Introduction

- More than 40% of under-five deaths globally occur in the neonatal period, resulting in 3.1 million newborn deaths each year [UNICEF, WHO, World Bank, 2011].
- The majority of these deaths usually occur in low-income countries and almost one million of these deaths are attributed to infectious causes including neonatal sepsis, meningitis, and pneumonia [Black et al., 2010].
- On the other hand, the survivors of neonatal sepsis are vulnerable to short- and long-term neurodevelopmental morbidity [Ferreira et al., 2014]
Definition

- Neonatal sepsis is defined as a clinical syndrome in an infant 28 days of life or younger, manifested by systemic signs of infection and isolation of a bacterial pathogen from the bloodstream [Edwards and Baker, 2004].

Overview

- Neonatal sepsis is caused by Gram-positive and Gram-negative bacteria and Candida [Jumah and Hassan, 2007].
- The diversity of organisms causing sepsis varies from region to another and changes over time even in the same place.
- This is attributed to the changing pattern of antibiotic use and changes in lifestyle.
- Many factors contribute to the susceptibility of the neonate to sepsis, which can influence the incidence of neonatal sepsis.
- Incidence also varies from NICU to others, depending on conditions predisposing infants to infection [Shrestha and Adhikari, 2010].
General aim of this study

To evaluate the epidemiology of neonatal sepsis at Nasser medical complex and to determine the antimicrobial sensitivity patterns of the etiologic agents

Operational definitions

Early onset of sepsis (EOS)
A positive blood culture taken within the first 72 hours of life. EOS is usually related to peripartum factors, i.e. acquisition of the infectious agent before or during delivery

Late onset sepsis (LOS)
A positive blood culture taken after 72 hours of life. LOS is usually acquired in the newborn nursery, neonatal intensive care unit or in the community.
Materials and Methods

Design
- Retrospective study

Study setting
- Nasser medical complex (Neonatal intensive care unit)

Population
- Total of 69 culture proven cases of neonatal sepsis

Collection of specimens

- Blood samples were collected from the neonates with suspected sepsis for blood cultures.
- Blood was collected from a peripheral vein.
- Approximately 1 mL of blood was inoculated directly into blood culture medium vials and sent to Nasser medical complex clinical microbiology laboratory for cultivation and subsequent processing.
Patient Data

✓ A standard structured data collection form was designed to obtain socio-demographic, clinical, and laboratory data that were recorded by qualified medical staff.

✓ All neonates were subjected to full clinical examination stressing on gestational age, birth weight, the pathogenic bacteria of positive blood culture and their antibiotic susceptibilities.

Results

Total number of cultures proven sepsis = 69
Total number of admissions = 884
Incidence of neonatal sepsis = 7.80% (69/884)
  • 0.22-11.2% in developed countries
  • 10-30% in developing countries
  • 45.9% in Egypt, 2015

Neonatal sepsis mortality rate of all deaths: 22.7% (29/128)
  • 10/1000 live births in developed countries
  • Roughly three times more in developing countries
  • 45.7% in Egypt, 2015
Results – culture of proven sepsis

<table>
<thead>
<tr>
<th>Proved cultures</th>
<th>N (%)</th>
<th>Case fatality rate</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>44 (63.8)</td>
<td>Male</td>
<td>19 (43.1)</td>
</tr>
<tr>
<td>Female</td>
<td>25 (36.2)</td>
<td>Female</td>
<td>10 (40.0)</td>
</tr>
<tr>
<td>Total</td>
<td>69 (100.0)</td>
<td>Overall case fatality rate</td>
<td>29.9 (41.5)</td>
</tr>
</tbody>
</table>

Proportion of sepsis in early and late onset

- LOS: 53.6%
- EOS: 46.4%
Sepsis and case fatality rate based on birth weight

<table>
<thead>
<tr>
<th>Birth weight</th>
<th>%</th>
<th>Case fatality rate</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2500 gm</td>
<td>34.80</td>
<td>&gt;2500 gm</td>
<td>12.5</td>
</tr>
<tr>
<td>&lt; 2500 gm</td>
<td>65.2</td>
<td>&lt;2500 gm</td>
<td>61.0</td>
</tr>
</tbody>
</table>

Case fatality rate in early and late onset sepsis

- LOS: 59.5%
- EOS: 21.9%
Case fatality rate based on gestational age

Distribution of organisms based on sepsis onset
Gram positive and Gram negative isolates

Case fatality in Gram positive and Gram negative
Predominant microorganisms responsible for septicemia

![Bar graph showing the predominant microorganisms responsible for septicemia.]

**Antimicrobial-resistance in neonatal Sepsis**

- Multidrug-resistance (i.e. resistance to > 2 classes of antibiotics) was identified in two isolated organisms (Enterobacter and Klebsiella).

- Gram negative isolated organisms were amoxicillin resistance and show good sensitivity to **Gentamicin**.

- Gram-positive isolated organisms show good sensitivity to **Vancomycin**.
Conclusion

- **Determination of the antibiotic resistance** among all the neonate and infant populations are necessary to prevent complications.

- The study highlights the **need of hand washing** still stands out among the other universally precautions in the neonatal care units.

- Future studies related to antimicrobial-resistance in neonatal sepsis should be done

References


Thank You