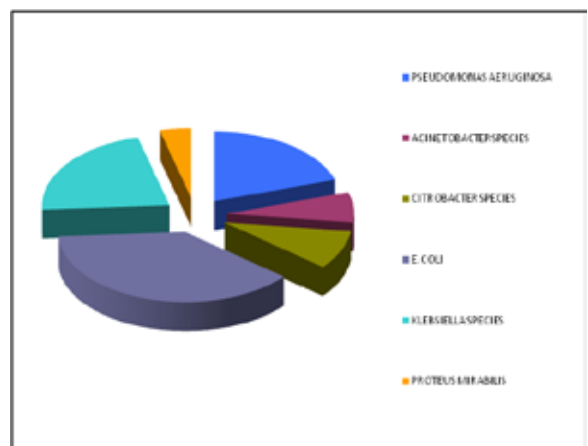


Figure 1: Percentage of GNB isolated

Drug resistance rates of gram negative bacilli were 58% for norfloxacin, 36% for piperacillin/tazobactam, 32% for amikacin, 23% for cefipime, 18% for cefoperazone/sulbactam and 11% imipenem. *Proteus* species were the most imipenem resistant GNB (25%) followed by *Acinetobacter* (14.28%), *Klebsiella* (13.68%), *Pseudomonas* (13.53%), *Citrobacter* (11.11%) and *E. coli* was least resistant (7.89%).

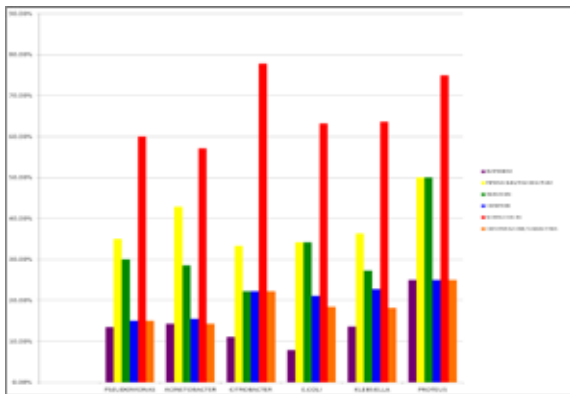


Figure 2: Graph showing resistance levels of GNB against various antimicrobials

Discussion:

Antibiotics, which are thought to be the most important weapons against microorganisms, can occasionally cause some problems as well. The increased and sometimes unnecessary use of antibiotics, especially within hospitals, has given rise to increased antibiotic resistance by several microorganisms. Most bacteria that are resistant to antibiotics are also resistant to various disinfectants and antiseptics. Both hospital- and community-acquired bacterial infections are among the frequently encountered and are thought to be bolstered by the widespread use of antibiotics [Barisic 2003].

Drug resistance in Gram-negative bacilli is increasing and thus the surveillance of antibacterial agents is necessary and rational use of antibiotic is urgently needed to reduce the production and dissemination of drug resistant strains. The emergence of resistance to imipenem and the lack of options for the treatment of GNB infections with the exception of colistin and polymyxin B are considerable [Nordmann 2009; Tam 2010].

The results of this study will help to guide clinicians in the selection of appropriate antimicrobial agents when confronted with Gram-negative infections. Our findings can be used to monitor the evolution of bacterial resistance in other similar hospitals and will be helpful for the development of antibiotic stewardship programs.

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