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BLOOD STREAM INFECTIONS AND THEIR SENSITIVITY PATTERN: IN A TERTIARY CARE HOSPITAL

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Abstract:-

BACKGROUND:

The emergence of antimicrobial resistance is a global problem in the community and in hospital. Present study was conducted to determine the common bacterial pathogens causing blood stream infections and their sensitivity pattern.

OBJECTIVE:

To study the pathogen isolated from blood culture and identify their resistance and sensitivity pattern against different groups of antibiotics.

METHODS:

It's a cross sectional study conducted in a tertiary care hospital. The total of 365 samples of blood culture were collected and processed for culture and sensitivity by using Kirby-Bauer disc diffusion method. Data were analyzed for frequency and percentages by SPSS version 16.

RESULT:

Total 365 blood culture samples were collected, among them 59 were positive (16.16%) and 306 were negative (83.83%). Each positive sample was tested against antibiotic to evaluate the sensitivity pattern of the isolated pathogen. Salmonella typhi was found to be the frequently isolated pathogen 37.28%, followed by S.aureus P.aeruginosa Klebsiella and Citrobacter specie, 35.59%, 15.25%, 8.47%, 3.39% respectively. Augmentin, Amikacin, Quinolones and Fusidic acid also found to be 100% sensitive. Vancomycin was the most resistant antibiotic 42.85% against S.aureus. Most of the tested antibiotics showed resistance against Klebsiella and citrobacter species.

CONCLUSION:

Salmonella typhi was frequently isolated pathogen from blood culture, showed resistance against most of the antibiotics tested. There is an overall decline in the antibiotic susceptibility towards commonly isolated bacterial pathogen. Emergence of new drugs is required and irrational and indiscriminate use of antibiotic can be avoided.

Keywords: Blood culture, *S.typhi*,

INTRODUCTION

Performing blood culture test to detect microorganism causing infection is an important essential technique. This test was taken from patients presenting with the symptoms of an infection like high fever or chills.

As soon as the microorganisum invade the body and comes in bloodstream they spread into other parts of the body and cause a serious infection. Bloodstream infections are life threatening condition and required timely antimicrobial therapy1.

The culture can reveal which microorganism is causing the infection, and also determine antimicrobial susceptibility agaist that causative agent.This test also guide clinicians in the selection of the most appropriate and cost-effective treatment for patient. Bloodstream infections cause significant morbidity and mortality worldwide and are among the most common healthcare-associated infections2.

The presence of bacteria in the blood is termed as bacteramia. It occur in diseases such as typhoid fever and endocarditis etc. Septic shock is the clinical term that describe severe life threatening condition, when bacteria multiply and releases toxin in to the blood stream it activate the production of cytokines, consequential leads to fever, chills, toxicity, and shock. Enterobacteriaceae other than Escherichia coli are associated with increased mortality as compared to other Gram-positive infection .Gram-negative and polymicrobial bacteremia can result in septic shock and mortality is greater with high-grade bacteremia and polymicrobial infection. It is required to prevent and control these serious hospital-acquired infections by knowing their sensitivity pattern against microorganism.

The bacterial resistance against antibiotics changing patterns of antimicrobial usage is a major problem for the treatment of infectious diseases leading to both treatment failure and increase in the cost.

Staphylococcus aureus is an important causative agent related to serious infections both in hospitals and community setting. S. aureus has been found to be the most frequently isolated pathogen causing bloodstream infections, skin and soft tissue infections, and pneumonia. Enterococci are part of the normal gastrointestinal flora of humans. Most clinical isolates of enterococci represent colonizing rather than infecting organisms; however, they can cause more serious infections and are sometimes responsible for cholecystitis, cholangitis, peritonitis, septicemia, endocarditis, and meningitis.

The aim of our study is to isolates pathogens from the blood samples and identify common pathogen and their sensitivity pattern. Recommendation of rational use of antibiotics based on experimental results.

MATERIALS AND METHOD:

This is an experimental, cross sectional study. Samples were collected from Fatima Hospital situated in Baqai Medical University. The sample size was calculated by the software epi info. The total numbers of blood culture samples were 365 out of which 59 were positive. The history of the patients collected according to the Performa in which patients name, sex and presenting complaint were mentioned. Blood samples were collected in a aseptic condition and transferred into culture bottle containing Brain heart infusion under strict aseptic condition, the amount of blood used for culture was 1:10 ratio (1 ml blood and 10 ml culture media), the culture bottle was properly marked by the Lab. No. Then incubate at 37o C for 24 hours, after 24 hours the positive and negative results noted by observing turbidity, if the culture samples showed no growth incubated further up to 7 days and continuously observing after each 24 hours. The positive samples processed for Gram staining by using selected colony, in case of Gram positive cocci, the catalase and coagulase test performed which differentiate in to staphylococcus and streptococcus. In case of Gram negative rods, motility and some biochemical test are used to identify the isolated bacteria. All the positive results of blood culture were tested following Kirby-Bauer's disk diffusion method3,4. According to the identification of specific organisms pattern were observed their antibiotic sensitivities and resistance.

RESULTS:

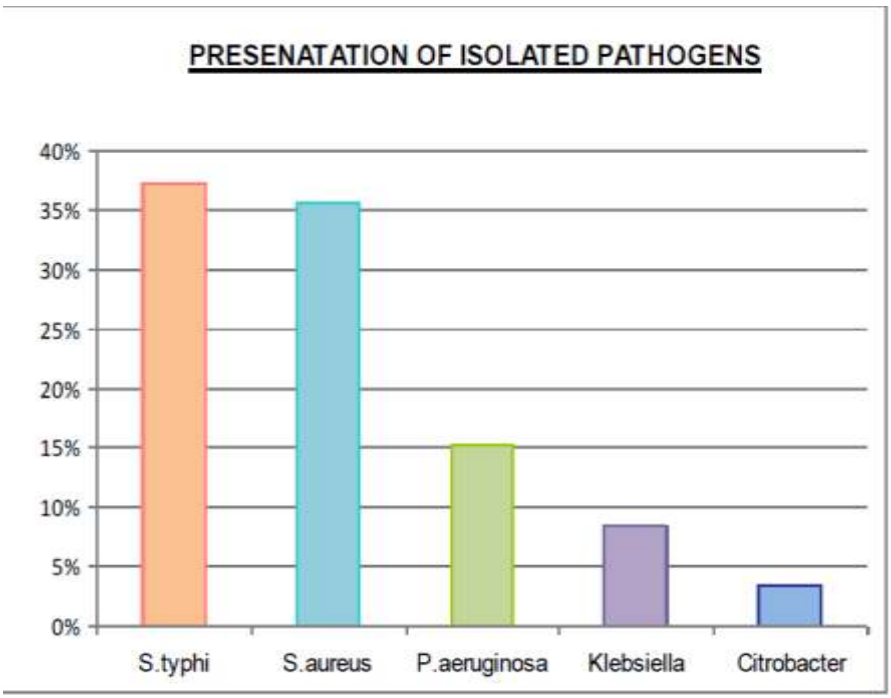
Total 365 blood culture samples were, isolated among them 162 were from female patients and 203 were male. The age distribution showed most of them were from 16 to 30 yrs (table 1).

Tables 1: Age distribution of patients

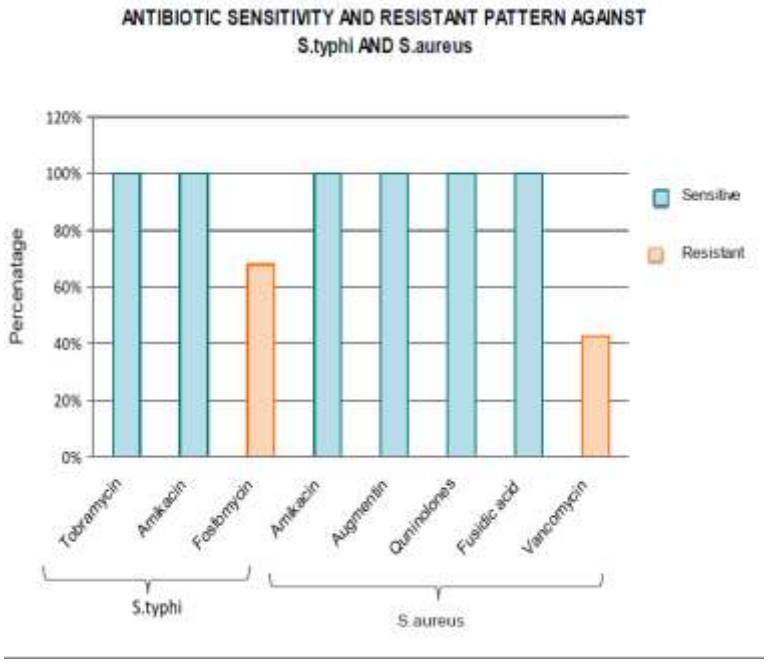
S. No	Age (years)	No of Patients	Percentages (%)
1	1 - 15	112	32
2	16 – 30	147	40
3	31 - 45	27	07
4	46 - 60	49	13
5	> 60	30	08
	Total	365	100

Out of which 59 blood cultures were positive (16.16%) and 306 were negative (83.84%). Each positive sample were tested against antibiotics to evaluate their sensitivity and resistant pattern. All the patients were referred by their physicians with the complaint of high grade, diarrhea, vomiting, dyspnea, cough, chest congestion, abdominal pain and other anomalies. The following pathogens were isolated.

Salmonella typhi, *staphylococcus aureus*, *pseudomonas aeruginosa*, *klebsiella species*. Graph 1. Shows the presentation of pathogens salmonella typhi and staph aureus shows the highest percentage of these isolates (38% and 36 %) respectively.



Graph 1: Percentage of different isolated pathogens.



Graph 2: The sensitivity pattern of these two commonly isolated pathogens.

DISCUSSION:

The inappropriate use of antibiotics in treatment of bacteremia may become life threatening emergency. In addition it also leads to emergence of antimicrobial resistance and has cost implications especially in under developed countries. Staphylococci even now is the most common organism isolated from blood cultures and majority of them was Coagulase negative5. It can result in excessive use of vancomycin and consequently an increased length of hospital stay6. Our results also show high resistant pattern of S. aureus against vancomycin (42%) (Graph 2).

A study performed in rural area of sindh showed drug sensitivity against Quinolone group (95%) cephalosporin (90%)6. Neonatal sepsis is one of the leading causes of mortality and morbidity. The G –ve organiums are the major cause of this observed in a study conducted in children hospital Lahore. It showed that there is highly resistance found against the antibiotics (Ampicillin, Gentamycin, & Cefotaxim)7.

Empirical antibiotic therapy in seriously ill patients required careful selection of antibiotics. Patients admitted in medical ICU in the positive bacterial culture showed Sulbactum group with Cefoperazone in combination with amikacin gives best results. The alternate use of Imipenam is also good8. S. aureus showed no resistance to glycopeptids. Other G-ve isolated showed sensitive pattern against Ciproxin and Amikacin. E coli, Klebsilla and S. aureus remain the principal organisum responsible for bacteremia is a tertiary care setting9.

CONCLUSION:

Salmonella typhi and Staph aureus was frequently isolated pathogen from blood culture, showed resistance against most of the antibiotics tested. There is an overall decline in the antibiotic susceptibility towards commonly isolated bacterial pathogen. Emergence of new drugs is required and irrational and indiscriminate use of antibiotic can be avoided.

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