

SOME ASPECTS OF SEPSIS IN NEWBORNS

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Abstract. It has been revealed that at the present stage the differences between early and late sepsis are being erased both in terms of gestational age and weight of children, and in terms of risk factors and even representatives of gram-positive and gram-negative strains. Of particular concern is the isolation of a significant number of multiresistant gram-positive and gram-negative isolates from newborns in maternity hospitals.

Keywords: newborns, bacteriology, neonatal sepsis, risk factors.

INTRODUCTION

Traditionally, early and late neonatal sepsis are distinguished. It is believed that early neonatal sepsis (Early Onset Neonatal Sepsis, EONS) develops in the first 72 hours after birth due to transplacental or ascending infection of the mother with opportunistic microflora. In developed countries, the main epidemiologically significant pathogens of EONS are group B hemolytic streptococci (GBS), Escherichia coli, coagulase-negative staphylococci, Haemophilus influenzae and Listeria.

MATERIALS AND METHODS

Late Onset Neonatal Sepsis (LONS) develops in the period from 4 to 90 days of life, essentially being nosocomial, and among the main pathogens most often identified are coagulase-negative staphylococci, Staphylococcus aureus, Escherichia coli, Klebsiella, Pseudomonas aeruginosa, Enterobacteria, Candida, hemolytic group B streptococci and rarely Serratia, Acinetobacter and anaerobes [1]. Among the risk factors for the development of EONS, chorioamnionitis and vaginal maternal infections are in first place [4, 8], and, according to G.J. Chan et al., laboratory-confirmed maternal infections increase the risk of developing early neonatal sepsis by 6.6 times (95% CI 3.9-11.2); laboratory-confirmed vaginal colonization OR - 9.4 (95% CI 3.1-28.5); EONS in children from mothers with risk factors for infections, OR - 2.3 (95% CI 1.0-5.4) [2]. An analysis of 48 medical records of newborns with early and late neonatal sepsis was performed. The data of children at birth, maternal, natal and postnatal risk factors, and bacteriological research data were assessed. Statistical processing of the obtained results was performed using Fisher's parametric criterion. Design: retrospective single-center observational cohort study.

RESULTS AND DISCUSSION

The Department of Anesthesiology and Intensive Care for Newborns of the Dnipropetrovsk Regional Children's Clinical Hospital is a regional third-level center for specialized care for newborns in the Dnipropetrovsk region, where infants with severe respiratory distress syndrome, severe hypoxic-ischemic encephalopathy, severe asphyxia during childbirth, and extremely low birth weight are admitted from second-level medical institutions; it is a center for therapeutic hypothermia, serves as a specialized center for neurosurgery for newborns, a peritoneal dialysis center, and a center for surgery of tumors and tumor-like formations of congenital genesis; it consists of an intensive care unit with 6 beds and a subintensive care unit with 8 beds. The problem of sepsis is relevant for the department, since in the structure of mortality, sepsis is in second place among the causes of death after IVH of the 3rd-4th degree.

To compare groups of children with early and late neonatal sepsis, gestational age and birth weight were analyzed, as well as the following indicators:

Risk factors:

- Birth asphyxia.
- Resuscitation at birth.
- Natural birth or cesarean section.
- Bacterial excretion by the mother during pregnancy.
- Fever during labor.
- Signs of ascending placental infection (API) according to pathological examination.
- Presence of a central venous catheter in the child >72 hours.
- Diagnosed hemodynamically significant PDA.
- Total parenteral nutrition >72 hours.
- Start of enteral feedings later than 72 hours after birth.
- Events of NEC.
- Conducting selective decontamination of the intestine.

Bacteriological examination data. Biological material collection site: external auditory canal, feces, blood, tracheal aspirate, cerebrospinal fluid, mucous membranes of the nose and pharynx, sowing of a fragment of the central catheter after its removal.

The results of the bacterial culture study are systematized as follows: gram-positive coccal flora: Staph. aureus, other staphylococci, Enterococci, CNS, other streptococci, GBS. In addition to identifying the obtained isolate, its sensitivity/resistance to methicillin (oxacillin) and vancomycin was determined.

Of the 48 analyzed case histories, the diagnosis of early neonatal sepsis was established in 38 cases, the diagnosis of late sepsis - in 10 cases. The main criterion by which children were assigned to one group or another was the time of onset of sepsis manifestation from the moment of birth: less than 72 hours or 96 hours or more of life. When comparing children with early and late neonatal sepsis, no significant differences were found between the groups either in gestational age or in the weight of children at birth. Only the frequency of cesarean sections differed significantly, which was almost twice as high in the late sepsis group (23.7% vs. 50.0%). The reliability criterion p was 0.110, however, due to the small number of observations, this value of the reliability coefficient can be considered significant.

In our study, the main etiological causes of both early and late sepsis should be considered to be representatives of the gram-positive coccal flora. Among the causative agents of early neonatal sepsis from gram-positive microorganisms, various staphylococci, including *Staphylococcus aureus*, dominated. Among the gram-negative rods, *Klebsiella pneumoniae* was in first place, which in Europe and the USA is traditionally considered more characteristic of late (or hospital-acquired) sepsis.

The epidemiological structure of pathogens isolated from children with late neonatal sepsis was almost identical to the early one, when representatives of staphylococci and *Klebsiella* came to the forefront. An interesting fact is the absence of *Staphylococcus aureus* isolation from patients of this group. Since this pathogen is one of the leading causes of wound and catheter-associated infection, its absence in the microbial landscape of the department where the study was conducted can be explained by the existing infection control system and adequate antiseptic treatment of the staff's hands.

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When studying the contamination of various biological environments and central venous catheters, no reliable difference was found between the studied groups. The low percentage of cultures from the CVC also indicates sufficient prevention of catheter-associated infections. The low frequency of positive blood cultures in both groups can be explained, on the one hand, by the fact of antibacterial therapy at the stages of treatment before the ODKB, and on the other hand, it requires a revision of the quality of bacteriological environments that are routinely used to examine newborns. The high percentage of contamination of the external auditory canals in children is noteworthy. According to foreign authors, the flora isolated from the ears of newborns is almost 100% consistent with the flora of the mother's birth canal.

CONCLUSION

Thus, summarizing the above, we can emphasize the following facts obtained as a result of the study:

1. The peculiarity of the course of neonatal sepsis at the present stage is that the differences between early and late sepsis are erased both in relation to gestational age and weight of children, and in relation to risk factors and even representatives of gram-positive and gram-negative strains.
2. In fact, the only real difference between early and late neonatal sepsis remains only the time of manifestation of clinical signs before or after 72 hours of hospital stay.
3. Carrying out operative delivery reduces the likelihood of developing early sepsis ($p=0.110$) due to the fact that the child bypasses the contaminated birth canal of the mother.

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