SALMONELLOSIS IN CHILDREN: CLINICAL FEATURES, MODERN LABORATORY DIAGNOSTICS, ANTIMICROBIAL RESISTANCE AND PREVENTION

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Abstract. Salmonellosis remains one of the major foodborne bacterial infections worldwide. Children, particularly infants and young children, are at increased risk of dehydration and severe complications. The emergence of antimicrobial-resistant Salmonellosis is primarily transmitted through contaminated food and water, as well as contact with infected animals. The disease commonly presents with fever, diarrhoea, abdominal pain and vomiting. Stool culture remains an important diagnostic method, while molecular tests provide rapid pathogen detection. Antimicrobial susceptibility testing is essential in severe and invasive infections. Supportive treatment, especially adequate rehydration, remains the main approach in uncomplicated cases.

Keywords: salmonellosis, children, Salmonella enterica, gastroenteritis, laboratory diagnosis, antimicrobial resistance, PCR, foodborne infection, prevention.

Introduction. Salmonellosis is an acute infectious disease caused by bacteria of the genus Salmonella. It remains a significant public health problem because of its widespread distribution, multiple transmission routes and potential to cause severe illness. Non-typhoidal Salmonella (NTS), particularly serovars Enteritidis and Typhimurium, are among the major causes of foodborne gastroenteritis [1,2].

Children, especially those under five years of age, are particularly vulnerable to complications associated with diarrhoea and dehydration. In some cases, the infection may spread beyond the gastrointestinal tract and cause bacteraemia, meningitis or other invasive conditions [1,3]. The increasing detection of antimicrobial-resistant Salmonella strains has made rational antibiotic prescribing and laboratory confirmation particularly important. Therefore, modern approaches to salmonellosis should combine clinical assessment, microbiological diagnosis and preventive measures [2,4].

Pathogenesis and routes of transmission. The main route of infection is alimentary, through consumption of contaminated food products, including eggs, poultry, meat, milk and insufficiently washed vegetables. Transmission may also occur through contaminated water, contact with infected animals and the faecal–oral route. After entering the gastrointestinal tract, Salmonella bacteria survive gastric passage and invade the intestinal epithelium. Their interaction with intestinal cells triggers inflammatory responses, resulting in impaired intestinal absorption and increased fluid secretion. These processes contribute to diarrhoea, abdominal pain and systemic manifestations such as fever [1,3].

Clinical features in children The incubation period of non-typhoidal salmonellosis usually ranges from 6 to 72 hours. The disease commonly begins acutely with fever, abdominal cramps, diarrhoea, nausea and vomiting. Stools may be watery and occasionally contain mucus or blood [1].

Clinical manifestations vary according to age and disease severity. In infants, repeated diarrhoea and vomiting may rapidly cause dehydration, electrolyte

disturbances and metabolic abnormalities. Signs of dehydration include dry mucous membranes, reduced urine output, sunken eyes, lethargy and decreased skin turgor. In severe cases, Salmonella may spread into the bloodstream and cause systemic infection. Extraintestinal complications include bacteraemia, meningitis, osteomyelitis and septic arthritis [1,3].

Laboratory confirmation is essential for accurate diagnosis, particularly in severe, prolonged or epidemiologically significant cases.

1. Bacteriological examination

Stool culture remains a key diagnostic method for identifying Salmonella. Blood culture is indicated when bacteraemia or systemic infection is suspected. Isolated bacteria can be identified and serotyped, providing valuable information for epidemiological surveillance [3,5].

2. Molecular diagnostic methods

Polymerase chain reaction and multiplex gastrointestinal panels allow rapid detection of Salmonella genetic material in clinical specimens. These methods can shorten the time required for pathogen identification and support early clinical decision-making. However, molecular detection does not always provide a viable bacterial isolate. Therefore, follow-up culture is important when antimicrobial susceptibility testing or epidemiological characterisation is required [3,5].

3. Antimicrobial susceptibility testing

Antibiotic susceptibility testing is particularly important in invasive infections and cases where antimicrobial therapy is indicated. The increasing occurrence of resistant Salmonella strains may limit treatment options and complicate clinical management [2,4].

Treatment and management. Rehydration is the main component of treatment for uncomplicated salmonellosis. Oral rehydration solutions are recommended for

children with mild or moderate dehydration. Intravenous fluid therapy may be necessary in severe dehydration, persistent vomiting or circulatory disturbances.

Antibiotics are not routinely recommended for otherwise healthy children with uncomplicated non-typhoidal salmonellosis. Unnecessary antimicrobial therapy may contribute to resistance and prolong bacterial shedding. Antibiotics should be considered in severe infections, bacteraemia, extraintestinal disease and patients at increased risk of invasive infection, including young infants and immunocompromised children [3,6]. Monitoring fluid balance, electrolytes, urine output and general clinical status is essential throughout treatment.

Resistance to fluoroquinolones, third-generation cephalosporins and other antimicrobial groups may complicate the treatment of invasive infections. Modern genomic surveillance and whole-genome sequencing can help identify resistant lineages, investigate outbreaks and trace transmission pathways [2,4].

Prevention of salmonellosis in children requires consistent hygiene and food safety measures.Important recommendations include: thorough cooking of meat, poultry and eggs, avoiding consumption of raw or insufficiently pasteurised milk, washing hands before preparing food and after contact with animals, preventing cross-contamination between raw and cooked products, using safe drinking water and maintaining appropriate food storage conditions, strengthening hygiene education among parents and caregivers. Laboratory surveillance and timely investigation of suspected outbreaks are also essential for identifying infection sources and preventing further transmission [1,2,7].

Conclusion. Salmonellosis remains an important infectious disease in childhood because of its potential to cause severe dehydration and invasive complications. Stool culture remains a fundamental diagnostic method, while PCR and molecular technologies provide additional opportunities for rapid pathogen detection. Antimicrobial susceptibility testing is important in severe and invasive cases, supporting rational antibiotic selection. Rehydration, appropriate clinical

monitoring, responsible antibiotic use and food hygiene remain the principal measures for reducing complications and preventing transmission.

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