

# “Bacteriological Profile of Isolates from Blood Culture at a Tertiary Care Centre Kanpur”

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## Abstract:

Blood stream infections (BSI) are the major cause of morbidity & mortality among patients admitted in Intensive care unit & surveillance of etiological agents in these infections are important for their prevention & treatment.

**Material and Methods:** This study was an observational study carried out at the Department of Microbiology, Rama Medical College Hospital & Research College Kanpur, Uttar Pradesh, India from January 2020 to September 2020 Blood was collected from 2 different sites (avg. 8 mL per site) 20 minutes apart in every patient using strict aseptic precautions and inoculated immediately into BacT 9050 system —aerobic blood culture bottles with 0.025% of sodium polyanethol suffocate as anticoagulant. The positive blood culture bottles were sub cultured on Blood agar (BA) and MacConkey agar (MA) (HiMedia, Mumbai) and incubated aerobically at 37°C for 24 hours. The isolates were identified based on colony appearance, gram stain and standard biochemical tests.

**Results:** The culture positivity is 8.59%. The Spectrum of bacterial isolates were 74.07% GPC (Gram Positive cocci), 25.92% GNB (Gram Negative Bacilli). The common organisms isolated were CONS (Coagulase negative staphylococci) 48.14% and Staph. Aureus 18.51% and E.faecalis 7.40%.

**Conclusion:** Clinical recognition of sepsis is not always straight-forward. Appropriate intervention requires an early a etiological diagnosis.

**Keywords:** blood culture, Blood stream infections.

## Introduction

Blood stream infections (BSI) are the major cause of morbidity & mortality among patients admitted in Intensive care unit & surveillance of etiological agents in these infections are important for their prevention & treatment. Blood stream infection is the infection that requires one or more culture positive for a bacteria or a fungus of blood samples obtained in the presence of fever(>38°C) not attributable to other causes(based on US centers of Disease control & prevention)[1]. Community acquired Bacteremia (CAB) was defined if the first positive blood culture was obtained before or within 48 hours of hospitalization. Blood stream infections are considered to be nosocomial if signs & symptoms of these infections became evident after 48 hours following hospital admission and/or if the patient had been hospitalized during the 2 weeks before the current admission. The invasion of micro-organisms in the circulating blood pose a major threat to every organ in the body leading to serious consequences including shock, multiple organ failure, DIC & Death. Blood stream infections with primary diseases admitted in ICU are Infective Endocarditis, CAP(community acquired pneumonia), Uro-sepsis & Meningitis [2].

BSI with Secondary Bacteremia is infections resulting from health care interventions such as vascular catheter insertion, infection following Urinary catheter related sepsis, infection of Surgical sites & infection arising out of hospital acquired or ventilator associated pneumonia [3]. The only way to avoid infections from this intervention is strict attention to asepsis during insertion of vascular access devices, regular review of each vascular channel so that they are kept as long as essential. The use of Chlorhexidine-based preparations & insertion of Central line through the Subclavian access reduce infection rate [4,5]. The most common bacteria isolated from patients in ICU are gram positive aerobic bacteria (S.aureus, Enterococcus) and gram negative aerobic bacteria (Enterobacteriaceae, Pseudomonas aeruginosa) & the common fungi include Candida albicans in both immune competent & immune compromised patients [2]. CONS which was previously considered as contaminants have increased in clinical importance & are now recognized as pathogens [4, 6]...

## Material and Methods

This study was an observational study carried out at the Department of Microbiology, Rama Medical College Hospital & Research College Kanpur, Uttar Pradesh, India from January 2020 to September 2020. All 314 blood samples were collected from in patients in our hospital during the study period and processed in the central laboratory. Blood was collected from 2 different sites (avg. 8 mL per site) 20 minutes apart in every patient using strict aseptic precautions and inoculated

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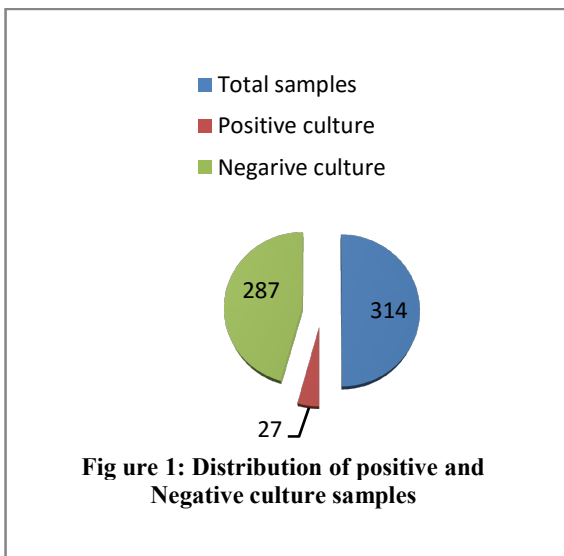
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immediately into BacT 9050 system —aerobic blood culture bottles with 0.025% of sodium polyanethol suffocate as anticoagulant. In pediatric cases 1-2 mL of blood was inoculated in BacT 9050 system pediatric blood culture bottles. After collection these bottles were immediately incubated in BacT 9050 system a fully automated blood culture system for detection of growth in blood culture. The negative results were followed up to 5 days and final report was issued. While, in case of a positive growth, the BacT 9050 system automatically gives an alert. The positive bottles were then sub-cultured on Blood agar (BA) and MacConkey agar (MA) (HiMedia, Mumbai) and incubated aerobically at 37°C for 24 hours. The isolates were identified based on colony appearance, gram stain and standard biochemical tests.

**Results**

A total of 314 blood samples were collected during January 2020 to September 2020 at Dept of Microbiology, Rama Medical College, and Kanpur. Among 314 samples, culture was found to be positive in 27 (8.59%) samples. [Fig1] In BSI positive cases 17 were males and 10 were females. Age wise distribution of Positive culture cases are mentioned in %).[Table1]. Most common age group associate with BSI was <10 years (85%) and the next common age group was 10 to 20 years (8%).[Table1] Total Culture positive cases were 27. Gram positive cocci were 20 (74.07%), Gram negative bacilli were 07 (25.92%). [Table 2]



**Table 1: Age and gender wise distribution of positive cases (n=27)**

Age	No. of cases		Total	Percentage %
	Male	Female		
<10	14	9	23	85.18
11-20	1	1	2	7.40
21-40	1		1	3.70
41-60	1	-	1	3.70
>61	-	-	-	0
Total	17	10	27	100

**Table 2: Organisms isolated by Blood Culture in Septicemia Patients (n=27)**

Organisms	No. of positive cases (n=27 )	%
<b>Gram Positive Cocci</b>	20	74.07
Staphylococcus Epidermidis	13	48.14
Staphylococcus Aureus	5	18.51
Enterococcus Fecalis	2	7.40
<b>Gram Negative Bacteria</b>	07	25.92
Pseudomonas Aeruginosa	1	3.70
Klebsiella Pneumonia	1	3.70
Escherichia Coli	4	14.81
Acinetobacterspp	1	3.70
Total	27	100

**Discussion**

In the present study, majority of the patients were admitted in ICU with clinical signs of sepsis were in the age group of <10 yrs. In this study we did not distinguish between community- and hospital-acquired infections for analyzing the results. Fever (10%) and Respiratory distress (19.45%) were the most common presenting symptoms. This results contrast with the study of Nishant Kumar et al. 2020[7] and Van Gestel ET al[8], 2004 in which majority of the patients were from 49-73 yrs and the male female ratio is 1:7:1. There

was a male preponderance accounting for 62.96% in this study. From 27 BSI positive cases CONS was the most common pathogen isolated in 13 (48.8%) followed by *Staphylococcus aureus* 5 (18.51%), and *Enterococcus faecalis* (7.40%). *E. coli* was isolated in (14.81%), *Klebsiella* in (3.70%), *Acinetobacter* in (3.70%). Pittet et al 2009 [9], Rello et al 2009[10] and Jamal et al [11] 2009. Also gave the prevalence of Bacteremia was 30%. Etiological agents were more commonly Gram positive bacteremia (74.05%) with CoNS being the most common isolate. Among gram negative with *E. coli* being the most common isolate. While the study done by S Bhattacharya ET al [12], 2002 where GNB accounted for 56.2% & GPC accounted for 24%. Given that CONS isolated from blood are often skin contaminants which are clinically insignificant, we suspect that the observed low isolation of CONS in our paper could be due to or related to strict aseptic practices of collection method followed for blood sampling of blood culture. The burden of other Gram-positive isolates was much lesser than *Staphylococcus aureus* which is in accordance with these studies. This also indicates that infections by Gram-positive organisms constitute a significant threat to septicemia in our locale and the spectrum of organisms is subject to geographical alterations.

## Conclusion

Clinical recognition of sepsis is not always straightforward. Appropriate intervention requires an early an etiological diagnosis.

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