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PRACTICALITY OF BLOOD CULTURES SENT FROM THE EMERGENCY MEDICINE DEPARTMENT- A PROSPECTIVE OBSERVATIONAL STUDY

Emergency Medicine

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ABSTRACT

Introduction: Blood cultures are frequently requested in the emergency department for patients with suspected infections. They are widely regarded as the most sensitive technique for detecting bacteraemia or fungemia and are deemed beneficial for specific diagnoses and critically ill patients; however, increasing trends in obtaining blood cultures over the past decade for low-risk patients seem to be associated with core measures and reimbursement policies. Consequently, their utility has become a subject of contention. **Aims And Objectives:** To study the practicality of blood cultures ordered in the emergency department on subsequent patient management. **Results:** The study showed a low occurrence of true infections detected through blood cultures, with a majority of cases being either negative or false positives. Among the total 200 cases, the most common action was to take no action, with 150 cases (75.0%) falling into this category, primarily associated with negative cultures. For false positive results, the actions included continuing antibiotics in 22 cases (11.0%) and repeating the sample in 10 cases (5.0%). Only 8 cases (4.0%) saw antibiotics stopped, and 9 cases (4.5%) had changes made to the treatment plan, with the majority involving false positives. True positive results led to continued antibiotics in 1 case (0.5%) and changes in treatment in 4 cases.

KEYWORDS

blood culture; usefulness of blood culture; blood culture in emergency medicine.

INTRODUCTION

Critically ill patients or those with a high likelihood of persistent sepsis should undergo blood culture testing in the emergency department.[1,2,3]This procedure is widely recognized as the most sensitive method for identifying bacteraemia or fungemia and is particularly valuable for specific diagnoses and severely ill patients. [4,5,6]However, over the past decade, there has been a noticeable increase in the use of blood cultures for low-risk patients, potentially driven by reimbursement policies and performance metrics.[7,8] This trend has raised questions about their overall utility, sparking numerous studies in recent years that often report similar findings.[9,10,11]Blood cultures remain a common diagnostic tool for evaluating suspected infections in the emergency setting.[12,13] While global and national studies have assessed the effectiveness of blood cultures in emergency departments, there is a scarcity of research specific to Kerala.

This study aims to explore the question: Are blood cultures obtained from the emergency department truly effective? By addressing this, the research seeks to provide deeper insights into the role of blood cultures in improving patient outcomes and reducing unnecessary financial burden on patients.

Aims And Objectives

To study the practicality of blood cultures ordered in the emergency department on subsequent patient management.

Methodology

An observational study of blood cultures taken in the emergency department of PRS Hospital, Trivandrum, of a period of 2 years between March 2022-March 2024, after obtained ethical clearance from the Institutional Human Ethics Committee of PRS Hospital, Trivandrum, studied among 200 blood cultures sent from the casualty. Computerized microbiology reports were analysed and categorized those reported as "significant" or "significance uncertain" as "true positive", and those assessed as "doubtful significance" designated as "false positive" (eg, thought to result from skin contaminants). Patients' clinical records, of true positive cases, will be compared to the diagnosis, and ascertain whether the microbiology report was acknowledged and determine whether clinical management was influenced (for example, a change in the antibiotic regimen).

RESULT

Among the total 200 cases, no action was taken with 150 cases i.e, 75.0% falling into this category, primarily associated with negative cultures [Fig. 1].

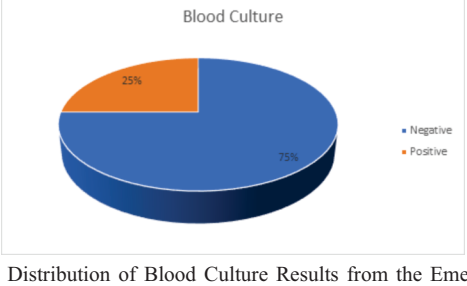

Fig. 1: Distribution of Blood Culture Results from the Emergency Medicine Department

The study showed a low occurrence of true infections detected through blood cultures, with a majority of cases being either negative or false

positives [Fig.2]. The results suggest the need for enhanced protocols for blood culture testing to improve the yield of meaningful positive results and minimize contamination or false positives, which can lead to unnecessary treatments or misinterpretations. Out of the blood cultures taken, only 3% were true positives [Fig. 2].

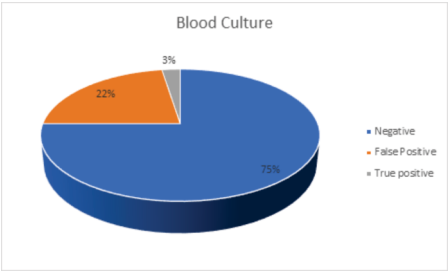

Fig. 2: Categorization of Blood Culture Results into Negatives, False Positives, and True Positives

Among the total 200 cases, the most common action was to take no action, with 150 cases (75.0%) falling into this category, primarily associated with negative cultures. For false positive results, the actions included continuing antibiotics in 22 cases (11.0%) and repeating the sample in 10 cases (5.0%). Only 8 cases (4.0%) saw antibiotics stopped, and 9 cases (4.5%) had changes made to the treatment plan, with the majority involving false positives. True positive results led to continued antibiotics in 1 case (0.5%) and changes in treatment in 4 cases (2.0%)[Fig. 3].

The Chi-Square value (Chi-Square = 2.587E2a, p-value = .000) indicates a significant association between the blood culture results and the subsequent actions taken. This data underscores the impact of blood culture results on clinical decisions, highlighting that false positives often lead to continued treatment or additional sampling, while negative cultures result in no changes. True positives, although rare, prompt more targeted treatment modifications.

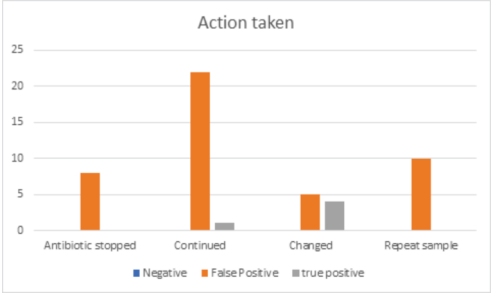

Fig. 3 : Action taken following blood culture results

CONCLUSION

The emergency department reports a low incidence of positive blood culture results, which may be attributed to a reduced threshold for initiating blood culture tests. To improve the efficiency of these procedures, adherence to clinical decision-making standards and adequate training of junior staff are crucial. This study highlights the importance of carefully evaluating blood culture results and their justification to ensure appropriate clinical responses and to minimize unnecessary interventions.

Current research shows that roughly 90% of blood cultures do not detect any organisms. Of the 10% that are positive, only about half indicate true bacteremia, while the remaining half are false positives caused by contaminants. These false positives significantly increase healthcare costs and extend hospital stays. Additionally, 22.4% of clinicians continue empiric antibiotic treatment even in the absence of culture evidence, further complicating care.

The criteria for ordering blood cultures in emergency departments remain unclear. [14]There is a lack of data specific to emergency practice, and initiatives to promote more judicious use of this test are limited. Blood cultures are often requested based on the presence of fever or the admitting registrar's preference, rather than clear clinical benefit. [15]This underscores the need for a more deliberate approach to interpreting blood culture results to prevent unnecessary treatments and improve patient outcomes.

Blood cultures obtained in emergency departments rarely influence patient management and, in some cases, can harm patients. Beyond financial implications, false positives can lead to inappropriate antimicrobial use and prolonged hospital stays, adding unnecessary burden to both patients and the healthcare system.

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