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DISTINCTIVE FEATURES OF TOXIC INTESTINAL DISORDERS IN INFANTS AND TODDLERS

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Abstract: Empirical observations indicate that the conventional approaches to diagnosing and managing intestinal toxic disorders in pediatric patients require certain contextual adaptations when implemented in regions with elevated ambient temperatures. These adjustments primarily relate to the nuances of rehydration therapy and to several organizational components of medical care. The latter hold particular relevance, as the concurrence of a hot climate with intestinal infections and specific demographic and social factors such as elevated birth rates, a high proportion of children within the population structure, and the predominance of rural residency among them creates the need for tailored recommendations aimed at both clinical practitioners and administrators of pediatric healthcare systems.

Introduction

Joint assessments conducted by the World Health Organization (WHO) and /UNICEF have led to the development of an integrated strategy aimed at improving child health outcomes. This approach combines the management of prevalent pediatric illnesses with interventions in nutrition, immunization, and other essential determinants of child and maternal health [6,7]. Nevertheless, diarrheal diseases (intestinal toxic conditions) and severe forms of malnutrition continue to represent major causes of mortality among children under five years of age. Data from the Global Burden of Disease analysis (2000) indicate that, without substantial intensification of global health efforts, these conditions will remain among the leading contributors to childhood mortality well beyond 2020 [3,7].

Research Objective

Empirical evidence indicates that standard approaches to the diagnosis and management of intestinal toxic conditions in children require modification when implemented in hot climates. These adjustments primarily concern the specific aspects of rehydration therapy and several organizational components of healthcare delivery. The latter are particularly significant, as the combination of high ambient temperatures, the prevalence of intestinal infections, and various social determinants—such as elevated birth rates, a high proportion of children in the population, and predominant rural residency necessitates the development of targeted recommendations for both practicing pediatricians and healthcare administrators.

Table 1. Key Factors Influencing the Management of Intestinal Toxic Conditions in Children in Hot Climates

Category	Specific Factors	Impact on Clinical Management
Environmental	High ambient temperature;	Requires enhanced fluid and electrolyte

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	increased risk of dehydration	monitoring; adjustment of rehydration protocols
Epidemiological	High incidence of intestinal infections; poor sanitation	Necessitates early diagnosis and prompt antimicrobial and supportive therapy
Social/Demographic	High birth rate; large proportion of children; rural residency	Demands expanded access to pediatric care and public health education
Organizational	Limited healthcare infrastructure; shortage of trained personnel	Calls for training programs and optimized healthcare delivery systems

Materials and Methods of the Study

Observations indicate that water-deficit (hypertonic) dehydration occurs more frequently and tends to predominate in hot climatic conditions, where fluid loss through perspiration is significant. To facilitate the rapid and accurate differentiation of dehydration types upon a child's admission to the hospital, a concise diagnostic table (Table 2) is utilized. This table summarizes the key clinical indicators, with body temperature and thirst listed as the primary parameters. Its design emphasizes clarity, simplicity, and ease of memorization, allowing healthcare professionals to make prompt assessments. A distinguishing feature of this tool is its straightforward diagnostic principle: all parameters are elevated in water-deficit (hypertonic) dehydration, while they are decreased in salt-deficit (hypotonic) dehydration. This systematic approach supports quick clinical decision-making and improves the efficiency of patient evaluation in acute care settings.

Table 2. Types of Dehydration

Symptom/Indicator	**Water-deficit**	**Isotonic**	**Salt-Deficit**
Body temperature	Significantly elevated	Normal/subfebrile	Tendency to hypothermia
Thirst	Strongly expressed	Normal/subfebrile	Refusal of water
State of the central nervous system	Agitation	Some lethargy	Adynamia
Plasma sodium content	Elevated	Normal	Decreased

For the assessment of dehydration severity and the calculation of fluid requirements for rehydration therapy, we propose a table modeled after the well-known Dennis scheme. Calculations for newborns are based on slightly modified data from V.M. Balagin and colleagues.

All children with dehydration require additional fluid replacement. In cases of diarrhea, it is important to determine the duration of diarrhea and check for blood in the stool. This assessment involves careful inspection and palpation, including:

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1. General condition: Determine if the child is lethargic or unconscious, or restless and irritable.
2. Ocular examination: Check for sunken eyes.
3. Oral intake: Offer the child fluid and observe: poor intake indicates moderate dehydration, while greedy drinking may indicate severe dehydration.

The primary principle of treatment is the administration of additional fluid, based on the child's tolerance.

- Exclusively breastfed infants: Administer oral rehydration solution (ORS) at 5 ml/kg/hour for 3-4 hours and monitor.
- Non-breastfed children: Provide ORS or fluids derived from food products, such as soup, rice broth, kefir, biolact, or kumys.

Additional fluid requirements depend on age and stool output:

- Children under 2 years: 50-100 ml after each loose stool.
- Children 2 years and older: 100-200 ml after each loose stool.

Continue supplemental fluid therapy until diarrhea completely resolves.

In our proposed table, dehydration severity is primarily determined using the percentage of body weight loss, with diuresis serving as an auxiliary indicator ([1,3], Table 3).

Table 3. Determination of the Degree of Dehydration and Calculation of the Total Fluid Requirement for Rehydration Therapy in Intestinal Toxicosis in Children on the 1st Day of the Disease

Degree of dehydration	Weight Loss, %	Diuresis	From 7 days to 1 month	1-3months	3-6 months	7-18 months	1-3 months
I (Mild)	Up to 5 (up to 10 newborns)	Preserved	190-220	170-180	150-160	130-140	100-130
II (Moderate)	5-10 (up to 15 newborns)	Oliguria	220-270	190-210	175-185	150-170	130-170
III (Severe)	Over 10 (up to 20 newborns)	Oliguria up to anuria	270-350	220-250	200-210	170-190	160-171

A rule has been implemented requiring the primary care physician, when referring a child with intestinal toxicosis for inpatient care, to record the child's most recent outpatient weight (prior to illness) along with the date of measurement. This ensures accurate assessment of body mass loss and prevents errors that may arise from deviations in the child's pre-illness growth curve.

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Following the determination of dehydration severity according to Table 2, the fluid volume required for the first day of treatment is calculated. In cases of elevated body temperature or high ambient temperatures particularly relevant in Central Asian climates an additional fluid volume is administered.

When rehydration therapy has been initiated at the prehospital stage, the clinical signs of water deficit and plasma hypertonicity (hydrotonicity) associated with the water-deficit variant may significantly diminish within a few hours. This improvement provides a rationale for reclassifying the dehydration status as isotonic upon the child's admission to the hospital.

Conclusion

In hot climates, water-deficit dehydration represents 65–75% of intestinal toxicosis cases in infants, making it the most prevalent form. To achieve substantially improved outcomes, a comprehensive, integrated approach to the management of affected children is essential. Programs aimed at protecting child health should extend beyond disease control, addressing the overall well-being, development, and welfare of children.

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