

INDICATIONS OF BLOOD MICROBIOLOGICAL ANALYSIS IN CHILDREN OF EARLY AGE WITH SEPSIS

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Resume: Despite the progress made in providing emergency medical care, treatment and early diagnosis of severe cases of sepsis in children remains one of the urgent problems of emergency pediatrics.

The purpose of the study is to study the peculiarities of the blood microbiological analysis in young children with sepsis.

Materials and methods. 45 children with early age sepsis were included in the study. Microbiological examination was carried out in the bacteriological laboratory at the Republican Scientific Center for Emergency Medical Care. When examining blood sterility, microbial growth was detected in 32 patients in the main group, which was 71%. In the etiological structure of sepsis, gram-positive flora prevailed - 71.6%. Gram-negative flora - 23.9%, fungi - 4.4%.

Result. When examining blood sterility, microbial growth was detected in 32 patients in the main group, which was 71%. In the etiological structure of sepsis, gram-positive flora prevailed - 71.6%. Gram-negative flora - 23.9%, fungi - 4.4%. Most of the identified microorganisms were found to be sensitive to antibiotics that are currently used.

Conclusion. Gram-positive bacteria still remains predominant in the etiology of sepsis in early childhood. We can say that the high titer of bacteria in the microbiological analysis of blood correlates with the severity of the patient's condition. Despite the diversity of the etiology of sepsis, its clinical manifestations remain very similar and nonspecific.

Key words: pediatrics, sepsis, blood microbiological analysis.

The large international studying multicenter SPROUT 2019 [4] began to study the prevalence of sepsis in 26 countries. In Europe, 6.2%, in Africa, 23.1% ($p < 0.001$). It was found that the overall mortality rate by region varied depending on the level of development of the countries: 21% in North America, 29% in Europe, 32% in Australia/New Zealand, 40% in Asia, 11% in South America and 40% in Africa. Among the survivors, one in five children discharged from the hospital had moderate functional disability (Lekmanov A.U. Mironov P.I. 2020).

Purpose:

To study the peculiarities of the blood microbiological analysis in young children with sepsis.

Material and research methods:

In order to improve the diagnostic and intensive treatment tactics of children with sepsis on the basis of the Republican Scientific Center for Emergency Medical Care, we planned to conduct a medical researching of 45 children aged 1 month to 3 years who were hospitalized with sepsis in 2022-2024.

1. Physical examination methods (measurement of temperature, pulse rate, respiratory rate, blood pressure)
2. Blood analysis (leucoformula), blood biochemical analysis (total protein, urea, creatinine, bilirubin, potassium, medium molecular weight peptides, LDG, albumin, ALT, AST)
3. Inflammatory markers: Procalcitonin, lactate, C-reactive protein and Presepsin.
4. Instrumental research methods (chest X-ray, ECG, MSCT, ultrasound)

In order to ensure the accuracy of the results of blood microbiological examination in all patients included in the study, 2 ml of blood was taken before the start of antibacterial treatment.

In order to maximize the growth of pathogens and their identification, the material under study was cultured on several nutrient media.

The nutrient medium consisted of 1.7% - 2% agar and a semi-liquid prepared from a broth with the addition of glucose and agar. Antibiotic susceptibility was tested using the traditional disk method.

Microbiological examination was carried out in the bacteriological laboratory at the Republican Scientific Center for Emergency Medical Care.

When examining blood sterility, microbial growth was detected in 32 patients in the main group, which was 71%.

In the etiological structure of sepsis, gram-positive flora prevailed - 71.6%. Gram-negative flora - 23.9%, fungi - 4.4%.

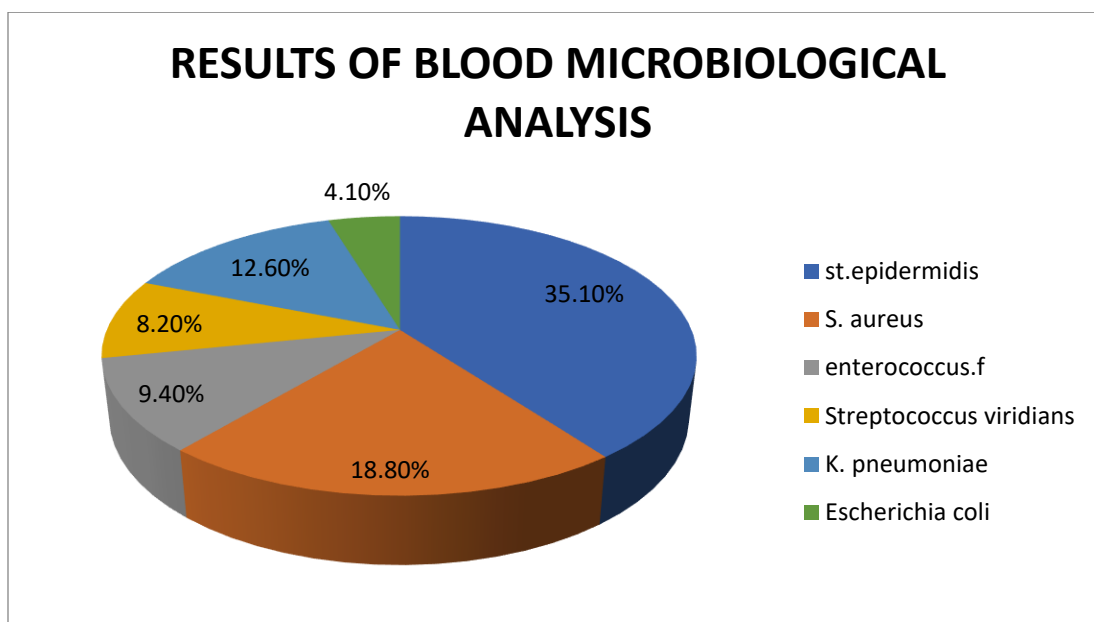


Figure-1. Analysis of gram-positive microflora.

Analyzing gram-positive microflora, S. epidermidis - 35.1%, S. aureus - 18.8%, Enterococcus faecium and Streptococcus viridians accounted for 9.4% and 8.2%, respectively. (Figure-1)

When analyzing gram-negative microflora, *Escherichia coli* was detected in 17.6%, *K. pneumoniae* - 6.8%, *Ps. aureginosa* in 4.1% of cases, and a combination of bacteria and fungi accounted for 12.6%.

Most of the identified microorganisms were found to be sensitive to antibiotics that are currently used. (Figure 2).

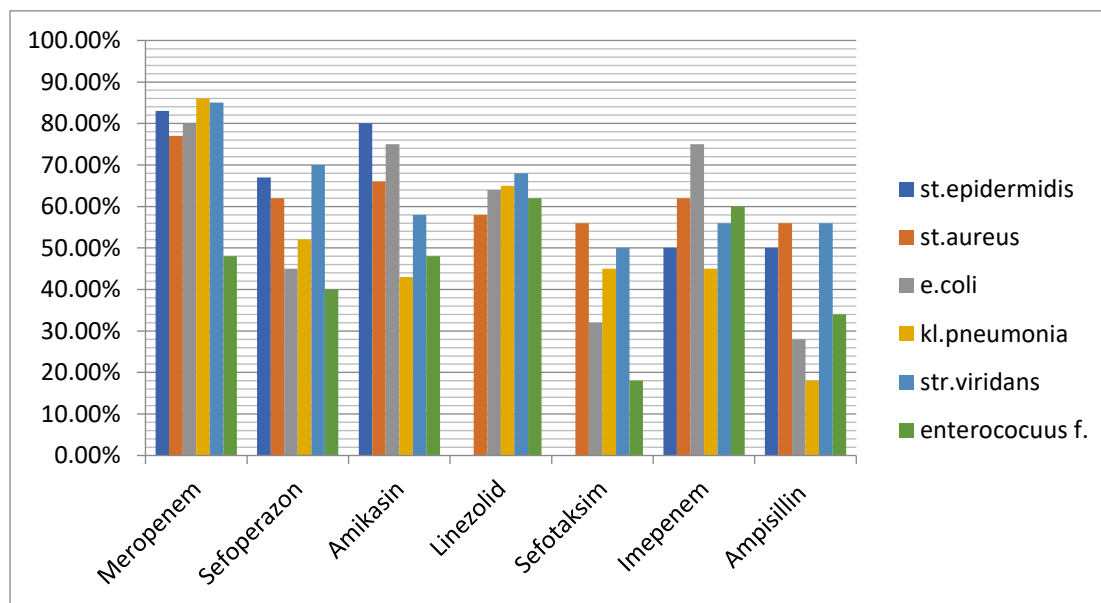


Figure-2. Sensitivity of identified microorganisms to antibiotics.

The highest sensitivity of *S. aureus* was determined to Amikacin (66.7%), cefoperazone sulbactam (88.8%), meropenem (77.8%), and resistance to ampicillin sulbactam was determined in 64.4% of cases, and to cefotaxime in 53.3%.

In *Escherichia coli*, sensitivity was determined mainly to Cefotaxime, cefoperazone sulbactam, and meropenem. In *E. faecium*, high sensitivity was determined to imipenem (75.0%), amikacin (75.0%), and resistance was determined to cefotaxime and cefoperazone sulbactam.

From the first day of hospitalization, patients were treated with antibiotic therapy according to 2 regimens. In the 1st "A" scheme, cephalosporins + aminoglycosides were used empirically (60.7%), and in the 2nd scheme, carbapenems + vancomycin were used in a deescalation method (39.3%).

Scheme "B" was used in patients with a Presepsin index of more than 350 ng / ml, symptoms of septic shock were detected (this therapy was carried out within 4 hours from the patient's arrival).

Scheme "A" was used in the following patients: in patients who did not have indications for connecting to an artificial respiration apparatus at the initial examination, were shown non-invasive respiratory support (CPAP), and did not need respiratory therapy (15.6%).

Later, antibacterial therapy was changed according to the dynamics of clinical and laboratory indicators, the sensitivity of the cultured microflora to antibiotics (3rd generation cephalosporins, carbapenems, glycopeptides, oxazolidinones). The effectiveness of antibiotics was checked at 48-72-96 hours depending on the Presepsin indicator.

In conclusion, we can say that, gram-positive bacteria remains predominant in the etiology of sepsis in early childhood. We can say that the high titer of bacteria in the microbiological analysis of blood correlates with the severity of the patient's condition. Despite the diversity of the etiology of sepsis, its clinical manifestations remain very similar and nonspecific.

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