IDENTIFICATION AND SENSTIVITY PATTEREN OF BLOOD CULTURE ISOLATES IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Bloodstream infection frequently occur more in hospitalized as well as ICU patients as compare to other units. BSI occurs due to long stay in hospital and patients colonized with hospital acquired organism. The aim of this study is to identify the causes and isolates of pathogenic bacteria from blood cultures and provide their antimicrobial susceptibility data for in intensive care unit (ICU) and other wards over 4 months of a study period from 1-Jan-2017 to 30-April 2017 in a tertiary care hospital, Jalandhar. In four months study period 26 positive blood cultures were identified out of 100 samples. All 26 samples were only isolate bacterial infection and fungal infection was not seen. Out of 26 positive isolates 15 samples accounts with Gram positive organisms. Most commonly occurred bacteria were *Staphylococcus aureus* i.e. 93.33%. Out of which 28.57% cases were representing Methicillin resistant *Staphylococcus aureus*. The second isolate of Gram positive organism in blood was *Enterococcus falcium* account 6.66% infection in patients. Gram negative bacteria have broad spectrum and cause wide range of infection from Enterobacteriaceae family. Identified microorganisms isolated from blood culture found in this study were *Pseudomonas aeruginosa* 45.45%, *E. coli* 45.45%, and *Klebsiella* 9.09%. This is essential to reinforce surveillance and judicially usage of antibiotics to reduce drug resistance and health issues.

Keywords: Blood culture, Sepsis, Drug resistance, *Staphylococuss aureus*

INTRODUCTION

The prevalence of blood stream infections as well as multiple drug resistance is relatively high among patients admitted in intensive care units [1]. Usually blood remains free of microbial flora. If any bacteria encounters with blood, usually they are cleared within 30-45 minutes in healthy and immunocompetent individuals with the help of fighting white blood cells, liver and spleen [2]. Empirical and uncontrolled usage of antimicrobial agents leads to drug resistance issue among hospitalized patients [3]. *Klebsiella pneumoniae* as gram negative and *Staphylococcus aureus* as gram positive are the major pathogen responsible for blood stream infections [4, 10]. With the help of blood culture data, surveillance can be done in hospitals and can be used for choosing appropriate therapy. This will minimize the emergence of drug resistance among pathogens [5, 11]. A research has shown that both gram positive and gram negative pathogen are responsible for sepsis or blood stream infections [6]. By following standard laboratory protocol, bacterial blood culture isolates can be identified and treated effectively [7]. Blood stream infections are the major cause of increase in mortality and morbidity rate [8]. Only in case of bacteraemia, mortality rate found to be ranging from 20-50% [9, 12]. Antimicrobial agents should be used rationally instead of empirically to prohibit drug resistant emergence [10]. The prevalence of sepsis is common among neonates and children leading death [12].

MATERIAL AND METHODS

This study was conducted at tertiary care hospital with aim to isolate and identify microorganism isolated from blood sample and study their antibiotic susceptibility pattern [14]. Total 100 specimens were collected and processed for this study as per standard laboratory protocol [20]. The isolated pathogenic microorganisms were identified by culture technique and performing biochemical test like catalase, coagulase, oxidase, indole, methyl red, citrate and Voges-Proskauer test. Their antibiotic susceptibility pattern was performed through Kirby- Bauer disc diffusion method on Muller Hinton agar and semi-automated instrument Siemens- MicroscanAQS4 system according to Clinical Laboratory Standard Institute (CLSI) guidelines [11, 13].

RESULT

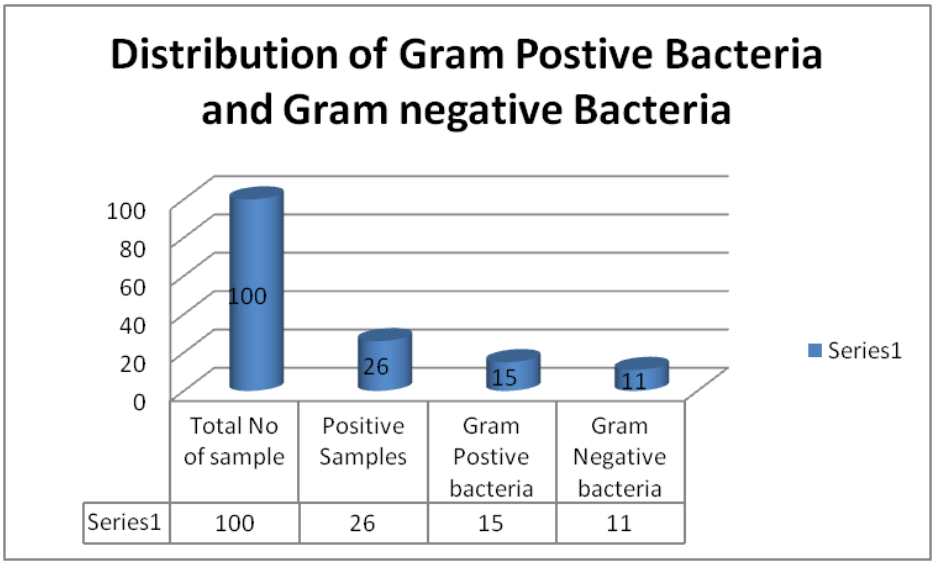

Table 1: Distribution of gram positive and gram negative isolates from blood culture

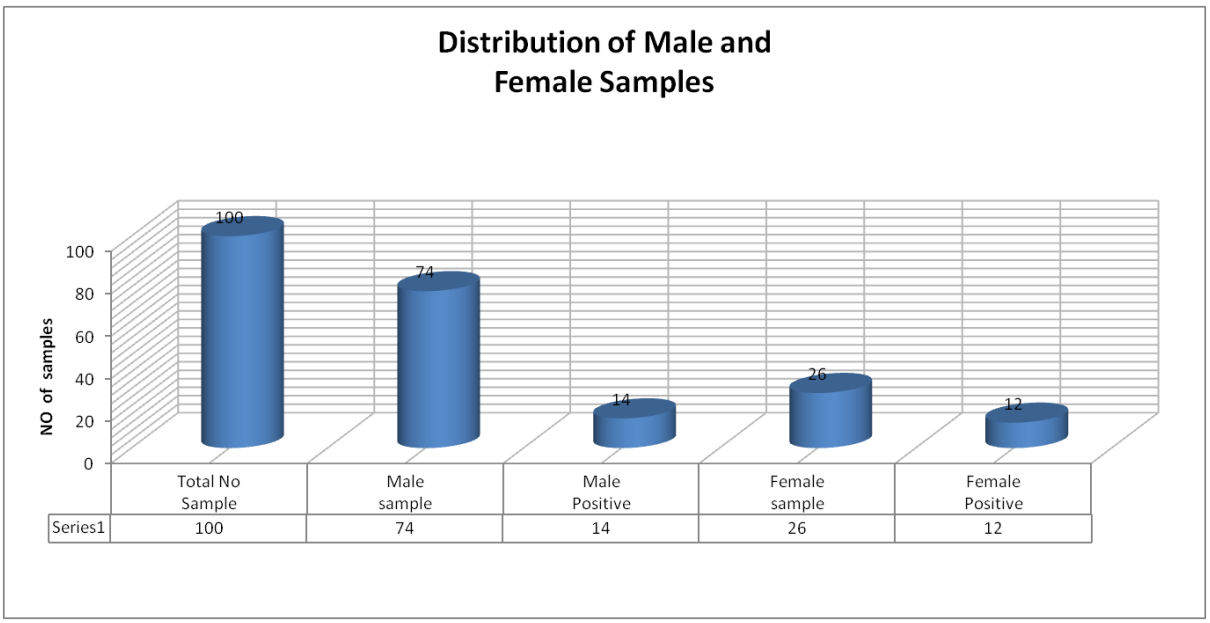

Table 2: Distribution of bacterial isolates among male and female specimen

Name of Organism	No of positive specimen	Percentage (%)
Staphylococcus aureus	14	93.33%
Enterococcus falcium	1	10%
Pseudomonas aeruginosa	5	45.45%
Escherichia coli	5	45.45%
Klebsiella pneumoniae	1	9.09%

Table 3: Isolated bacterial species from blood culture

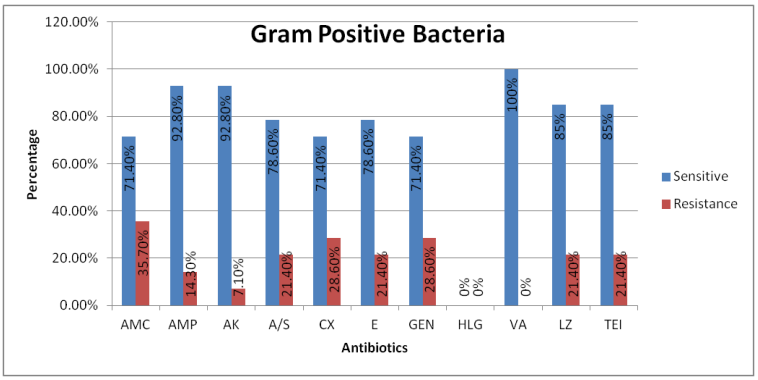

Table 4: Antibiotic sensitivity pattern of Gram positive bacterial isolates

Organism	AMC	AMP	AK	A/S	CX	E	GEN	VA	LZ	TEI
Staphylococcus aureus	28.57%	14.28%	7.14%	21.42%	28.57%	21.42%	0%	0%	21.42%	21.42%
Enterococcus faecium	100%	0%	0%	100%	NT	0%	0%	0%	0%	0%

Table 5: Resistance pattern of Gram positive bacterial isolates

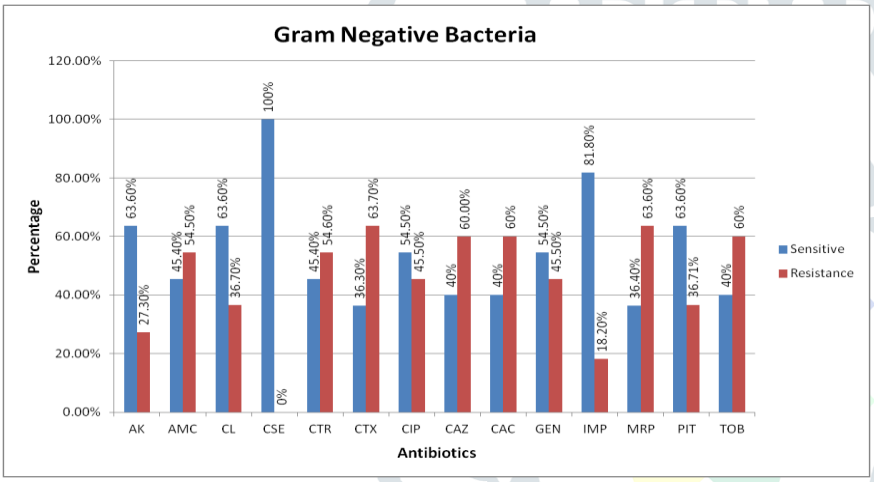

Table 6: Antibiotic sensitivity pattern of Gram negative bacterial isolates

Organism	AMC	CL	CTR	CTX	CIP	CAZ	CAC	GEN	IMP	MRP	TOB
P. aeroginosa	40%	40%	20%	20%	40%	60%	60%	40%	20%	80%	60%
E. coli	40%	60%	40%	20%	40%	40%	0%	40%	20%	60%	NT
Klebsiella	100%	0%	0%	100%	0%	0%	0%	0%	0%	100%	NT

Table 7: Resistance pattern of Gram negative bacterial isolates

DISCUSSION

During the study period which is carried out in the microbiology lab of Tertiary care hospital, Jalandhar. Clinical blood samples were obtained for the identification of microbial infection. In which 100 samples were processed by standard microbiological technique. The study showed that male have 37% blood infection and female have only 13% blood infection. Out of 100 blood samples 26 samples were isolated as positive blood culture. 15 samples were isolated as Gram positive bacteria and 11 bacteria are isolated as Gram negative bacteria. There were total 74 male specimens in which 14 samples were positive. On the other side 26 female specimens were isolated and out of them 12 samples were positives. The selected antimicrobial agents for Gram positive isolate were Amoxyclav 70.40% sensitive and 35.70% resistant, Ampicillin 92.80% sensitive and only 14.30% resistant, Amikacin was 92.80% sensitive and 7.10%

resistant, Ampicillin/s 78.60% sensitive and 21.40% resistant, Cefoxitin 71.40% sensitive and 28.60% resistant, Erythromycin 78.60% sensitive and 21.40% resistant, Gentamycin 71.40% sensitive and 28.60% resistant, Vancomycin showed no resistant it showed 100% sensitivity toward Gram positive bacteria. Linezolid & Teicoplanin showed 85% sensitive and 21.40% resistant. In Gram negative bacteria Ceftriaxone EDTA Sulbactum showed highly sensitivity of 100% toward all Gram negative bacteria which were isolated. After that Imipenem, Colistin, Amikacin, Piperacillin/ Tazobactum showed more than 60% sensitivity toward Gram negative bacteria. Amoxclav, Ceftriaxone, Cefotaxime, Ceftazidin and Calvanic acid, Meropenem and Tobramycin showed resistance near about 60%. Similar results found by Manjusha et al [15].

CONCLUSION

Nowadays many microorganisms establish drug resistance toward multiple drugs such as *Staphylococcus aureus* resistant to methacilin drugs and penicillins [16]. On the other hand all the gram negative bacteria establish resistant toward cephalosporin drugs. Similar results found in report by Sorsa et al [17]. Regular surveillance, early identification and treatment will help to reduce the drug resistant among pathogens [11]. Several studies have been shown that during bacteraemia early usage of appropriate antimicrobial therapy has reduced the cost and hospital stay duration [18]. Sensitivity pattern data will help the clinicians for right choice of antimicrobial therapy [19]. In hospitals, such microbiological studies related to bacterial isolates and antimicrobial sensitivity pattern should be done on regular basis to check the possible causes of sepsis and to check the degree of resistance developed by pathogens to minimize health issues [20].

CONFLICT OF INTEREST

The author declares no conflict of interest and no external funding was secured for this study.

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