MEDICAL CHANNEL

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PREVALENCE OF STAPHYLOCOCCUS EPIDERMIDIS IN SUSPECTED SEPTICEMIC NEW BORNS

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ABSTRACT

Objectives: To observe frequency of Staphylococcus epidermidis in suspected septicemic newborns.

This is a cross-sectional descriptive study conducted in Shaheed Mohtrama Benazir Bhutto Medical College in department of pathology with collaboration of Dept. of pediatric Sind Government Lyari General tertiary care hospital of Karachi. from June 2012 to December 2012.

Material & Methods Blood samples for culture were collected from 105 newborn admitted in Neonatal Intensive Care Unit with suspected septicemia. Specimens were inoculated in brain heart infusion broth in ratio of 1:5. Subcultures were performed at 24 hours, 48 hours &72 hours and on the 7th day. Isolates were identified by standard methods.

Result: A total of 70, organisms isolated out of 105 samples. These include Klebsiella species Which were 18, Staphylococcus aureus were 10, Staphylococcus epidermidis were 13, Proteus mirabilis 7, Enterobacter species 5, Pseudomonas species 6, Escherichia coli 5, Acinetobacter species 3, Citrobacter species 2, and Staphylococcus saprophyticus 1.

Conclusion: In this study Staphylococcus epidermidis tends to show a major causative pathogen with higher frequency now a day in neonates.

Key words: New borns, Septicemia, Staphylococcus epidermidis.

INTRODUCTION

S.epidermidis is common inhabitant of the skin and mucous membranes. The appearance of S.epidermidis in literature could be dismissed as contamination; it is now one of the most important agents of nosocomial infections especially in immunocompromised neonates. In these patients, the infection result from a compromise in both general and local defense mechanism and inability to clear staphylococci from infected device because of a biofilm on the foreign body surface. Distinguishing, clinically significant pathogenic strains from contaminant strains are one of the major challenges for clinical microbiologists. Because many isolates are antibiotic resistant, their infections are difficult to treat and can even be fatal. A detailed characterization of isolates of S.epidermidis strains through speciation, genetics and antibiotic susceptibility may be necessary to distinguish infecting from contaminating isolates[1].

Coagulase-negative Staphylococci (CoNS) are the most frequently causative pathogens in bloodstream infection of neonates. Common risk factors for such infections have been identified, including low gestational age, low birth weight and the presence of a central venous catheter. Although CoNS bloodstream infections are significantly less severe than those caused by other pathogens, they lead to prolonged hospitalization and increased antibiotic use[2]..

Recently sepsis caused by Staphylococcus epidermidis has occurred with increasing frequency in several neonatal intensive care units[3]..

S. epidermidis is the most common etiological agent of nosocomial infections in critically-ill immune-compromised patients, and premature neonates admitted into neonatal intensive care units (NICU) are the most vulnerable to CoNS infections. S. epidermidis rarely causes infections in healthy tissue but has a ability to proliferate on surfaces of indwelling medical devices where it forms persistent multilayered agglomerations called biofilms. As biofilms are intrinsically resistant to antibiotics, biofilm-associated infections are a notorious burden on the increased duration of hospital admissions, medical resources and healthcare costs[4].

Coagulase-negative Staphylococci (CoNS) are mostly- causing late-onset sepsis in newborn infants admitted in neonatal intensive care units (NICU) worldwide, up to 66% of late-onset sepsis have been reported. The high incidence of these infections is due not only to a high rate of invasive procedures in immune compromised patients but also to the bacterium's ability to form bioûlms.

The bioûlm-forming property of Coagulase negative Staphylococcus is considered the most important virulence factor. Bioûlm formation is mediated by several factors, such as the polysaccharide intercellular adhesion (PIA) and surface proteins. PIA is regulated by the ICA operon, and the presence of the ica genes has been shown to be a predictor for bioûlm formation in Staphylococcus epidermidis.

Antibiotic resistance in CoNS, especially against –lactam antibiotics, has been increasing now a day. The mecA gene is present in more than 80% of the CoNS late-onset sepsis isolates. The high rate of antibiotic resistance and their bio-ûlm-forming capacities probably enable CoNS to remain persist in the intensive care units by giving them a selective advantage over other more-susceptible species[5].

MATERIAL AND METHODS

The study was performed in department of pathology, Shaheed Mohtrama Benazir Bhutto Medical College Karachi.

A total of 105 neonates with suspected septicemia were included, Blood samples were collected aseptically through cleaning of venous site with 70% alcohol and subsequently followed by iodine. The used needle was replaced and then venous blood was injected into brain heart infusion (BHI) broth in ratio of one part of blood to five parts of broth. Blood culture bottles were incubated at 37C for 7 days. Three subcultures were made at 24hours, 72 hours and on the 7th day on MacConkeys agar (MA) and blood agar (BA) incubated at appropriate temperature and atmosphere according to standard procedure. The colonies isolated were identified by their colonial morphology, Gram's stain and conventional biochemical tests.

RESULTS

Amongst the 105 total number of specimens 63% were positive which are shown in table-1. Table-2 shows different species of organism in which second most common isolate was Gram positive S. Epidermidis, which was 18.57% (N-13).

Other organisms include Klebsiella species which were 25.71% (N-18), staphylococcus aureus were 14.28% (N-10), Proteus Mirabilis were 10% (N-7), Pseudomonas species were 8.57% (N-6), E.coli, Enterobacter species, Acinetobacter, Citrobacter and S. Saprophyticus isolates were less common which are shown in table-2.

TABLE I

Total specimens	Positive specimens
105	70 (63.63%)

TABLE II
DISTRIBUTION OF ORGANISMS ISOLATED ACCORDING TO PERCENTAGE

Isolates	Number	Percent
Staphylococcus epidermidis	13	18.57%
Proteus mirabilis	7	10.00%
Enterobacter species	5	7.14%
E.coli	5	7.14%
Pseudomonas species	6	8.57%
Acinetobacter	3	4.28%
Citrobacter	2	2.85%
Staphylococcus aureus	10	14.28%
Klebsiella species	18	25.71%
Staphylococcus saprophyticus	1	1.42%

DISCUSSION

In Pakistan incidence of neonatal sepsis is three times more common than other developed countries. It is therefore, necessary to continue bacteriological surveillance of septicemia in hospitals and neonatal units for identification of common organisms and their sensitivity pattern. These organisms have developed increased resistance to antibiotics over the last two decades due to unhygienic condition and poor infection control in maternity and neonatal units[6].

Out of 105 suspected septicemia 70 (63.63%) cases of blood culture were positive. which is in strong agreement to study conducted by Nimboor Kavita (2006)[7] reported 62% of culture positivity. Akhtar et al. (2005)[8] and Desai et al. (2010)[9] reported positivity rate of 46.43% and 46.20% respectively, which is in contrast with present study. In present study Gram negative bacteria were isolated in maximum number that is 46 (65.71%) and Gram positive cocci were 24 (34.28%) out of 70 positive cases. This study is supported by Sharma et al. (2008)[10]. According to which Gram negative septicemia was found in 72.7% cases while Gram positive cocci were isolated in 27.2% cases. Most of Gram negative bacteria belong to Enterobacteriaceae family. Majority of authors have reported the Gram negative bacterial preponderance, especially Enterobacteriaceae as the case of sepsis in children such as Waheed et al (2003)[11] who reported Gram negative bacteria as 80% of the cases and Jain et al. (2003)[12] reported 67.7% Gram negative bacterial and 32.3% were Gram positive bacteria which is also in close approximation with the present study.

In the present study Staphylococcus epidermidis was isolated in 13 (18.57%) cases. This is in close agreement to Kamga et al. (2011)[13] who reported 16.4% Staphylococcus epidermidis infection in neonates.

CONCLUSION

S.epidermidis is common inhabitant of the skin and mucous membranes. The appearance of S.epidermidis in clinical material could be dismissed as contamination. Septicemia is a common problem in neonates. Conventionally most common causative organism of septicemia was Gram-negative bacteria.

In this study Staphylococcus epidermidis tends to show a major causative pathogen with higher frequency now a day in neonates.

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