

# Prevalence and Antimicrobial Sensitivity Pattern of Gram Negative Rods in Blood Cultures: A Tertiary Care Hospital Study

ALMAS RAZA<sup>1</sup>, SADAF MUNIR<sup>2</sup>, NASIR RASHID<sup>3</sup>, RAMEESHA MUZAFAR<sup>4</sup>, SHEEMA KHAN<sup>5</sup><sup>1</sup>Assistant Professor, Pak Red Crescent Medical College, Lahore<sup>2</sup>Assistant Professor, Sharif Medical and Dental College, Lahore<sup>3</sup>Assistant Professor Pathology, Pak Red Crescent Medical College, Lahore<sup>4</sup>Senior Demonstrator, Pak Red Crescent Medical College, Lahore<sup>5</sup>Assistant Professor Pathology, Pak Red Crescent Medical College, Lahore

Correspondence to Dr. Nasir Rashid, Assistant Professor Pathology

## ABSTRACT

**Aim:** Prevalence and antimicrobial susceptibility pattern of gram negative rods in blood cultures.

**Methods:** Cross-sectional study performed in Pathology section, Pak Red Crescent Teaching hospital, Lahore for one year i.e. 01-11-2019 to 31-12-2020. After approval from ethical committee, 1100 blood samples were taken for C/S from various sections of the Hospital. The antimicrobial sensitivity was done by Kirby-Bauer disc diffusion method as approved by Clinical and Laboratory Standard Institute (CLSI).

**Results:** Out of 1100 Blood samples, 65 samples of blood cultures were positive for Gram –ve Rods. The prevalence of Gram negative Rods in blood specimens was only 6%. Out of 6% gram –ve rods, 12% were E.coli, 9% Klebsiella, 3% Enterobacter cloacae, 45% Salmonella, 2% Proteus, 17% Pseudomonas, 10% Acinetobacter and 2% were serretia.

**Conclusion:** The prevalence of Gram negative rods in blood specimens was only 6%.

**Keywords:** Gram negative rods, blood cultures, Antibiotic sensitivity pattern

## INTRODUCTION

Infection of blood is associated with high morbidity and mortality and is main cause of death<sup>1</sup>. Early therapy improves the disease but is dependent to identify the causative agent<sup>2</sup>. This presence of bacteria in the blood stream is called "bacteremia." Mostly, bacterial infection is healed rapidly by the immune system but in case of severe infection, the immune system is failed to clear the bacteria from the blood, causing bloodstream infection (BSI)<sup>3</sup>.

Blood culture requires at least 48–72 hours before the results of microbial identification and antimicrobial susceptibility testing can be reported to clinicians<sup>4</sup>. Worldwide, blood cultures (BCs) are one of the most frequently done microbiological tests in hospitals and still remain the gold standard for detecting bacteremia<sup>5</sup>.

The objective of the study was to find out prevalence and antimicrobial susceptibility pattern of gram negative rods in blood cultures.

## METHODOLOGY

This is a study which is performed for one year i.e. November, 2019 to October, 2020 in the Pathology Deptt. of tertiary care hospital, Lahore. 1100 blood samples were taken from different departments of the Hospital. Patients with high grade fever, not taking antibiotics previously were included and cases with fever but taking antibiotics were excluded. Disinfect bottle tops with 70% isopropyl alcohol (alcohol pad); clean puncture site with alcohol followed by chlorhexidine (CHG) and allow drying. For adults, there is collection of 10-20ml of blood and for children, 1-3ml of blood. For data analysis, SPSS version 25 was used. This research was approved by Hospital Ethical Review Committee.

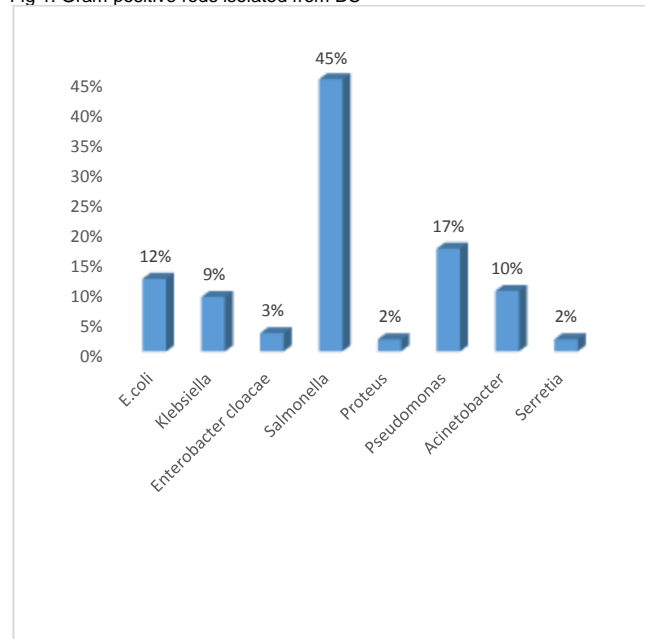
## RESULTS

Out of 65(6%) cases of gram negative rods, 8(12%) were E.coli, 6(9%) Klebsiella, 2(3%) Enterobacter cloacae, 29(45%) Salmonella, 1(2%) Proteus, 11(17%) Pseudomonas, 7(10%) Acinetobacter and 1(2%) were serretia.

Regarding sensitivity %age of E. coli, 75% sensitive to AK, IMP and MEM, 50% to AMC, DO, TZP while 88% were resistant to AML AMP CTX, CRO, CXM, CE, CIP, LEV, SXT, TZP.

Klebsiella species showing 50% sensitivity to DO, 50% were Intermediate to IPM while , 100% resistance against AML, AMC, AMP, SAM, FEP, CTX, CRO, CXM, CE, CIP, LEV, AK, IMP, MEM, SXT, TZP. Enterobacter cloacae showed 100% sensitive to LEV, AK, IMP, MEM IPM, SXT and 100% showed resistance against AML, AMC, AMP, SAM, CTX, CRO, CXM, CE,SXT. Salmonella typhi showed 100% sensitive to DO, IPM, MEM and TZP, 93% sensitive to AMC and AZM while 76% showed resistance against AMP and SXT. Pseudomonas showed 90% sensitive to IPM, MEM, TZP, 81% sensitive to CAZ, CIP, LEV and PRL while 36% showed resistance to ATM, FEP, AK and CN. Acinetobacter showed 100% sensitivity to DO, 57% were sensitive to SAM while 86% showed resistance against CTX, FEP, CRO, CAZ,CIP, AK, IMP, MEM, SXT, TZP. Serretia mercesencs was resistant to AML, AMC, AMP, SAM and showed sensitivity to FEP, CTX, CRO, CXM, CE, CIP, LEV, DO, AK, IMP, MEM, SXT,TZP.

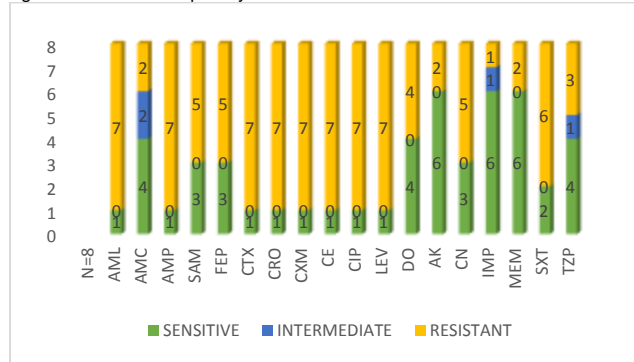
Fig 1: Gram positive rods isolated from BC



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Fig 2: Antibiotic Susceptibility Pattern of E. coli



## DISCUSSION

Before start of antimicrobial therapy, blood culture media i.e. resin-based is approved by the CLSI culture SOPs<sup>6</sup>. For infection in relation with catheter, it is necessary to see either catheter is really infected. It is done by using CLSI culture SOPs. If there is infected catheter, there must be more CFU/ml bacteria in the sample<sup>6</sup>.

It is also important to draw a proper quantity of blood with dominant labeling of culture bottles. This is done by experienced staff. Surveys in the entire world showed low compliance rates for blood culture samples taken before antibiotic therapy. The low level of evidence might be responsible for these results. In addition, the comparatively good data about the importance of early, broad-spectrum antibiotics associated with mortality reduction<sup>7</sup> and prevention of shock<sup>8</sup> in patients with sepsis.

## CONCLUSION

The percentage prevalence of Gram negative Rods in blood specimens was only 6%. Out of this 6% isolated gram negative

rods, 12% E. coli, 9% Klebsiella, 3% Enterobacter cloacae, 45% Salmonella, 2% Proteus, 17% Pseudomonas, 10% Acinetobacter and 2% were serretia. Among the positive cultures for E.coli the most sensitive antibiotics were Amikacin, Imipenem and meropenem.

**Conflict of interest:** Nil

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