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A study of blood stream infesctions in intensive care units, government hospital, Ambikapur

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***Abstract*---**Any bacterial cells found in the blood should raise concern because it is sterile. Bacteremia is the term used to describe the presence of live, transitory bacteria in the blood. However, in the majority of bacteremic conditions, only a tiny number of bacterial cells enter, and no symptoms appear because the transients are quickly eliminated. immune blood cells eliminate. Aim: a study of blood stream infesctions in intensive care units, government hospital,ambikapur. MATERIALS AND METHODS :The study was carried out in the department of microbiology, central laboratory RSDKSGMC and Hospital, Ambikapur, CG. STUDY PERIOD: Oct 2021 to Dec 2021.Total 150 Number of patients. The study was approved by the ethical committee of RSDKS GMC, Ambikapur, Surguja, C.G. with reference number 2388A/GMC/2021/06-04-2021. CONCLUSION: To enhance the clinical outcome of BSIs in the ICU setting, several techniques should be put into practise. An immediate start to an investigation is still crucial.effective antibiotic therapy that should be personalized. Depending on the source of the illness in each individual patient,the likelihood of antibiotic resistance as well as the most frequently isolated bacteria.

***Keywords*---**BSI, intensive care, gram stain, colony morphology.

Introduction

The majority of morbidity and death among patients referred to intensive care units are caused by blood stream infections (BSI), and monitoring the etiological agents of these infections is crucial for their prevention and treatment. [1-2] Any bacterial cells found in the blood should raise concern because it is sterile. Bacteremia is the term used to describe the presence of live, transitory bacteria in the blood. However, in the majority of bacteremic conditions, only a tiny number of bacterial cells enter, and no symptoms appear because the transients are quickly eliminated. immune blood cells eliminate. [3-4] When more cells than can be properly eliminated reach the bloodstream, When an infectious pathogen spreads throughout the body, septicaemia develops bloodstream.

Septicemia can be brought on by surgery on infected tissue or by a localised infection in the body (like pneumonia).[5] Sepsis develops when the body's immunological reaction to the infection is out of control for unclear reasons, leading to abnormalities in physiology, biochemistry, and pathology. The reaction could harm and overpower other healthy tissues and organs. Overwhelming cellular, metabolic, and circulatory abnormalities result from septic shock. Despite being one of the least understood medical disorders, it is one of the most deadly killers in hospitals.[6] According to a review done in intensive care units in the US3 and Europe between 1990 and 2000, between 70 and 80 percent of severe sepsis cases in adults occurred in patients who were already in hospitals for other conditions. No clear aetiology was discovered in 30 to 50 percent of cases.[7]

Materials and Methods

The study was carried out in the department of microbiology, central laboratory RSDKSGMC and Hospital, Ambikapur, CG. Study Period: Oct 2021 to Dec 2021.Total 150 Number of patients. The study was approved by the ethical committee of RSDKS GMC, Ambikapur, Surguja, C.G. with reference number 2388A/GMC/2021/06-04-2021.

Inclusion criteria

Patients in the age group more than 20 years with signs and symptoms of Blood Stream Infections- fever with or without chills, diaphoresis, tachypnea, tachycardia, leukocytosis and leucopenia.

Exclusion criteria

Patients in the age group < 20yrs. Patients who denied consent for participation in study. 10-20 ml of blood were taken for culture, placed in a blood culture bottle with 50 ml of brain heart infusion broth, and incubated for 5 days at 37 oC. At 48 hours and 72 hours, subcultures were carried out in 33 MacConkey agar and blood agar plates, and broths were checked for turbidity. Additionally, the plates were subcultured the same day and incubated at 37 °C for 24 hours if turbidity started to form early. If no development appeared even on the seventh day of subculture, or final subculture, the blood culture was regarded as negative.

Based on GRAM STAIN, COLONY MORPHOLOGY, and different BIOCHEMICAL REACTIONS, any growth that took place throughout the 7-day incubation period was recognised.

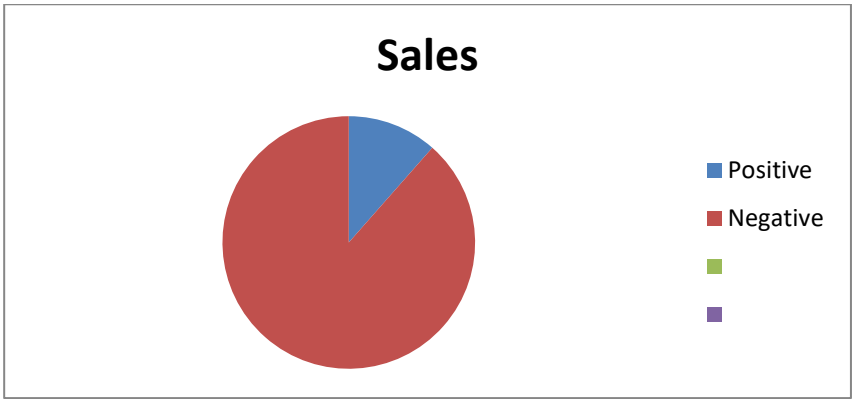
To identify whether a colony is Gram positive or Gram negative, Gram staining is typically performed on all colonies found on culture plates. Take a clean, grease-free slide, and place a drop of saline solution on it. A single colony is emulsified in this saline to create a smear, which should be about 15-20 mm in size. It is heat glued and air dried. The principal stain, methyl Violet (0.5 percent), is then applied to the smear, and it must sit for 1 minute before being rinsed with water. Following the addition of the mordant Grams Iodine, the slide is cleaned after waiting for 1 minute. Then the Smear is decolourised with few drops of acetone and finally secondary stain dilute Carbol Fuchsin in the ratio of 1: 10 is added then allowed to dry. Stained smear is viewed under oil immersion (100x).

Results

The study was carried out in the department of microbiology, central laboratory RSDKSGMC and Hospital, Ambikapur, CG. STUDY PERIOD: Oct 2021 to Dec 2021.Total 150 Number of patients. The study was approved by the ethical committee of RSDKS GMC, Ambikapur, Surguja, C.G. with reference number 2388A/GMC/2021/06-04-2021.

Table 1
Results of blood culture

BLOOD CULTURE	RESULTS	%
POSITIVE	22	11.5
NEGATIVE	128	88.5



Graph 1. Results of blood culture

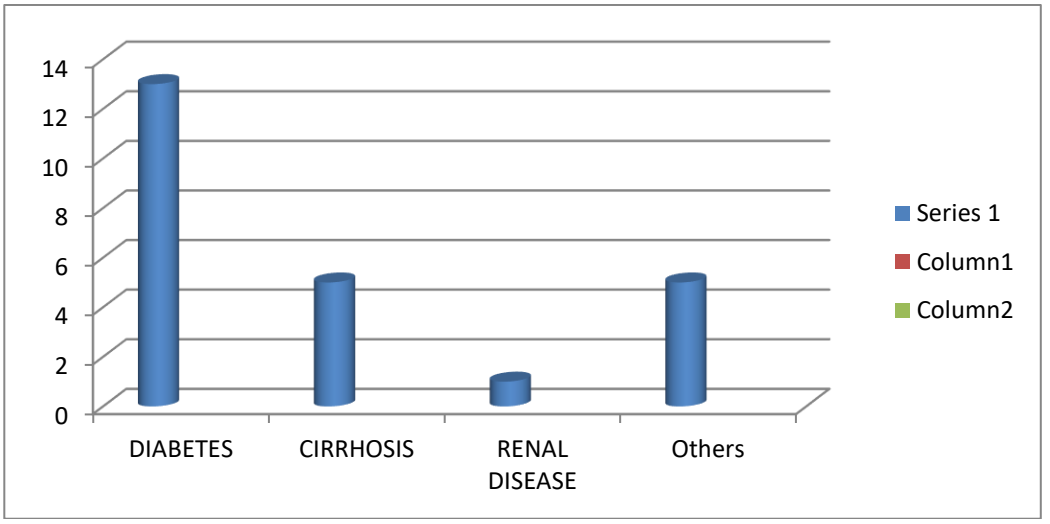
Table 2
Gender wise distribution of cases [N=150]

GENDER	NUMBER OF PATIENTS	PERSENTAGE
MALE	85	60%

FEMALE	65	40%
TOTAL	150	100%

Table 3
Correlation of co-morbid condition associated with culture positive cases

CO-MORBIDITIES & RISK FACTORS	NO OF PATIENTS	%
DIABETES	13	35%
CIRRHOSIS	5	11%
RENAL DISEAS	01	4%
OTHERS	5	12%

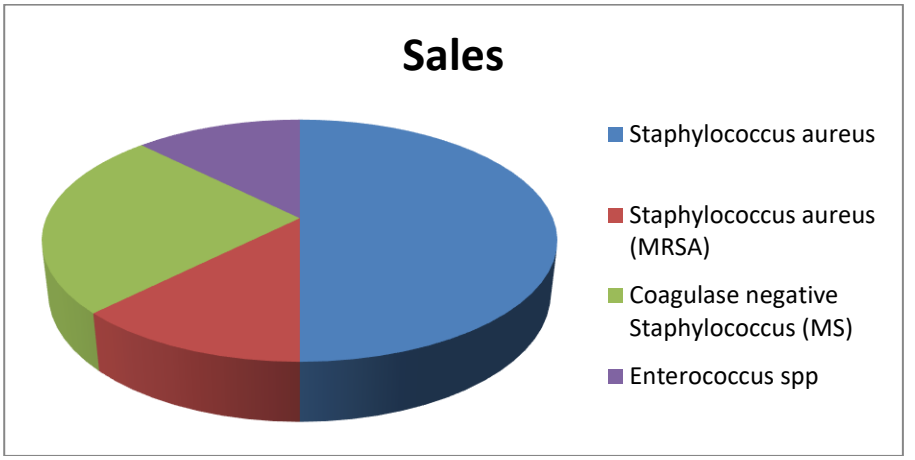


Graph 2. Correlation of co-morbid condition associated with culture positive cases

Table 4
Gram positive organisms

ORGANISMS	NO ISOLATED	%
Staphylococcus aureus (MSSA)	4	55.5
Staphylococcus aureus (MRSA)	1	11.1
Coagulase negative Staphylococcus (MS)	2	22.2
Enterococcus spp	1	11.1

Total culture positive cases were 22. Gram positive organisms were 13.6%.



Graph 3. Gram positive organisms

Table 5
Gram negative organisms

ORGANISMS	NO ISOLATED	%
Klebsiella pneumoniae	10	37.9
Acinetobacter baumannii	6	27.5
Escherichia coli	5	17.5
Klebsiella oxytoca	3	10.3
Pseudomonas aeruginosa	2	6.8

Table 6
Antimicrobial susceptibility pattern of gram negative organisms

DRUGS ISOLATES	AK 30 µg	GM 10 µg	COT 1.25/ 23.75 µg	TET 30 µg	CIP 5 µg	CTX 30 µg	CAZ 30 µg	PT 100/10 µg	IMP 10 µg
Klebsiella spp (n=10)	70.5 %	63.3 %	22.4 %	-	100 %	29.2 %	-	63.3%	77.5 %
Acinetobacter baumannii(n=8)	37.5 %	-	37.5 %	-	25%	23%	-	50%	62.3 %
Escherichia Coli (n=5)	35.6 %	-	-	-	25%	24%	-	50%	61.2 %
Pseudomonas Aeruginosa (n=2)	100%	100%	-	-	100 %		-	100%	100%

Table 7
Antimicrobial susceptibility pattern of gram positive organisms

Drugs ORGANISMS	ERY 30µ	PEN 10µ	COT 1.25 / 23.75 µ	TET 30µ	CIP 5µ	LZ 30µ	VAN 100/10 µ	HLG 10µ
Staphylococcus aureus (MSSA) [n=4]	100 %	100%	50%	100%	70%	100 %	100%	-
Staphylococcus aureus (MRSA) [n=1]	-	-	-	99.9 %	-	100 %	100%	-
Coagulase negative Staphylococcus (MS)[n=2]	100 %	99.0 %	-	-	100 %	100 %	100%	-
Enterococcus spp[n=1]	-	100%	-	-	-	100 %	99.9%	99.9 %

Discussion

Patients in intensive care units frequently suffer from and die from blood stream infections. Reports on the incidence of BSI vary widely, reflecting individual risk variances depending on institutions, patient types, and other factors, the length of the stay and comorbidities. Out of the 150 blood samples taken up for study, 22 (11.5 %) were positive by blood culture . This correlated with the study of Matteo Basetti et al (2016)[8] were observed in 15% of the infected patients. In another study Vincenzo Rusotto et al(2017),[9] 22% developed BSI. The factors that affect the outcome of a BSI infection include the related pathogens, the source of the infection in the ICU, underlying risk factors, timely intervention, and the type of care provided. In order to identify bacteremia in critical care settings, their source of infection, and to ascertain the antimicrobial susceptibility patterns of isolates from blood cultures, this study was carried out.[10-12]

Conclusion

To enhance the clinical outcome of BSIs in the ICU setting, several techniques should be put into practise. An immediate start to an investigation is still crucial.effective antibiotic therapy that should be personalized.Depending on the source of the illness in each individual patient,the likelihood of antibiotic resistance as well as the most frequently isolated bacteria. Among the most common reasons for infections in ICU patients are BSIs. In the ICU context, resistant bacteria are to blame for an increasing incidence of BSIs. The doctor needs to be knowledgeable about the risk factors for BSIs brought on by resistant bacteria, common resistant mechanisms, and the overall management of critically sick patients, including source control, proper antibiotic therapy, and surveillance techniques.

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