Neonatal Infection in the Neonatal Unit at Baghdad Teaching Hospital, Iraq

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ABSTRACT:

BACKGROUND:

In Iraq, the true magnitude of the neonatal infection among newborns receiving care is not known as health system was badly eroded in the last two decades. This work was carried out to find factors associated with neonatal infection among newborns receiving care in intensive unit.

METHODS:

The records of a total of 723 neonates admitted to the neonatal intensive unit at Baghdad teaching hospital during the period Nov. 2003 to Oct. 2004 were reviewed. Information regarded birth weight, gestational age, medical history of the mothers, bacterial infections and management procedures were collected.

RESULTS:

Out of the total neonates, 9.3% had bacterial infection. Low birth weight, prematurity and prolonged rupture of membrane were factors significantly associated with bacterial infection (p = 0.001, 0.002 and 0.03, respectively). Oxygen therapy, invasive procedures, and the nasogastric tube (p = 0.01) were significantly associated with infection. *S. aureus, enterbacter* and *E. coli* were the commonest pathogens.

CONCLUSION:

The study provides useful information for future surveillance in association with preventive program as there were several factors associated with neonatal infection which could be prevented.

KEY WORDS: neonatal infection, invasive procedures, low birth weight, preterm

INTRODUCTION:

Newborns receiving care in the Neonatal Intensive Care Unit (NICU) are at increasing risk of hospital acquired infections [1-3], which is the most important cause of morbidity and mortality among hospitalized newborns. Several reports in Iraq demonstrated the risk factors and specified the causative agents [4-8]. The impact of different nosocomial infections has been well documented [8]. In Iraq, the true magnitude of the problem is not known as health system has been badly eroded in Iraq over the period of gulf wars and sanction [9] together with deterioration and damage to water purification, sewage system and electricity, which in turn have a strong impact on the prevalence of infectious diseases [10]. This work was carried out to find out factors associated with neonatal infection among newborns receiving care in NICU.

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MATERIALS AND METHODS:

A total of 723 neonates admitted to NICU of the Baghdad Teaching Hospital during the period Nov. 2003 to Oct. 2004.The case records were reviewed and information regarding birth weight of the neonate, gestational age, and medical history of the mother, bacterial infection of newborn and management procedures were collected. Blood and / or CSF cultures were used to establish the diagnosis of bacterial infection. Early onset sepsis (EOS) was defined as sepsis presenting within the first 72 hours of birth, while the late onset sepsis (LOS) was the infection after 72 hours of birth [11]. Multiple logistic regression was used to examine the association between the dependent variable (positive blood culture) with the independent variables (LBW, preterm, pre-eclampsia, diabetes mellitus, prolonged rupture of membrane, type of delivery, and management procedures). P value less than 0.05 was considered statistically significant.

RESULTS:

Among 723 neonates, 67 (9.3%) had bacterial infection. Low birth weights (LBW), prematurity and prolonged rupture of membrane were significantly associated with bacterial infection ($p < 0.05$) (Table 1). There were 21 (31.8%) neonates with EOS, while those with LOS were 45 (68.2%).

All neonates (100%) who received oxygen therapy (O_2) or invasive procedures (canula or intravenous set) had bacterial infection. Nasogastric tube was significantly associated with bacterial infection ($p = 0.01$). These findings are shown in Table1.

The most common pathogenic organisms were *s. areus* (24 cases or 35.8%), Enterobacter (12 cases – 17.9%). *E. coli* (12 cases – 17.9%), Klebsiella (11 cases – 16.4%), and *S. albus* (4 cases – 4.5%). (Table 2).

DISCUSSION:

The finding that 9.3% of neonates admitted to NICU had bacterial infection is similar to the reported septicaemia at other Teaching Hospital in Baghdad (8.8%) [5] in 2001. However, other workers reported much higher rates in Baghdad (41.9%) [4]. The prevalence of neonatal infection varies with considerable fluctuation overtime and geographical location and even from hospital to hospital. These variations may be related to rates of prematurity and LBW, prenatal care, conduct of labour and environmental conditions [12-15].

Early neonatal sepsis was detected in 31.8% of the neonates with infection. Several workers reported that the most common age of nosocomial infection was the 4th day of period [16]. EOS may be introduced at time of resuscitation [17].

The study revealed significant association of neonatal infection with LBW and prematurity. It is consistent with that of other workers [7,12,16]. The significant association of prolonged rupture of membrane with neonatal infection is in agreement with that of many studies [18-20].

The finding that 100% of neonates who received O_2 therapy, canula or intravenous set had bacterial infection and the significant association of nasogastric tube with infection is similar to that reported from developing countries [3]. The use of invasive procedures increases the risk in many ways. Others stated that upper respiratory tract colonization and infection rates increased in intubation of neonate [21] and applying intravenous catheter [16]. Exposures for more than 5 days to umbilical venous catheter may increase the risk of sepsis by at least 21 times and exposure to an arterial catheter may increase the risk of sepsis by 16 times [22].

Laboratory findings had confirmed the importance of *S. aureus*, *Klebsiella* and *E. coli*. This finding is consistent with that of others [3-5,7]. In agreement with reports from developing countries no group B streptococcal infection was reported [16].

CONCLUSION:

This study provides useful information for future surveillance in association with preventive program as there were several factors associated with it which could be prevented. Poilices for prevention of infection in NICU have evolved over years, and the major aim of the NICU team has been to reduce the risk of infections among highly susceptible patients in their care.

Table 1 Factors associated with nosocomial neonatal infection

Variable	No.	Positive blood culture			
		No.	β	SE	P value
Preterm	67	53 (79.1)	0.5	0.02	0.001
LBW	67	55 (82.1)	0.3	0.05	0.002
Pre-eclampsia	67	10 (14.9)	0.05	0.02	0.2
Diabetes mellitus	67	4 (6.0)	0.04	0.01	0.7
Prolonged rupture of membrane	67	9 (13.4)	0.05	0.02	0.03
Type of delivery (NVD)	67	38 (56.7)	0.02	0.02	0.8
Management procedures					
Canula	67	67 (100.0)			
IV set	67	67(100.0)			
NG tube	33 (49.5)	0.4	0.01	0.01	
Suction	67	4 (6.0)	0.04	0.001	0.5
O_2 therapy	67	67 (100.0)			

Table 2 Distribution of isolated bacteria

Bacteria	No.	%
Staph. areus	24	35.8
enterobacter	12	17.9
E. coli	12	17.9
Klebsiella	11	16.4
Staph. albus	4	5.9
Serratia	3	4.5
Salmonella typhi	1	1.5

REFERENCES:

1. Apostolopoulou E. Nosocomial bloodstream infection in neonatal intensive care unit: excess of length of stay, extra cost of antibiotics. ICU nurse web 2004; 19: 1-7.
2. Stoll BJ. Infection of the neonatal infant. In: Behrman RE, Kleigman RM, Jenson HB (editors), Nelson textbook of pediatrics, 17th edition, Philadelphia, Saunders 2004, pp 623-640.
3. Nagata E, Brito A, Matsuo T. Nosocomial infections in a neonatal intensive care unit: incidence and risk factors. Am J Infect Control 2002; 30: 26-31.
4. Al-Ghaban NI, Said NI, Al-Ani W. Neonatal septicaemia. Iraqi J Comm Med 2001; 14: 7-9.
5. Salman M. Septicaemia and focal infections in neonates. Iraqi J Comm Med 2001;14:122-126.
6. Al-Zwani EJK. Neonatal septicaemia in neonatal care unit, Al-Anbar governorate, Iraq. East Mediterr Hlth J 2002;8:509-514.
7. Abood HR, Al-Sadoon I. Neonatal sepsis; causative agents. M J B U 2003;21:20-24l
8. Ibrahim AH. Bacterial septicaemia in neonate. J Fac Med Bagh 2005; 47: 162-164.
   Al-Alwan A. H
9. ealth in Iraq. A draft prepared as discussion paper for the first conference on health. MOH. August 2004.
10. UNICEF Iraq. The situation of children in Iraq. An Assessment Based on the United Nations Convention on the Right of the Child. Geneva. 2002.
11. Moffet H. Pediatric infectious disease, problem oriented approach., (3rd edition). New York, 1989. pp.469-501.
12. Yancy M, Duff P, Kubilis P. Risk factors for neonatal sepsis. Obst and Gynaecol 1996; 87:188 – 194.
13. Haque KA. A scheme for better perinatal care in Kingdom of Saudi Arabia. Saudi Med J 1988; 9:239-246.
14. Harfouche JK, Verhoestrate LV, Al-Shazali H. The state of child health in Eastern Mediterranean Region. 2nd edition, Alexandria,WHO (EMRO) . 1995. pp.31-37.
15. Klein J, Maray S. Bacterial sepsis and meningitis. In: Remington J, Klein J (editors), Infectious diseases for foetus and newborn. Philadeliphia, WB Saunders, 1995. pp.835-890.
16. Payman S, Ali-Akbar R, Masood Y, Mohsen N. Neonatal nosocomial infection in Bahrami children hospital. Indian J Pediatr 2006; 73: 197-200.
17. Chacko B, Sohi I. Early onset of neonatal sepsis. Indian J Pediatr 2005; 72: 23-26.
18. Asindi AA, Bilal NE, Fatinni YA, Al-Shehri MA, Mannan N, Habeeb SM. Neonatal septicaemia. Saudi Med J 1999; 20: 942-946.
19. Linder N, Ohel G, Gazit G, Keider D, Tamir I, Rechman B. Neonatal sepsis after prolonged rupture of premature membrane. J Perinatol 1995; 15: 36-38.
20. Marlowe SE, Greenwald J, Anwar M, Haitta M, Hegyi T. Prolonged rupture of membrane in term newborn. Am J Perinatol 1997; 14: 45-52.
21. Asindi AA, Archibong E, Mannan N. Mother-infant colonization and neonatal sepsi in prelabor rupture membrane. Saudi med J 2002; 23: 1270-1274.
22. Moro ML, DeToni A, Staifi J, Camen M, Broga M, Znne R. Factors for nosocomial sepsis in newborn in intensive care unit. Eur J Pediatr 1996; 155: 315-322.