

BACTERIAL INFECTIONS IN NEONATAL UNIT IN TRIPOLI MEDICAL CENTER, LIBYA

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Abstract

Background: Infection is a frequent and important cause of morbidity and mortality in the neonatal period.

Objective: This work was carried out to investigate the prevalence of bacterial infection and the frequency of different pathogens among newborns admitted to the Neonatal Intensive Care Unit (NICU) at Tripoli Medical Center (TMC), Libya.

Methods: The case records of all neonates admitted to the NICU of TMC, Libya for the period Sept. 1996 through August 1997, inclusive, were reviewed. Blood and/or CSF cultures were used to establish the diagnosis of bacterial infection. The admissions were categorized as sterile and unsterile.

Results: A total of 1123 newborns were admitted to NICU over the period of the study, 129 (11.5%) of them were proved to be bacterially infected, 10.6% and 24% of the sterile and unsterile admissions, respectively, had bacterial infection. Blood culture

was positive in 115 (10.2%) of the admitted newborns, while CSF culture was positive in 24 (2.1%) of them. Gram-negative bacteria were the predominantly isolated bacteria. *Serratia* spp. was isolated from 38.3% and 50% of blood and CSF cultures, respectively. *Klebsilla pneumoniae* was isolated from about 25% of both blood and CSF cultures. Coagulase negative staphylococcus (CONS) was isolated from 11.3% of blood cultures.

Conclusion: It can be concluded from this study that neonatal infection is still a problem facing the country and there is a need for study of bacterial colonization of anogenital tract of Libyan pregnant women and its relation to neonatal infections .

Key words: neonatal infection, gram-negative bacteria, Libya

IRAQI J MED SCI, 2007; VOL. 5 (2):13-17

Introduction

Infection is a frequent and important cause of morbidity and mortality in the neonatal period. Infections affect neonates either through transplacental haematogenous vertical transmission or exposure to infectious diseases in the community^{1, 2}. The frequency of different pathogens varies between geographical areas and should be defined in each setting³⁻⁵.

This work was carried out to investigate the prevalence of bacterial infection and the frequency of different

Pathogens among newborns admitted to the Neonatal Intensive Care Unit (NICU) at Tripoli Medical Center (TMC), Libya.

Materials and Methods

The case records of all neonates admitted to the NICU of TMC, Libya for the period Sept. 1996 through August 1997, inclusive, were reviewed. Data regarding date of admission, gestational age, birth weight and laboratory results were collected. Blood and/or CSF cultures were used to establish the diagnosis of bacterial infection.

The admissions were categorized as sterile and unsterile. The sterile category refers to neonates who delivered at TMC and admitted to the NICU, while unsterile category includes neonates who were

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Received 26th July 2005; Accepted 22nd February 2006

delivered at home or others hospitals and then admitted to the NICU.

Data analysis was carried out using scientific package for social sciences program (SPSS) for windows version 11. Chi-square was used for comparison of prevalence rates. P value less than 0.05 was considered as statistically significant.

Results

A total of 1123 newborns were admitted to NICU over the period of the study, 129 (11.5%) of them were proved to be bacterially infected, 10.6% and 24% of the sterile and unsterile admissions, respectively, had culture proven bacterial infection. The difference between the two rates is statistically significant (p < 0.05) (Table 1).

Table 1 : Prevalence rates of neonatal bacterial infection

Type of admission	Total Number	Infected newborns*	
		No.	%
Sterile	1048	111	10.6
Un Sterile	75	18	24.0
Total	1123	129	11.5

* Blood and / or CSF culture positive (X² = 18.3, d.f. = 1, p < 0.05)

Blood culture was positive in 115 (10.2%) of the admitted newborns, while CSF culture was positive in 24 (2.1%) of them. Prematurity (gestational age less than 37 weeks) was reported in 49.3% of

newborns, while low birth weight (LBW) was reported in 43% of newborns. Microorganisms isolated from bacterially infected newborns are shown in Table 2.

Table 2: Microorganisms isolated from blood and CSF cultures

Blood culture			CSF culture		
Microorganism	No.	%	Microorganism	No.	%
Serratia species	44	38.3	Serratia species	12	50.0
Klebsilla pneumoniae	28	24.3	Klebsilla pneumoniae	6	25.0
Enterobacter species	15	13.0	E. Coli	2	8.3
Coagulase negative staphylococcus (CONS)	13	11.3	Acinetobacter species	2	8.3
Staph. Epidermidis			Others	2	8.3
Others	15	13.0			
Total	115	89.2	Total	24	18.6

Gram- negative bacteria were the predominantly isolated bacteria. Serratia spp. was isolated from 38.3% and 50% of blood and CSF cultures, respectively. Klebsilla pneumoniae was isolated from about 25% of both blood and CSF cultures. Coagulase negative staphylococcus (CONS)

was isolated from 11.3% of blood cultures. Figure 1 showed the monthly variations of prevalence of bacterially infection among sterile and unsterile admissions to the NICU. Neonatal infection shows an increase in the prevalence with time in both admissions.

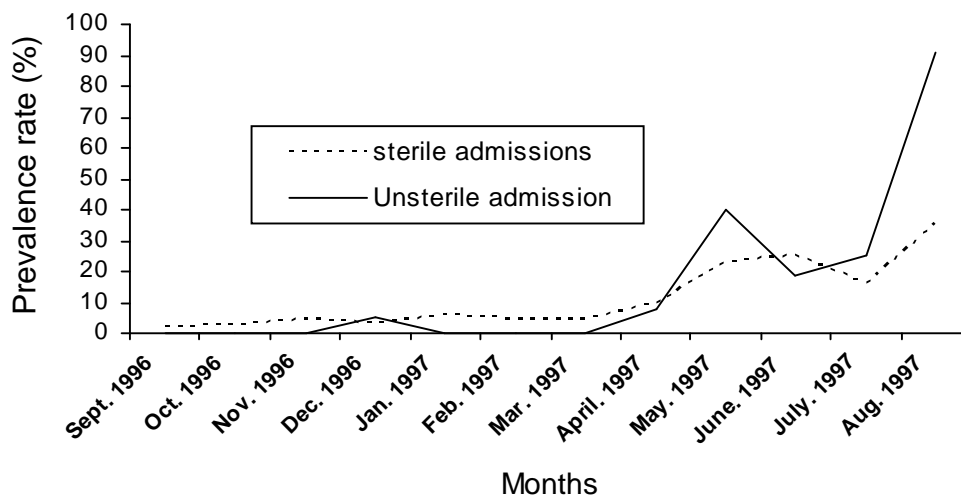


Figure 1: Monthly variations of prevalence of bacterial infections among sterile and unsterile admissions to NICU in TMC

Discussion

The prevalence of neonatal sepsis varies with considerable fluctuation overtime and geographical location, and even from hospital to hospital. These variations may be related to rates of prematurity, low birth weight (LBW) ^{6, 7}, prenatal care ⁸, conduct of labor ⁹, and environmental conditions ¹⁰.

This study revealed that 11.5% of neonates admitted to the NICU had culture proven bacterial sepsis of blood and / or CSF culture; 10.2% had bacteraemia only. Neonatal bacteraemia is estimated to occur in 1-8 infant per 1000 live births in developed countries ¹¹. In developing world neonatal sepsis is a greater problem, a rate of 5-10% was reported in Malaysia ¹² and a rate of 6% of neonatal septicaemia was reported in Saudi Arabia ¹³. The relatively high prevalence rate of neonatal sepsis revealed by this study may be attributed to the finding of high prevalence of prematurity and LBW which in turn could be due to the admission policy in TMC, as it was a common practice to admit premature and LBW neonates to the NICU. The risk of infection is inversely related to gestational age and birth weight ^{6,7}.

The finding that a significantly higher percent of unsterile admission than the sterile admission could be due to the fact that unsterile deliveries, whether home deliveries which are largely in hands of untrained birth attendants or hospital deliveries which are mostly in hands of nurses or midwives in the district and subdistrict hospitals; these deliveries presumably conducted in poor hygienic practices with increased risk of neonatal infection during delivery or thereafter. Nosocomial infection may account for large proportion of both forms of neonatal infections ⁷. Abdul Latif ¹⁴, In Iraq reported a significant association between neonatal infection and type of delivery place and birth attendant. A similar finding was reported from India ¹⁵ and Bangladesh ¹⁶.

Several investigators reported variations in the frequency of different pathogens between geographical areas; the bacterial pathogens affecting infant tend to be those, which colonize the anogenital tract of the mother. In Western and developed countries, group B streptococci (GBS) has emerged as the leading cause of neonatal sepsis ^{3,17,18}. The picture of neonatal

infection in the developing world is quite different, gram- negative organisms still predominate, as revealed by this study with insignificance of GBS as a pathogen. This is the picture in India^{19,20}, Pakistan²¹, Sri Lanka²², Bangladesh¹⁶ and Jordan²³. In Saudi Arabia, also, many workers reported a rate of GBS neonatal infection, although some of them found a high rate of colonization of anogenital tracts of pregnant women with GBS^{13,24-27}. Coagulase negative staphylococcus (CONS) which was isolated from 11.3% of blood culture in this study, and staphylococcus aureus seem to emerge as important pathogens as these developing countries implement modern neonatal practices^{13,20,25}.

The increase in the prevalence rate of infection among neonates with time may reflect just a simple increase in admission rate due to increased referral to this specialized center, a relative deterioration in the health services with time in the NICU after its recent establishment in 1996, with subsequent increase in nosocomial infections.

It can be concluded from this study that neonatal infection is still a problem facing the country and there is a need for study of bacterial colonization of anogenital tract of Libyan pregnant women and its relation to neonatal infections.

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