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# ORIGINAL ARTICLE

## PATTERN OF ANTIBIOTICS USAGE IN BIDAR INSTITUTE OF MEDICAL SCIENCES, (BRIMS) TEACHING HOSPITAL, BIDAR

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**ABSTRACT:** Objective: To assesses the pattern of antibiotic utilization and outcome of patients with bacteremia in the hospital. **METHODOLOGY:** All positive blood cultures (BC) over a 12-months period from January-2012 to December-2012 were retrospectively review/ positive BC were recorded in 50patients received antibiotics before or soon after obtaining the BC and ceftriaxone was the most frequently- prescribed antibiotics (42.9%), either alone or in combination with other antibiotics. **RESULTS:** The bacteremia was due to gram-negative rods in 84.9% and gram-positive cocci in 15.1% cases. Most common gram-negative bacilli were E. coli, Klebsiella pneumoniae and Salmonella species while most common gram-positive cocci were Staphylococcus aureus. Antibiotics regimen was changed in 37% cases after BC results became available. Most frequent change was addition of meropenem in-case of gram-negative bacilli (29.6%) and vancomycin in gram-positive cocci (12.5%). Ten (18.5%) patients developed serious sepsis or septic shock; 3(30.0%) improved and 7 (70.0%0 had fatal outcome. **CONCLUSION:** Antibiotic selection needs to be tailor made for each patient. However, most bacteremia necessitating hospital admission is due to gram-negative bacilli and it should be considered in antibiotics selection prior to BC.
**KEYWORDS:** Bacteremia, Nosocomial infections, Antibiotic resistance.

**INTRODUCTION:** In developing nations, the cost of drugs is a major concern to medical health care professionals and patients. Antibiotics expenditures account for nearly 50% of a hospital's total drug budget.[1] Extensive usage of antimicrobial drugs with possibility of higher adverse effects has been reported recently and nearly half of all antibiotic prescriptions have been found to be poorly selected. In appropriate and unreasonable utilization of antimicrobials can cause microbial resistance to the commonly- prescribed antimicrobials.[2] This may necessitate use of newer, more costly antibiotics.[3]

**MATERIAL AND METHODS:**

**Study Design:** Retrospective analysis of all patients admitted in BRIMS Teaching Hospital over a period of 12 months between Jan-2012 to December 2012 was done. Patients were considered to have infection if they had at least one positive blood culture (BC) for organisms known to cause bacteremia. Any nosocomial infection was defined by Standard Centre for Disease Control and Prevention.

**Blood Culture:** Using all aseptic precautions, 10ml of venous blood from the patients was obtained. Blood cultures were incubated in BacT/ ALET 3D. Positive BC was inoculated on Mac Conkey and Blood agar plates and incubated $37^0$C. The plates were examined for growth at 24-48 hours. Isolates, if any, were identified and their sensitivity was read on min API system.

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**RESULTS:** A total of 50 patients were affected by infection; 36 (72%) were males and 14 females (28%) were females. The mean age of patient was 60.0±15. Twenty eight (51.9%) had received empirical antibiotics before availability of results. Ceftriaxone was the most frequently prescribed antibiotic before the results were obtained. Twelve (42.9%) had received ceftriaxone, either alone or in combination with other antibiotics.

Bacteraemia was caused by gram-negative rods in 42 patients (84.9%) and gram-positive cocci in 8 patients (15.1%). Gram-negative bacilli identified were E.coli, Klebsiella pneumoniae and Salmonella species. Various gram-positive cocci were identified, including Staphylococcus aureus, Coagulase-negative Staphylococcus and Streptococcus pyogenes. The most common gram-positive cocci was S. aureus.

The suspected source of the bacteremia was identified in 22 patients, including respiratory (57.4%), urinary (36.8%) or skin (5.8%). Post availability of sensitivity, antibiotic treatment was changed in 19(37%) patients; those who were not responding to empirical antibiotics therapy. Majority received an an add-on therapy of meropenem in gram-negative bacteremia and vancomycin in gram positive bacteremia. 10 patients (20%) developed serious sepsis or septic shokc; 3 (30%) improved and 7(70%) succumbed.

**DISCUSSION:** Monitoring of systems and intervention is useful in improving quality of health care system.[4] This is especially relevant for the appraisal of antibiotics utilization. High rate of antibiotic use combined with high percentage of critically ill patient has made intensive care units (ICU) a major source of antibiotic resistant infections.[5,6]

Borg et al while investigating factors driving the development of 3rd generation cephalosporins resistance in Escherichia coli and methicillin-resistant Staphylococcus aureus (MRSA) found a positive correlation between the level of antibiotic administration and resistance development and recommended a judicious use of antibiotics.[7] 50% of prescribed antibiotics use in antibacterial prophylaxis and treatment was said to be unnecessary.[8, 9]

Shimermeri et al[10] reported that most of the patients had infection from the gram-positive organisms and approximately 30% of patients had infection due to gram-negative organisms. Change of treatment was mandated in 30 patients who did not respond to treatment and this may be indication of an antibiotic resistance.

We observed that a high proportion of patients received antibiotics prior to the availability of BC results. This is crucial for arresting or preventing the spread of infection in severe infection cases. Experience of the prescriber is called upon in selecting antibiotic treatment so as to appropriately cover the suspected agents. However such usage should be limited to an initial intervention therapy and replaced by culture sensitivity medications as soon as possible. The most commonly prescribed drug was the 3rd generation cephalosporin, ceftriaxone.

The antibacterial activity of ceftriaxone covers Streptococci, Staphylococci, Citrobacter, Gonococci, Esherchia, Shigella and Clostridia infections, which are normally susceptible to ceftriaxone treatment. Most of the patients had infection from gram-negative organisms and change in treatment/ add on drug was required was required in 20 patients who did not respond to the initial treatment and such change often involved addition of meropenem or vanocomycin to the antibiotics regimen. While the need for antibiotic change may be as a result of demonstrated greater

antibacterial effects of the new medications, it is also likely to be an indication of the involvement of antibiotic resistance in the patient group.

A physician shall not be able to determine the identity of the microbial organism involved in infection before BC results are available. Crucial factor in selecting appropriate antibiotic is prescriber's familiarity with antibacterial infections and susceptibility pattern in the local community. As observed majority of the patients were infected by gram-negative organisms and significant proportion by gram positive organisms, the ideal treatment option should be the administration of an antibiotic agents capable of eradicating both types of infections.

The study had some limitations. Patients in a single hospital were assessed and caution must be exercised in extending the conclusions t a larger number of patients. Drug utilization pattern was considered only over a 1 year period and it may be different from pattern obtained over longer period. Commencement of empirical antibiotic treatment in serious infections is needed but it should be limited till the availability of microbial culture and sensitivity test results. Antibiotic management guidelines should, as much as possible, limit the pre-culture use of antibiotic agents with broad-spectrum antibacterial effects (e.g., the 3rd generation cephalosporins). This change of attitude shall reduce risk of development of multi-drug resistant strains and decrease the cost of drug treatment.

**CONCLUSION:** Most bacteremia necessitating hospital admission was due to gram-negative bacilli and it should be considered in antibiotic selection prior to BC. This would help in controlling drug expenditure, minimize the potential health hazards from the unnecessary antibiotics consumption and reduce the incidence of drug resistant strains. Strict adherence to antibiotic protocols is mandated.

**REFERENCES:**

1. Gugilelmo BJ. Antimicrobial therapy. Cost-benefit consideration. Drugs 1989; 38: 473-80.
2. Farrar WE. Antibiotics resistance in developing countries. J infect Dis 1985; 152: 1103-6.
3. Hogerzeil HV. Promoting rational prescribing. An international prespective. Br J ClinPharmacol 1995; 39: 1-6.
4. Marr Jj, Moffet HL, Junin CM. Guideliness for improving the use of antimicrobial agents in hospitals: A statement by the infectious diseases Society of America. J Infect Dis 1988; 157: 869-76.
5. Lepape A, Monnet DL, on behlaf of participating members of the European Society of intensive Care medicine (ESICM). Experience of European intensive care physicians with infections due to antimicrobial- resistant bateria. Euro Surveill 2009; 14.pill: 19393.
6. Hanberger h, Monnet DL, Nilsson LE. Intensive care unit. In: Gould IM, van der meer JW, editor. Antibiotic Policy-Theory and practice New York: Kluwer; 2005.p.261-79.
7. Borg MA, Zarb P, Scicluna EA, Rassian O, Gur D, Redjeb SB, et al. antibiotic consumption as a driver for resistance in Staphylococcus aureus and Escherichia coil within a developing region. Am J Infect control 2010; 38: 212-6.
8. Meyer E, Schwad F, Pollitt A, Bettolo B, Schroeren-Boersch B, Trautmann M. impact of a change in antibiotic prophylaxis on total antibiotic use in a surgical intensive care unit infection 2010; 38-19-24.

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9. John JF Jr, Fishman No programmatic role of the infectious diseases physician in controlling antimicrobial costs in the hospital. Clin infect Dis 1997; 24: 471-85.
10. Al Shimemeri A, Al Ghadeer H, Memish Z. Antibiotics utilization pattern in a general medical ward of a tertiary medical center in Saudi Arabia, Avicenna J Med 2011; 18: 8-11.

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