

MINI REVIEW ON BACTERIOLOGICAL PROFILE OF HOSPITALIZED ICU PATIENTS

Gurinder Singh

Department Of Medical Laboratory Sciences, Lovely Professional University, Punjab (India)-144411.

Abstract:

Recent trends of various infections like bacteraemia and UTI are very common in the clinical health care centers across the globe. The pathogens responsible for these infections are mostly resistance to multi drugs and accountable for infections in the hospitals. It initiates the challenges in the treatment of patient appropriately. It leads to increase the mortality and morbidity of the patients in the ICU of health care centers. Mostly resistance microbes have been accountable for various infections. More use of invasive instruments and compromised immunity of the patients in the ICU play vital role to cause the hospital acquired infections in the hospitals. So there is needed to take more initiatives to control the infections in the ICU. The purpose of this mini review to make available the information about the frequency of antimicrobial resistant, sources and microbial pathogens accountable for nosocomial infections in different ICU patients with the goal to improving its management to minimize the of spreading of infectious in the patients clinical centers.

Keywords: infections, antibiotic resistance, multi-drug resistance, Gram positive, Gram negative.

Bacteriological profile of hospitalized ICU patients:

Patients of Intensive Care Unit (ICU) are at greater possibility of contracting hospital infections. A recent epidemiological research found that ICU patients accounted for 34% of all Gram negative bacteria in the hospital. Patients with Gram negative bacteria are documented to have a high mortality rate and prolonged ICU stay. Gram-negative bacteria have been more life threatening in hospitals than Gram-positive bacteria (44 % vs. 30 %). Despite their obvious effect on patient outcomes, ICU has become a high risk region for nosocomial infections. The ICU is dealing with the most critical cases in a hospital and a great need of higher antibiotic is there while treating patients in ICU [1].

The cases like trauma, kidney transplant, heart surgery and any other surgical cases are brought to ICU after the surgical procedure in OT. Talking about the operation which is believed to be the major place from where a multidrug resistant organisms transfer from one patient to another patients .Among them multidrug *Acinetobacter* ,*MRSA*, *VRE*, *Pseudomonas spp* are most popular nosocomial organism which infect the patient during surgical intervention. Patients in the ICU are at 5 to 7 times the danger of infections in the clinical st up relative to the average patient and 20 to 25 % of all nosocomial infections arise in the ICU [2].

Across the world, various infections in the hospitals due to multidrug-resistant have been playing crucial role among the hospitalized patients. The studies revealed that treatment centers infections in ICU is growing mainly due to the bigger use instruments in the ICU higher rate of infections due to *Staphylococcus aureus*, *Acinauetobacte spp*, *Pseudomonas species* and *Candida species* [3].

Hospital acquired infections are accountable for life threatening in hospital Patient and also raise the cost of care and prolong hospitalization. Control Prevention (CDC) revealed that the intensive care unit accompanying with infections when they occur after 48 hours of ICU admission or within 48 hours of ICU transfer of patients]. Globally, ICU patients have undergone growing incidence and transmission of drug resistance pathogens. The worldwide incidence rate is 23.7 infections per 1,000 patients per day. The incidence of nosocomial infections among ICU patients extended from 5% to 30% [4]. Among the pathogenic bacteria some were able to gain resistant to the antibiotic and have become antimicrobial resistant organism and now those bacteria have become resistant against most of the antimicrobial agents these days. These bacteria are especially affecting the ICU of a hospital and so as the community. While ICU usually accounts for < 5 per cent of all hospital beds, it accounts for 20 to 25 per cent of all nosocomial infections [5].

The duration of stay exposure to invasive instruments and procedures improved patient contact with health care staff and length of stay in ICU. A large number of bacteria are possible pathogens in hospitalized patients *Klebsiella*, *Proteus*, *Morganella*, *Enterobacter*, *Citrobacter*, *Serratia*, *Acinetobacter* and *Pseudomonas spp.*, which are usually associated with the hospital environment and may also be isolated from patients with underlying disease, who are more likely to be permanently colonized with bacteria. [6].

In almost all cases, empiric antimicrobial therapy is required before microbial results are obtained, but the situation is further complicated by the advent of multi-betalactamase producers and multi-drug resistant pathogens. In a recent study, the American Infectious Disease Society explicitly discussed three types of Gram negative bacilli, namely prolonged range of beta lactamase (ESBL) developed by *Escherichia coli* and *Klebsiella spp.* Multi-drug resistant *Pseudomonas spp.* and carbapenem resistant *Acinetobacter spp.*[7].

All of these major studies suggest the need to collect data on the susceptibility trend prevalent strains in the ICU, to assist in the analysis of antibiotic policies and to guide clinicians in better patient management. For thousands of years, numerous microorganisms have survived through their ability to adapt to microbial agents. They do so through random mutation or DNA transfer. Given their obvious effect on patient outcomes. An alarming count of Gram-negative isolates have been recognized at species level with API 20E and API 20NE (Bio-merieux framework France). Microbial infections were observed in 155 (30 percent) of the 519 patients admitted to ICU. 110 (49 per cent) gram-negative bacteria were involved, Gram positive bacteria in 68 (31 per cent) mixed bacterial species in 25 (11 per cent) and *Candida spp* in 19 (9 per cent) of all 233 infection episodes. Five species were most commonly isolated: *Staphylococcus aureus* (40), *Acinetobacter spp* (28) *Pseudomonas spp* (22), *Enterobacter spp* (20), and *Klebsiella spp* (17). Most Gram-negative bacteria are susceptible to Imipenem and ciprofloxacin. Gram negative bacteraemia studies include epidemiological evidence and can enhance empiric antimicrobial therapy based on local susceptibility trends. These details can also contribute to infection prevention measures designed to reduce the risk of infection. Daily surveillance of essential pathogens and their resistance pattern is therefore mandatory [8].

Monitoring in routine is very important to reduce the danger of resistance pattern of pathogenic microbes. The intravascular products enhance the chances of acquiring primary bloodstream infections in the patients.

Studies have been revealed that catheters related to blood infections occur in 3%-7% in the United States annually [9]

Nosocomial infections occurred within 24 hours of ICU entry. Samples were obtained and stored. The result indicates that during the 21 months 3,163 patients in medical and surgical ICU, the frequency of blood infection was 38 (1 per cent) of 3,163 patients, while the incidence of central venous catheter was 34 (4 per cent) of 920 patients or 4.0 infections per 1,000 catheters per day. Among them, the Crude Mortality Rate was 53% [10].

Bacterial segregation and detection were executed using standard plate culture techniques and AST was done using a disk diffusion process. It was observed that 1,253 patients were admitted to ICU during the study. A total of 152 cases of nosocomial bacteremia occurred in 140 patients in 152 cases, 148 (97 per cent) were monomicrobial and 4 (3 per cent) were polymicrobial [11]. A total of 156 bacterial isolates have been obtained. *Pseudomonas aeruginosa* (21%) is the most common isolate. The bulk (71 per cent) of isolates accounted for all Grams negative bacteria. A source of bacteremia was reported in 49 (32 per cent) Episodes of lower respiratory tract being the most popular source of 49 percent [12].

Ventilator associated pneumonia (VAP) is a leading health care associated infection among critical ill patients accounting for 25% of all type of Intensive Care Unit (ICU) acquired infection [13]. In addition to its huge impact on morbidity and health care cost, VAP is considered the most deadly hospital acquired infection with a VAP associated mortality rates ranging from 24 to 50%. Increased drug resistant rate among Gram negative pathogen that frequently causes VAP may compromise treatment and results in prolongation of hospital stay inflation of inpatient health care cost and further increase in hospital mortality [14]. A study conducted in the adult intensive care unit, this study was conducted up to five years starting from October 2004 and 2009 were examined. A total of 248 isolates, including various pathogens, have been released. *Acinetobacter* spp was highly resistant to 60 to 80% of all other antimicrobials studied. *Pseudomonas aeruginosa* followed by *Klebsiella* spp. and *Staphylococcus aureus* was isolated from the study [15].

Conclusion: This report reveals the microbiological profile in ICU isolated patients. It was found that common isolated organism in ICU patients were *E coli* followed by *Pseudomonas aeruginosa*, *Klebsiella* spp and *Acinetobacter*. It was also revealed that multidrug resistant organisms were responsible for infections in the ICU. But Gram negative organisms were more common than the Gram positive microbes. There is need of more awareness multi drug resistance because ICU is the important place in the hospital where seriously ill patients have being treated should be free of these organisms unless a disastrous time will come.

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