Bacterial Pathogens and Antibacterial Susceptibility Pattern of Isolates from Blood Culture - A Retrospective Study

Dr Shrikant Palekar[1], Dr Hemangi Walke-Palekar[2]

[2]Assistant Professor PIMS Islampur, India

[1]Consultant Microbiologist Kolhapur, India

Abstract: _Introduction:_ _Now a days in ICU setup bacteremia is the important factor of mortality and morbidity. Bacteremia is defined as the presence of bacteria in the blood circulation; bacterial colonization of the blood stream is not usually fatal. Another important terminology is Transient bacteremia which is observer in several physiological conditions without any obvious clinical manifestations; The detection of pathogen on culture media in a patient's blood has a considerable diagnostic and prognostic importance. That's why Blood cultures provide essential information for the evaluation of a several diseases like endocarditis, pneumonia, pyrexia of unknown origin and particularly, in patients with suspected septicemia . Blood stream Infections are a major cause of morbidity and mortality worldwide._ _Aim and Objective:_ _The aim of the present study was to determine the distribution of pathogens and Blood stream infection, Septicemia, Antibiogram, Resistance._ _Materials and Methods:_ _A total of 300 blood specimens from patients were received from various intensive care units in Mrinmay Diagnostic Laboratory India, were cultured by standard microbiological procedures using Bactec for the isolation of pathogens. The isolates were subjected to antimicrobial susceptibility assay to investigate the resistance pattern of isolates by disc diffusion method and the reports were analyzed retrospectively over the period of three years._ _Discussion:_ _In the present study we observed the prevalence of Gram negative bacillus was higher than Gram positive bacteria isolated in our study. In the present, study E coli sp. showed higher resistance rate against cefixime, septran, ampicillin and ciprofloxacin. In this study we observed slightly higher rate of sensitivity against cephalosporin with betalactum followed by carbapenam group by all the gram negative bacterial pathogens isolated from blood culture._ _Conclusion:_ _The present study gives an idea of the current state of etiological agents of blood stream infections and their susceptibility pattern in private hospital._

Keywords: M. tuberculosis, First Line Anti-Tuberculosis Drugs, LPA, MDR-TB

1. Introduction

Now a days in ICU setup bacteremia is the important factor of mortality and morbidity. Bacteremia is defined as the presence of bacteria in the blood circulation; bacterial colonization of the blood stream is not usually fatal. Another important terminology is Transient bacteremia which is observer in several physiological conditions without any obvious clinical manifestations.[1,2] The detection of pathogen on culture media in a patient's blood has a considerable diagnostic and prognostic importance. That's why Blood cultures provide essential information for the evaluation of a several diseases like endocarditis, pneumonia, pyrexia of unknown origin and particularly, in patients with suspected septicemia. [6] Blood stream Infections are a major cause of morbidity and mortality worldwide. [3] The blood culture is a critical tool for the health care professional to detect the pathogenic growth of living organisms in the bloodstream. A positive blood culture can advocate a definitive diagnosis; enable the rite choice of therapy against the specific organisms. The aim of the present study was to determine the distribution of pathogens and Blood stream infection, Septicemia, Antibiogram, Resistance. The aim of the present study was to determine the distribution of pathogens and their antibiotic profile against the commonly used antibiotic therapy. A total of 300 blood specimens from patients were received from various intensive care units in Mrinmay Diagnostic Laboratory India, were cultured by standard microbiological procedures using Bactec for the isolation of pathogens. The isolates were subjected to antimicrobial

susceptibility assay to investigate the resistance pattern of isolates by disc diffusion method and the reports were analyzed retrospectively over the period of three years from Jan 2017 to Dec 2017. A total of 300 specimens were collected in a period of one years from Jan 2017 to Dec 2017, of which 125/300 (41.66%) were found to be positive for blood culture and 175/5614 (58.33%) showed no growth. In the present study 125 isolates were obtained from the Bactec positive blood (n=125) specimens comprising seven different bacterial pathogens were reported, of which 113/125 (90.4%) were found to be Gram negative bacilli and 12/125 (9.6%) were found to be Gram positive cocci.

2. Materials and Methods

A total of 300 blood specimens from patients were received from intensive care units and tested for culture and sensitivity in Mrinmay Diagnostic Laboratory, Kolhapur, India, and the reports were analyzed retrospectively over the period of one year from Jan 2017 to Dec 2017. Blood specimens were cultured according to standard microbiological procedures. The isolates were identified using routine bacteriological procedures by colony morphology, cultural and biochemical methods and subjected to antibacterial assay. Antibiotic susceptibility testing was carried out by Kirby-Bauer disc diffusion assay on Muller Hinton agar (Hi Media) to determine the antimicrobial susceptibility profiles of pathogenic isolates according to Clinical and Laboratory Standards Institute guidelines.[1]The panel of antibiotic disks (HiMedia)

includes aminoglycoside (amikacin 30µg), Penicillins (ampicillin 10µg), fluoroquinolones (ciprofloxacin 5µg) and Cephalosporin. The diameter of the zone of inhibition produced by each antibiotic disk was measured and the result was interpreted as susceptible or resistance to the antibiotics used and the zone of inhibition was compared with the standard chart provided by the manufacturer of the antibiotic disks. Results and Discussion A total of 300 specimens were collected in a period of one year from Jan 2017 to Dec 2017, of which 125/300(41.66%) were found to be positive for blood culture and 175/300 (58.33%) showed no growth. In the present study 125 isolates were obtained from the Bactec positive blood (n=125) specimens comprising seven different bacterial pathogens were

reported, of which 113/125 (90.4%) were found to be Gram negative bacilli and 12/125 (9.6%) were found to be Gram positive Cocci. Amongst 125 isolates, E coli. 76(60.8%) was the predominant bacterial pathogen isolated in our study, followed by 27 (21.6%) were Klebsiella spp ,Pseudomonas spp., 10(8 %) were.,8 (6.4%) were Acinetobacter sp, Citro 4(3.2%) 8 (66.67%) were Staphylococcus aureus, 4 (33.33%) were Coagulase negative Staphylococcus spp. were reported . Of the 113/125 (90.4%) Gram negative bacillus isolated from blood culture was taken for the study by Kirby-Bauer disc diffusion assay against a panel of antibiotics such as amikacin, Cephalosporin, and ciprofloxacin, flruquilones carbapenam etc .results showing in below table.

Resistance patterns are also included in that.

MRINMAY DIAGNOSTIC LABORATORY KOLHAPUR																				
Percentage sensitivity of organism isolated from various specimens submitted from MDL Kolhapur																				
			Total samples 300							Culture positive 125										
Specimen	Post	org	No	amp	ak	ctx	caz	cpz	mrp	ipm	cfs	tic	o	g	cpm	cm	ctr	cot	amc	amp	tg	cl
Blood 300	125	E COLI	76	35	35	21	27	34	69	80	78	57	70	80	45	65	78	45	43	23	100	100
		KLEB	27	23	57	32	34	23	90	90	89	89	79	67	43	72	67	38	49	21	100	100
		ACINETO	8	10	56	34	45	22	70	80	80	70	59	89	32	65	44	19	62	19	100	100
		PSUDO	10	6	67	45	34	22	79	78	70	80	70	69	49	56	65	62	59	32	100	100
		CITRO	4	7	35	35	35	31	80	70	89	56	80	40	71	65	50	45	56	12	100	100
		STAPH	8	20	54	40	NA	30	NA	NA	25	NA	78	NA	NA	NA	NA	NA	80	65	NA	NA
		C NEG	4	25	25	NA	NA	NA	NA	NA	50	NA	43	NA	NA	NA	NA	NA	90	45	NA	NA

3. Discussion

In the present study we observed the prevalence of Gram negative bacillus was higher than Gram positive bacteria isolated in our study. Our findings are not correlated with a study conducted in Taiwan in 2012, they reported gram positive sepsis was higher than that of gram negative sepsis.[5] One of the previous studies showed that Staphylococcus aureus was the predominant pathogen isolated from blood cultures, this finding was not similar and not correlated with the previous studies[4] . The antibiogram of Gram negative bacilli showed slightly higher resistance rate of all the antibacterial used in this study. Klebsiella sp. (80.5%) and Acinetobacter sp. (74.5%), produced highest resistance against ampicillin, amikacine and also Pseudomonas sp. (64.1%) and Acinetobacter sp. (73%) showed higher resistance rates against ciprofloxacin. In the present, study E coli sp. showed higher resistance rate against cefixime, septran, ampicillin and ciprofloxacin. In this study we observed slightly higher rate of sensitivity against cephalosporin with betalactum followed by carbapenam group by all the gram negative bacterial pathogens isolated from blood culture.

4. Conclusion

The present study gives an idea of the current state of etiological agents of blood stream infections and their susceptibility pattern in private hospital. As a result accurate and rapid identification of antimicrobial resistance are necessary for the timely diagnosis and accurate antibacterial therapy against septicemia.

References

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