INVESTIGATION OF POSITIVE BLOOD CULTURES IN INFANTS ADMITTED TO NICU OF MUSTAFA-KHOMEINI HOSPITAL, ILAM

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Abstract:
Infections are one of the most common causes of death in infancy. 2% of embryos and 10% of newborn infants are afflicted with infection during the first 6 months of life. Blood culture is one of the most important diagnostic methods in severe infections. The aim of this study was conducted investigate positive blood cultures in infants admitted to NICU of Mustafa-Khomeini Hospital, Ilam. The present descriptive cross-sectional study was performed in Mustafa-Khomeini Hospital Laboratory on all infants admitted to the NICU in May and September 2016 whose pediatricians requested a blood culture. For this purpose, required blood samples were collected. blood cultures were rapidly transferred to the laboratory, where it was transferred to the 37c° carburetor and the microbial examination was carried out. The interpretation of real and fake positive cases was conducted based on clinical and laboratory symptoms. The data collected were analyzed by SPSS version 18 through using descriptive-analytical statistics and chi-squared statistical test. 185 infants blood samples, of which 87 (47.1%) cases were boy and 98 (52.9%) cases were girl, were examined in the present study. The highest frequency of differential diagnosis of the type of microorganisms was related to Staphylococcus-Epidermidis and the lowest frequency was related to E.coli. The results of the present study are based on the high incidence of false positives in the blood culture of the neonates in the early stages, which impose huge costs on the therapeutic system, wasting time and manpower and worsening of the treatment process. Therefore, it is essential to establish better coordination between the clinical and laboratory departments and medical centers. It is also necessary to educate health personnel in order to collect blood sample with utmost precision and do their best to maintain proper blood stream.
Keywords: *Positive Blood Cultures, Infants, NICU, Ilam, Iran*

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INTRODUCTION:

Blood is one of the body liquids which is sterile in normal conditions; however, some factors, such as the intrusion of microorganisms into the blood stream, might cause the incidence of various infections, such as bacteremia, septicemia and parasitism [1]. Blood stream infection Blood flow infection is one of the most severe infectious diseases and medical emergencies, which, if not detected and treated appropriately, has high mortality and complications [2, 3]. According to the US Centers for Disease Control and Prevention, an infection is diagnosed to be bacteremia, as the most commonly reported infectious disease, if blood cultures and clinical signs confirm the emergence of this disorder after a period of 84-hour hospitalization [4, 5]. Infections are one of the most common causes of death in infancy. 2% of embryos and 10% of newborn infants are afflicted with infection during the first 6 months of life [6]. Inflammatory lesions, which rank second among mucous membrane diseases in Iran, are found in the autopsy of 25% of infants; according to 1995 health report, the mortality rate of this disease was 18 per 1000 live births in Iran [7]. Infectious and neonatal infections, especially blood infections, are among major causes of death worldwide in general, and in developing countries in particular [8]. Sepsis has been reported to play significant role in 200,000 deaths in America per year; additionally, the incidence of sepsis and septic shock has significantly increased over the past 20 years and more than 300,000 cases are likely to occur annually, of which approximately two thirds of cases occur in hospitalized patients at hospitals [9]. The main causes of infection among infants include exposure to infected passages during birth, immune system weakness, non-compliance with NICU hygiene, contamination of devices and equipment in the department, and failure to comply with sanitary measures especially by personnel located in the relevant department. Neonatal infections include sepsis, meningitis, omphalitis, diarrhea and urinary tract infections [10]. Generally, the causative bacterial agents are different from a geographical point of view; streptococcus group B is more prevalent in America, but golden staphylococci and gram-negative bacilli are more prevalent in developing countries [11]. It, also, has been claimed that boy infants suffer blood infection, which is the most prevalent disease in males, twice as more than girl infants [12]. Considering the fact that reducing neonatal mortality is one of the important goals of health programs in different countries, also considering the importance of knowing the most common neonatal septicemia and awareness of their sensitivity to antimicrobial drugs in the treatment of susceptible septicemia, the present cross-sectional study was conducted investigate positive blood cultures in infants admitted to NICU of Mustafa Khomeini Hospital.

MATERIALS AND METHODS:

The present descriptive cross-sectional study was performed in Mustafa-Khomeini Hospital Laboratory on all infants admitted to the NICU in May and September 2016 whose pediatricians requested a blood culture. For this purpose, required blood samples were collected according to the instructions at least 2 times from 2 separate sites. The process of blood culture was like this: the nurse in charge of collecting blood samples cleansed the patient's skin with 70% alcohol and then disinfected it for 2 minutes with iodine after washing hands with water and soap. Then, about 5cc, blood was taken at two separate times and at intervals of at least 20 minutes from the brachial vein. Blood was swiftly taken into containers containing a 70% alcohol disinfection medium without changing the needle, and then the blood cultures were rapidly transferred to the laboratory, where it was transferred to the 37c° carburetor and the microbial examination was carried out. The interpretation of real and fake positive cases was conducted based on clinical and laboratory symptoms [13]. The data collected were analyzed by SPSS version 18 through using descriptive-analytical statistics and chi-squared statistical test [14, 15].

RESULTS:

185 infants blood samples, of which 87 (47.1%) cases were boy and 98 (52.9%) cases were girl, were examined in the present study. The results showed that 15 cases had positive blood culture, of which 9 cases were related to girls and 6 positive cases were in boys (P>0.05)(Table 1). The highest frequency of differential diagnosis of the type of microorganisms was related to Staphylococcus-Epidermidis and the lowest frequency was related to E.coli (Table 2); additionally, preterm birth and respiratory disorders were the most common causes of admission to NICU among infants either at birth or during 24-72 hours after birth.

Table 1: Frequency of boys and girls with results of blood culture

Gender	Number (Percent)	Blood Culture	
Boys	87 (47.1%)	Positive	6
		Negative	81
Girls	98 (52.9%)	Positive	9
		Negative	89
Total	185 (100%)	-	

Table 2: Frequency of different type of bacteria

Type of bacteria	Frequency
Staphylococcus Epidermidis	10
Enterococcus	2
E. coli	1
Mix	2
Total	15

DISCUSSION:

Neonatal infection is one of the major causes of illness and mortality, especially among preterm infants [16]. Based on WHO estimates, infant infections are responsible for 5 million infant deaths per year in the world, and about 40% of all infant deaths occur in developed countries [17]. Blood culture is a universal standard method for the diagnosis of vasculitis and bacterial infections in adults, children and infants [18]. This method is routine due to the feasibility and availability of all laboratories. The septicemia is categorized in two groups of preterm and post term among infants; if the infant is exposed to the source of infection within 7 days after birth, it is called preterm and if exposure happens after 7 days, it is called post-term; however, fatal cases of toxic septicemia occur within the first 24 hours in infants [19]. A positive microbial pattern of positive blood culture was observed in NICU of Mustafa-Khomeini Hospital in the present study. 185 infants blood samples, of which 87 (47.1%) cases were boy and 98 (52.9%) cases were girl, were examined in the present study. The results showed that 15 cases had positive blood culture, of which 9 cases were related to girls and 6 positive cases were in boys (P>0.05). based on the results of Rajabi et al study (2012), which was conducted in order to investigate the antibiotic susceptibility of isolated tissues from neonatal blood and urine infections in Tehran, although he incidence of urinary tract infection was more frequent among boy in comparison with girl infants, the incidence of blood infection was equal between two sexes [20]. The result of the present study indicated higher incidence of blood infection among girl infants. The results of

other studies have stated the incidence of toxic septicemia among boy infant is twice as that of the girl infants, which is not consistent with the current study [12]; this difference is probably due to differences in the population surveyed. The most commonly reported bacterial strain turned out to be Staphylococcus-Epidermidis in the present study, indicating contamination and non-standard sampling techniques. The results of Motamebi et al study (2008), which was conducted in order to investigate the effect of training on correct sampling method on the reduction of blood culture contamination, showed a significant reduction in contamination and false positive culture [21]. It seems that nowadays the biggest problem in the diagnostic process through blood culture in adults and children is related to unwanted contamination during or after sampling, which is a disorder in the diagnosis and treatment of patients. The results of Chitsaz et al study (2005), which was conducted in order to discuss Bacterial contamination of blood cultures, showed that 19.95% of positive blood cultures have been diagnosed due to real bacteremia and 84.04% have been reported due to infection during or after an aging sample [22]. The results of a study conducted by Asefzadeh et al (2010) in order to investigate infection of blood culture and various positive real and false organisms showed that out of total 244 cases of cultivation, there were 62 false and 31 real positive cultures [23], which is consistent with the findings of the present study.

CONCLUSION:

The results of the present study are based on the high incidence of false positives in the blood culture of the

neonates in the early stages, which impose huge costs on the therapeutic system, wasting time and manpower and worsening of the treatment process. Therefore, it is essential to establish better coordination between the clinical and laboratory departments and medical centers. It is also necessary to educate health personnel in order to collect blood sample with utmost precision and do their best to maintain proper blood stream.

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