



INTESTINAL INFECTIOUS DISEASES IN CHILDREN (DIARRHEA, DYSENTERY, SALMONELLOSIS) AND THEIR TREATMENT

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Annotatsiya: *Intestinal infectious diseases remain one of the most significant causes of illness and death in children worldwide, particularly in low- and middle-income countries. These diseases primarily affect the gastrointestinal tract, causing diarrhea, vomiting, abdominal pain, and dehydration. Among the most common intestinal infections in children are acute diarrheal disease, bacillary dysentery (shigellosis), and salmonellosis. Each of these conditions is caused by specific pathogenic microorganisms that invade or intoxicate the intestinal mucosa, leading to inflammation, loss of fluids, and nutrient malabsorption.[1,7,8,9]*

Key words: *Dysentery (Shigellosis) Mechanism Dysentery, usually caused by Shigella dysenteriae, Shigella flexneri, or Shigella sonnei, involves bacterial.*

Introduction: According to the World Health Organization (WHO), diarrheal diseases account for nearly half a million deaths annually among children under five years of age, making them the second leading cause of childhood mortality after pneumonia. Although many of these deaths are preventable through simple interventions—such as rehydration therapy, safe drinking water, and adequate sanitation—intestinal infections continue to pose serious global health challenges. Children are particularly vulnerable to intestinal infections for several reasons. Their immune systems are still developing, their gastric acidity is lower than in adults (allowing more pathogens to survive ingestion), and their hygiene habits are not yet well established. Environmental factors such as contaminated water, improper food handling, poor sanitation, and lack of personal hygiene greatly increase exposure to infectious agents. In crowded environments like schools, daycare centers, and refugee camps, these diseases can spread rapidly. The clinical presentation of

intestinal infections ranges from mild, self-limiting diarrhea to severe, life-threatening dehydration and septicemia. Diarrhea is typically caused by viruses (such as rotavirus, adenovirus, or norovirus), while dysentery and salmonellosis are bacterial in origin—most often linked to *Shigella* spp. and *Salmonella* spp., respectively.

Materials and Methods: The pathophysiology of these diseases varies: some cause damage through toxin production, others through direct invasion of intestinal tissue. The primary goals in managing these infections are to restore fluid and electrolyte balance, eliminate the causative pathogen, and prevent recurrence or transmission. Advances in oral rehydration solutions (ORS), antibiotics, and vaccines have significantly reduced morbidity and mortality, yet recurrent outbreaks and antimicrobial resistance remain concerns. This paper discusses in depth the pathogenesis, mechanism, clinical features, treatment, and preventive strategies for intestinal infectious diseases in children, emphasizing evidence-based management and global health perspectives.[2,3,7,9] Pathogenesis and Mechanism The pathogenesis of intestinal infectious diseases in children depends on the interplay between the infectious agent, host immune response, and environmental conditions. Pathogens enter the digestive tract primarily through ingestion of contaminated food or water, or via the fecal–oral route. Once in the intestine, they disrupt normal physiological processes through toxin production, mucosal invasion, or immune-mediated inflammation. Diarrheal Disease Mechanism Diarrhea occurs when intestinal fluid secretion exceeds absorption, resulting in frequent, watery stools. The mechanisms include: Osmotic diarrhea: Caused by unabsorbed solutes (e.g., lactose intolerance after viral infection).[2,6,8,10] Secretory diarrhea: Results from toxins that stimulate chloride and water secretion into the intestinal lumen. Inflammatory diarrhea: Occurs when pathogens invade or damage the intestinal mucosa, leading to exudation of blood and mucus. Rotavirus, the most common viral cause in children, infects enterocytes in the small intestine, particularly in the duodenum and jejunum. The virus damages the microvilli, reducing absorptive surface area and

causing malabsorption of carbohydrates, which draws water into the intestinal lumen. Additionally, the viral NSP4 enterotoxin increases chloride secretion, compounding fluid loss. Other viruses such as adenovirus, norovirus, and astrovirus follow similar mechanisms, though with varying degrees of mucosal damage.[2,4,6,8] Because these infections are often self-limiting, the primary threat arises from dehydration rather than direct tissue destruction. **Dysentery (Shigellosis) Mechanism** Dysentery, usually caused by *Shigella dysenteriae*, *Shigella flexneri*, or *Shigella sonnei*, involves bacterial invasion of the colonic epithelium. The infection begins when *Shigella* organisms enter the intestinal tract via contaminated food or water and survive gastric acidity. They attach to and invade M cells in the Peyer's patches of the distal ileum and colon. Inside epithelial cells, *Shigella* multiply and spread laterally, destroying mucosal cells and triggering a strong inflammatory response.

Results: The release of Shiga toxin plays a crucial role. This cytotoxin inhibits protein synthesis in host cells by damaging the 60S ribosomal subunit, causing cell death and ulcer formation. The result is bloody diarrhea (dysentery) accompanied by fever and abdominal cramps. The immune response involves neutrophilic infiltration and cytokine release (IL-8, TNF- α), which further exacerbate tissue injury. Children are particularly susceptible because their intestinal epithelial barrier and immune defenses are still maturing, allowing more extensive bacterial invasion and slower recovery. **Salmonellosis Mechanism** Salmonellosis results from infection by *Salmonella enterica*, transmitted through contaminated eggs, poultry, or milk. After ingestion, the bacteria pass through the stomach and reach the small intestine, where they adhere to epithelial cells using fimbriae and invade through endocytosis. Inside epithelial cells, *Salmonella* multiply within phagosomes and stimulate the release of proinflammatory cytokines, leading to diarrhea, fever, and abdominal pain.[1,4,8,10] In some cases, bacteria penetrate the lamina propria, enter the bloodstream, and cause systemic infection (bacteremia). The severity depends on the host's immune competence and the virulence of the bacterial strain. Infants and

malnourished children are at greatest risk for systemic dissemination. The immune system responds with both innate (macrophage activation, complement) and adaptive (IgA antibody production) mechanisms. However, these defenses may be insufficient in young children, resulting in prolonged illness or relapse. Clinical Features and Treatment Clinical Presentation Intestinal infectious diseases in children present with overlapping but distinct symptoms depending on the pathogen involved. Diarrhea (mostly viral): Frequent watery stools Vomiting, mild fever Dehydration signs: dry mouth, sunken eyes, decreased urination, lethargy Typically self-limiting (3–7 days) Dysentery (bacterial): Small-volume, frequent stools mixed with blood and mucus, High fever, abdominal pain, and tenesmus (painful urge to defecate), Dehydration and weight loss in prolonged cases. Salmonellosis: Watery or semi-solid diarrhea with foul odor, Fever, abdominal cramps, nausea, vomiting, In severe cases: septicemia, joint pain, or meningitis (especially in infants) Diagnosis is made through clinical evaluation and confirmed by stool analysis, microscopy, culture, or PCR testing to identify pathogens. Blood tests may show elevated white cell counts and electrolyte imbalances in severe dehydration.

Discussion: Treatment Principles Treatment focuses on three main goals: rehydration, pathogen elimination, and nutritional recovery. Rehydration Therapy The cornerstone of treatment for all diarrheal diseases is oral rehydration therapy (ORT). WHO-recommended Oral Rehydration Solution (ORS) contains glucose and electrolytes (sodium, potassium, chloride, and bicarbonate) that facilitate water absorption through sodium-glucose co-transport in the intestinal mucosa. Mild to moderate dehydration: Oral rehydration is sufficient; children should receive frequent small sips of ORS after every stool or vomiting episode. Severe dehydration: Intravenous fluids (Ringer's lactate or normal saline) are used.[4,6,8] Fluid therapy continues until vital signs and urine output normalize. Dehydration assessment is critical—loss of 5% body weight indicates moderate dehydration, while loss over 10% is severe and life-threatening. Antibiotic Therapy Antibiotics are indicated only for confirmed or strongly suspected bacterial infections:

Dysentery (Shigella): Treated with azithromycin, ciprofloxacin, or ceftriaxone (depending on local resistance). Salmonellosis: Mild cases are treated symptomatically; severe or systemic infections may require ceftriaxone or ampicillin. Antibiotic misuse must be avoided in viral diarrhea to prevent resistance. Nutritional Support Early refeeding is encouraged to prevent malnutrition. Breastfed infants should continue nursing during illness. Older children should receive easily digestible foods (rice, bananas, potatoes, yogurt). Zinc supplementation (10–20 mg/day for 10–14 days) is recommended by WHO to reduce the duration and recurrence of diarrhea.[2,3,5] Adjunctive Treatments, Antipyretics for fever control. Probiotics (e.g., Lactobacillus, Bifidobacterium) to restore intestinal flora balance. Antiemetics (ondansetron) in cases of persistent vomiting. Avoidance of antidiarrheal drugs such as loperamide in children due to risk of toxicity and prolonged infection. Hospitalization is required for children with severe dehydration, persistent vomiting, or suspected systemic infection. Monitoring of electrolyte levels, especially sodium and potassium, is crucial during rehydration. Prevention and Conclusion, Prevention Strategies Prevention of intestinal infectious diseases in children relies on public health measures, hygiene practices, and immunization. Safe Water and Sanitation: Access to clean, chlorinated water and safe food handling reduce transmission. Proper waste disposal and handwashing with soap after defecation are essential. Vaccination: Rotavirus vaccine has significantly reduced diarrhea-related hospitalizations worldwide. Typhoid vaccine provides protection against Salmonella typhi, though not all Salmonella strains. Nutrition and Breastfeeding: Exclusive breastfeeding for the first six months protects infants by providing maternal antibodies and preventing exposure to contaminated foods. Adequate nutrition enhances immune resilience. Health Education: Parents should be educated on recognizing early signs of dehydration, preparing ORS at home, and maintaining hygiene. Schools should promote handwashing programs and safe meal practices. Environmental Improvements: Safe

storage of drinking water and regular disinfection of food utensils and toys are vital in daycare environments.[1,3,5]

Conclusion: Intestinal infectious diseases such as diarrhea, dysentery, and salmonellosis remain a major pediatric health burden globally. Despite being largely preventable and treatable, they continue to cause significant morbidity and mortality among children, particularly in resource-limited regions. Understanding the mechanisms of infection and the principles of management is essential for clinicians, caregivers, and policymakers alike. Early rehydration therapy remains the single most effective lifesaving intervention. Rational use of antibiotics, coupled with probiotics and nutritional support, ensures better recovery and reduces the risk of long-term complications. Prevention through vaccination, safe water, sanitation, and hygiene education is the ultimate goal. Coordinated efforts among healthcare systems, communities, and international health organizations can drastically reduce the global burden of these diseases.[1,3,5,7,9,10] In conclusion, combating intestinal infections in children requires an integrated approach that combines medical treatment, public health infrastructure, and community awareness. Only through sustained and collaborative actions can we ensure a healthier, infection-free future for children worldwide.

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