

Changing Pattern of Bacterial Isolates from Blood Samples in Paediatric ICUs

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ABSTRACT

Objective: To observe most frequent bacterial isolate from septicemic children.

Setting: Study was conducted in BMSI, JPMC, Karachi with collaboration of tertiary care hospitals of Karachi during July 2010 to December 2010.

Method: Blood samples for culture were collected from 105 children admitted in ICU with suspected septicemia. Specimens were inoculated in brain heart infusion broth in ration of 1:5. subcultures were performed at 24 hours, 72 hours and on the 7th day. Isolates were identified by standard methods.

Results: A total of 67 organisms isolated out of 105 samples. These include Gram negative (45/67) and Gram positive (22/67). *Klebsiella* were 18, *Staphylococcus aureus* were 12, *Staphylococcus epidermidis* were 10, *Proteus mirabilis* 7, *Enterobacter* 5, *Pseudomonas* 5, *Escherichia coli* 4, *Acinetobacter* 3, *Citrobacter* 2 and *Staphylococcus saprophyticus* 1.

Conclusion: In the view of isolates *Klebsiella pneumoniae* tends to show a higher frequency in the paediatric sepsis.

Keywords: Bacterial Isolates, blood culture, ICU, pediatric.

INTRODUCTION

Blood sample is an important diagnostic tool for identification of infectious diseases¹. Septicemia is a symptomatic bacteremia, is a common condition in children with a resultant high morbidity and mortality. Moreover, the condition is often seen in neonates and young children².

Primary site of invasion is most often blood stream. Meningitis occurs in 25% cases of neonatal sepsis³. Children can be infected by anaerobic bacteria which may be serious and life threatening⁴. The proportion of septic infection in hospitals due to gram negative bacteria varies between 30 to 80% whereas infection due to gram positive bacteria varies between 6-24%⁵. Sepsis remains the predominant cause of mortality and morbidity in developing and industrialized world. In developing world neonatal sepsis is greater problem⁶. Neonatal infections in hospital born babies at higher risk due to poor intrapartum and postnatal infection control practices⁷. In the community about 50 to 88% of all neonatal deaths are due to infectious causes and 22% to 66% of all admission in neonatal units is due to infection including septicemia and pneumonia⁸.

A significant mortality in neonatal period occurs

due to sepsis. Neonatal infections are estimated to cause 1.6 million of all neonatal deaths occurring in developing countries. Gram negative organisms remain major cause of neonatal septicemia⁹. In Pakistan it is three times more common¹⁰. Despite advancement in antimicrobial therapy and supportive care, septicemia continues to be a leading cause of morbidity and mortality during neonatal period¹¹. The immaturity of immune system, specially phagocytic and humoral immunity, predisposes children to an increased incidence of sepsis caused by bacteria¹².

The pattern of bacteriological agents implicated in septicemia has been shown to vary from place to place and from time to time even in the same institute¹³.

MATERIAL AND METHODS

The study was performed in Department of Microbiology, BMSI, JPMC, Karachi from July 2010 to December 2010. A total of 105 children aged 0-12 years 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) and sodium thioglycate broth in ratio of one part of blood to five parts of broth. Blood culture bottles were incubated at 37°C for 7 days. Three subcultures were made at 24 hours, 72 hours and on the 7th day on MacConkeys agar (MA), Chocolate agar (CA) and Blood agar (BA) and

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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 (based on the methods of Cowan and Steel).

RESULTS

Out of 105 samples of suspected septicemia 67 (63.8%) obtained with growth of bacteria. The incidence of gram negative and gram positive organisms were 45/67 (67.16%) and 22/67 (32.84%) respectively (Table I). Table II shows the total occurrence of isolates according to percentage.

Table I: Distribution of gram negative organisms

Total specimens	Positive specimens	Gram positive	Gram negative
105	67(63.80%)	22(32.84%)	45(67.16%)

Table II: Distribution of organisms isolated according to percentage

Isolates	=n	%age
Klebsiella species	18	26.86
Proteus mirabilis	7	10.44
Enterobacter	5	7.46
E.coli	4	5.97
Pseudomonas species	5	7.46
Acinetobacter	3	4.47
Citrobacter	2	2.98
Staphylococcus aureus	12	17.91
Staphylococcus epidermidis	10	14.92
Staphylococcus saprophyticus	1	1.49

DISCUSSION

Klebsiella pneumonia was the most frequent isolate in blood culture of children with suspected septicemia in hospitals. The present study was conducted to determine the frequency of septicemia due to different micro-organisms. In our study a total of 105 blood culture were examined and 67 samples were positive. Present study supports this finding that most common etiological agent of septicemia in children is *Klebsiella pneumonia*. In a study Kumhar et al¹⁴ reported that *Klebsiella* was predominant pathogen in 29% of cases. Bhutta and Yousif¹⁵ reported that *Klebsiella* was the most common cause of neonatal sepsis in Karachi Pakistan.

Joshi et al¹⁶ from India reported Gram negative sepsis by *Klebsiella pneumonia* in 30.4%.

In another study done by Leibovitz et al¹⁷ the appearance of extremely virulent multidrug resistant *Klebsiella* in their neonatal intensive care unit in Kaplan Hospital Israel. Another study done by Desai et al¹⁸ in India, *Klebsiella species* and *Staphylococcus aureus* were the most common gram

negative and gram positive organisms together accounting for 47.14% and 25% of the isolates respectively which correlates my study respectively.

My study is in agreement with Waheed et al⁸ who reported *Klebsiella*, *Staphylococcus aureus* and *Staphylococcus epidermidis* more common isolates in sepsis i.e. 35%, 17.4% and 19% in early and late onset sepsis. While *Staphylococcus epidermidis* were more common in early onset and *Staphylococcus aureus* were more common in late onset sepsis.

In accordance with another study by Latif et al¹⁹ the ratio of *Klebsiella species* is 24.1%, *Staphylococcus aureus* 24.1%, coagulase negative staphylococcus (CoNS) 20.8% and Streptococci 2%.

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