Neonatal Mortality in El-Fateh Children Hospital, Libya
Abdulsalam Misallati,* Khairyia M. Boujalawi,*

Abstract:
The rate of death of the newborn varies among neonatal intensive care units (NICUs) but all agree that recognition of conditions leading to death is the first important step in the efforts to reduce it. This paper is a retrospective study carried out in NICU of El-Fateh Children Hospital-Benghazi. It aims to find out the causes of death of newborn infants admitted to this unit within one year and age at the time of death and to discuss the steps necessary to reduce the mortality rate.

The main results were: The total admissions to the unit were 1430 newborns. 185 of them died (12.9%). The male to female ratio was 1.89:1. 67.5% of the newborns died in the first week of life, and the main causes of death were due to prematurity and its related complications, followed by congenital malformation and the third cause was septicemia/ meningitis.

The number of deaths could be reduced by improving the antenatal and postnatal care, strict control of infection and increasing the nurse-patient ratio in NICU.

Keywords: newborn, mortality, NICU.

Introduction:
The causes of neonatal mortality include low birth weight and short gestation, congenital malformation, infection and birth asphyxia. Although they are almost the same in all neonatal intensive care units (NICUs), but their magnitude and order differ between NICUs and the obligation of those who work in these units is to recognize the main causes of death in order to adopt strategies aiming to reduce not only the mortality rate, but also the morbidity.

The present study aims to find out the causes and time of death of newborn infants admitted to NICU within one year, and to discuss the measures that could reduce the mortality rate of newborn infants.

Materials and methods:
The NICU of El-Fateh children hospital is equipped with 45 incubators, ventilators, and phototherapy machines and a portable X-Ray. The unit provides medical service to Benghazi city population and the nearby areas. We reviewed the death record of the unit within one year; from October 2003 to September 2004. The following data were obtained: The cause of death, sex, gestational age by weeks and the age at time of death by days.

The definitions used are:
1. Premature newborn: is an infant born before 37 weeks of gestation
2. Proportional mortality rate: number of deaths in one year due to particular cause / total number of deaths in year

Descriptive statistics will be used and the data will be presented as absolute number, percentage and proportional mortality rate.

Results:
During the one-year-study period, 1430 newborns admitted to NICU with different medical problems, out of which 185 died (12.9%). Among the dead, there were 121 males and 64 females, with male to female ratio 1.89:1 (fig. 1)

Out of 185 newborns, 125 (67.5%) died in the first week of life, 54 (45%) in the first day of life (Tab No. 1). The leading cause of death was due to prematurity and it's related complications with proportional death rate of 56%. (Tab No. 2). Table No. 3 shows the main causes of neonatal mortality, as reported by many workers in different countries.

*) Department of Pediatrics, Faculty of Medicine, University of Garyounis, Benghazi, Libya.
Causes of Mortality in NICU and their Implications …… Abdulsalam Misallati, et al.

Table No. 1: Age (days) at the time of death

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>No. of newborns</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-7</td>
<td>125</td>
<td>67.5</td>
</tr>
<tr>
<td>8-14</td>
<td>25</td>
<td>13.5</td>
</tr>
<tr>
<td>15-21</td>
<td>14</td>
<td>7.5</td>
</tr>
<tr>
<td>&gt;21</td>
<td>21</td>
<td>11.5</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>100</td>
</tr>
</tbody>
</table>

Table No.2: Proportional mortality rate

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of deaths</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prematurity and it’s complications</td>
<td>104</td>
<td>56</td>
</tr>
<tr>
<td>Congenital malformation</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Septicemia/meningitis</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Congenital heart Disease</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Birth asphyxia</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Pulmonary Hemorrhage</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Inborn error of Metabolism</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Jaundice/cholestasis</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Pneumothorax</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Anemia</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>100</td>
</tr>
</tbody>
</table>

Table No.3: The four main causes of neonatal death as reported by four workers

<table>
<thead>
<tr>
<th>The author</th>
<th>First cause</th>
<th>Second cause</th>
<th>Third cause</th>
<th>Fourth cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbello</td>
<td>Prematurity</td>
<td>Asphyxia</td>
<td>Infection</td>
<td>Cong. anomalie is</td>
</tr>
<tr>
<td>Kambarami</td>
<td>LBW</td>
<td>Prematurity</td>
<td>Cong. anomalis</td>
<td>Asphyxia</td>
</tr>
<tr>
<td>Cai Y</td>
<td>Prematurity</td>
<td>Asphyxia</td>
<td>Pneumonia</td>
<td>Cong. anomalies</td>
</tr>
<tr>
<td>Wilkinson</td>
<td>Prematurity</td>
<td>Chromosomal</td>
<td>Asphyxia</td>
<td>Cong heart disease</td>
</tr>
</tbody>
</table>

Fig. 1: Male to female ratio
Discussion:
A-Number of admissions:
The present paper revealed that the total number of newborns admitted to NICU during the study period was 1430, (an average of 119 admission/month), more than the number of admission to the same unit in the 1994-1995, which was 1075. This makes clear that our unit is busy and dealing with increasing number of patients.

B-Number of deaths:
Out of 1430 newborns, 185 (12.9%) died, and comparing our figure with others, we found that ours was less than the 46.4% reported by Kambarami from Zimbabwe and also less than 22% reported by Arafà from Saudi Arabia, but our figure is higher than the 6.2% which is mentioned by D J Wilkinson.

C- Sex difference:
During the neonatal period males are at a higher risk of both morbidity and mortality than females. The male to female ratio in this study was 1.89:1. Many authors have come to the same result.

D-Time of death:
It is known for those who work in NICU that the highest risk of death of newborns is in the first few days of life. The usual causes of this early death are conditions like premature infants with respiratory distress syndrome, meconium aspiration and birth asphyxia. In our series 125 newborns (67.5%) died in the first week of life and it is similar to the findings reported by many authors.

E- Causes of death:
The main cause of death in this paper was prematurity and its complications like RDS, intraventricular hemorrhage and infection. The other three causes were congenital anomalies, septicemia, and congenital heart disease. These causes of death are similar to that reported by H. Elsahil, H. Alobaidy and Dekna, our colleagues from Tripoli-Libya. The same causes were also observed by De Carvalho from Brazil and Callaghan William from The United States.

We did not include newborns with congenital heart disease in the category of congenital malformation, because newborns with congenital heart disease have no anomalies affecting other systems and have good chance to survive as normal infants after correcting the heart lesions surgically. The potentially inherited diseases leading to death in this paper were congenital malformation and inborn error of metabolism and we believe that both of them need further exploration by researchers in the future because of risk of recurrence in the same families.

Conclusions:
Our data revealed that the causes of death in our NICU were similar to those found by many workers all over the world (Tab.No.3) but the difference is in the number of deaths which varies between different NICUs.

In order to reduce the neonatal mortality rate, we need to make plans to prevent these causes or to diagnose them early and treat them when their prevention is not possible.

The steps which are recommended by many scientific papers and researchers and lead to the reduction in neonatal mortality include:
1. Training of doctors and nurses working in NICU.
2. Increasing nurse to patient ratio.
3. Prevention of nosocomial infection.
4. Improving antenatal care.
5. Provide maximum medical care to the premature infants and use of surfactant for RDS.

References:
8. Cai Y and Ding Q, Wei Sheng Yan Jiu 2001; 30(5).