# Gastroenteritis Diagnosis and Management in Children: A simple Literature Review

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## Abstract

Gastroenteritis is a common infectious disease of the gastrointestinal tract and is of particular importance in infants, children, and adolescents. The morbidity and mortality associated with dehydration can be fatal despite the recent advances in care and management. This disease can be the result of many pathogens, with rotavirus being the leading cause, followed by the bacterial causes of Campylobacter spp. and Salmonella spp. **Objective:** In this study, we aimed to review the literature on the diagnosis and management of gastroenteritis in children to provide a summarized, yet comprehensive review paper. **Method:** PubMed database was used to select articles, and the following keys were used in the MeSH (("Gastroenteritis"[MeSH]) AND ("Evaluation"[MeSH] OR "Management"[MeSH] OR "Diagnosis"[MeSH])). **Conclusion:** Proper clinical assessment to rule out other causes of noninfectious gastroenteritis is the leading key management. The untreated conditions may deteriorate so quickly and patients become severely dehydrated resulting in endemic infection and serious deterioration of community health. The identification of high-risk groups including immunocompromised patients, pregnant women, and non-responsive patients by the physician is crucial as they have a higher rate of deterioration. Oral rehydration therapy is considered the first line in the treatment algorithm and should be combined with nutrient and zinc supplementation. Other options of therapy include IV hydration, antibiotics, and hospitalization in severe cases.

**Keywords:** Gastroenteritis, dehydration, oral rehydration therapy, management

## INTRODUCTION

Acute gastroenteritis is a diarrheal disease of rapid onset, with or without nausea, vomiting, thirst, fever, or abdominal pain typically lasting less than two weeks. In the US, this disease accounts for around 1.5 million doctor visits and 300 deaths in children each year [1]. As a result of diarrhea and vomiting, the condition may deteriorate so quickly and patients become severely dehydrated. Some signs of dehydration that should be noted carefully include dry skin, a dry mouth, feeling lightheaded and drowsiness, and thirst urgency. Detecting these signs is crucial because the complications tend to be rapid after reaching such a state [2]. In this paper, we will discuss the etiology, clinical features, investigations, and management of gastroenteritis.

## METHODOLOGY

PubMed database was used for articles selection, and the following keys used in the MeSH (("Gastroenteritis"[MeSH]) AND ("Evaluation"[MeSH] OR "Management"[MeSH] OR "Diagnosis"[MeSH])). In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics; gastroenteritis evaluation, and also gastroenteritis management and diagnosis. Exclusion criteria were all other articles, which did not have one of these topics as their primary endpoint, or repeated studies, and systematic reviews or meta-analysis.

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## DISCUSSION

### Etiology

Enteric viruses are among the most important pathogens associated with diarrheal illnesses in adults and children. These cause a great endemic burden and management difficulty even in advance healthcare systems [3]. Physicians should be alert to any child complaining of flu-like symptoms along with repetitive diarrhea and vomiting. Other major causative agents of infectious gastroenteritis are bacterial, followed by parasitic infections (self-limiting). Steyer et al. suggested that tests for viral agents such as rotaviruses (in winter), noroviruses genogroup II, adenoviruses trait 40/41, and astroviruses are to be excluded primarily [4]. After that, bacterial causes of campylobacter species (pets and contaminated food) and salmonella species (dairy products) should be investigated (etiology will then be detected in 83.5% of children). Other variations of this disease include eosinophilic gastroenteritis (EGE), which is less likely to be seen in daily practice. Despite this detailed and focused assessment, the chances of other unknown contributed mechanisms have been reported in 21-50% of cases [4-6].

### Definition and Clinical Assessment:

A proper history evaluation and clinical examination should be done to all patients, particularly infants and children. Occasionally, acute diarrhea may occur in association with other disorders, such as non-gastrointestinal infections, (e.g. meningitis and pneumonia). The clinician should not take diarrhea as a symptom of gastroenteritis, because it can be seen in serious medical conditions such as malaria, urinary tract infections, and acute appendicitis. According to the latest CDC report, the definition of diarrhea is the passage of loose or watery stools more than three times in 24-hours, with fluid volume loss varying from 5 to more than 200 ml/kg body weight/day according to age. The co-morbid status of gastroenteritis is a result of prolonged untreated diarrhea, dehydration, and electrolyte losses. A detailed history should target the characteristic assessment of the vomiting and diarrheal stool including onset; frequency; quantity; and presence of bile, blood, or mucus. Report of recent oral intake, body weight measure before illness, and associated symptoms should be recorded in detail along with all chronic or recent medical problems. Medications, history of travel, and human immunodeficiency virus (HIV) status should also be asked. The general condition of the patient should be assessed, particularly any recent changes in body weight, with special concern given to infants and children who appear restless, apathetic, or less reactive. The appearance of any dehydration sign should ring the bell for the occurrence of deterioration in the patients' status [7].

Certain clinical signs and symptoms can quantify the extent of a patient's dehydration and can be seen in the eye to toe examination. The exact classification of dehydration by CDC divides patients into mild (3 to 5% fluid deficit), moderate (between 6 and 9% fluid deficit), or severe (equal to or more than 10% fluid deficit, shock, or near shock status) [1]. The aim of the classification is to provide a starting point for treatment, determine home therapy upon discharge, inpatients allocation, and urgent intensive therapy need. The evaluation points include the general inspection and vital signs: body weight, breathing pattern, capillary refill status, extremities, eye appearance, and heart rate. Severely dehydrated patients will show lethargy and severe weight loss, and appear tachypneic and tachycardic. Other signs include the presence of sunken eyes, absence of tears, and skin turgor; they may also demonstrate a diminished urine output and –orthostatic-hypotensive shock [8].

### Investigations

There is no exact role of laboratory studies, such as serum electrolytes, in the assessment of acute diarrhea. Certain laboratory studies might help understanding other mechanisms, for example, complete blood counts, serum electrolyte panel, and urine plus blood cultures. These are indicated when the complications (e.g. sepsis) are a concern, any electrolyte derangements are observed in sever patients or when the bacteria invade and cause complications such as pseudomembranous colitis and hemolytic-uremic syndrome [4, 7]. Identification of the etiological agent by bacterial stool culture is required in some cases. These cases include severe or prolonged diarrhea, symptoms consistent with invasive disease, high-risk patients, and/or a complicated course of the disease (hospitalization). Physicians stratify the high-risk based on the patient's history, as in pregnant women, age or greater than 70 years, immunocompromised state, or other co-morbidities. Stool culture helps in detecting other signs and symptoms of inflammatory diarrhea such as mucus or blood in diarrhea. The three common bacteria identified in stool are Salmonella, Campylobacter, and Shigella. Testing for shiga toxin, leukocytes in the stool for EHEC, and stool culture should all be ordered if bloody diarrhea is present. If diarrhea persists, ova and parasite testing should be considered by the physician. Moreover, in cases of an outbreak, the identification of enteropathogens from stool cultures by the clinician is pivotal in tracking and identifying the outbreak [8, 9].

Nowadays, viruses such as rotaviruses, enteric adenoviruses, and astroviruses can be produced in cell culture. This has allowed this test usage in diagnostic studies, the elucidation of each virus's life cycle and to better understand factors correlated with immunity to infection. Nowadays, the use of molecular methods such as ELISA (enzyme-linked immunosorbent assay) in diagnosis, is preferable. This is due to their high sensitivity, specificity, fast results and the possibility of establishing the concentration of the causative enteric infectious (mainly viral pathogens). [10, 11]

### Management

Gastroenteritis disease can be serious and life-threatening if left untreated. The complications including severe dehydration and shock, metabolic acidosis, severe electrolyte imbalance, convulsions, and severe immunocompromised may all occur with late or missed treatment [8]. Generally, the

management aims to provide hydration, electrolyte replacement, spread limitation, specific etiology identification, re-establishing enteral feeding, and finding the use of additional therapies. An important point is that gastroenteritis is usually a viral or bacterial self-limiting disease. The recent guidelines recommend ORT as the first-line therapy for mild to moderate dehydration in acute gastroenteritis, along with the assessment of the need for intravenous access [1]. ORT improves health outcomes among children, and the latest recommendations include rehydration and maintenance fluids with oral rehydration solutions (ORS) combined with zinc supplementation, as well as continuous age-appropriate nutrition assessment. However, vomiting can compromise the use of oral rehydration therapy (ORT) in the management algorithm of dehydration. Although debatable, it is evident that antiemetics, such as ondansetron, improve ORT response, decrease the rate of intravenous therapy and the frequency of vomiting and hence lower hospitalization rates. The burden of health care costs can be reduced with the proper combination of rehydration and antiemetics therapy in acute gastroenteritis. The safety profile and the absence of sedative effects with ondansetron allow its incorporation into the dehydration guidelines with only precaution toward transient diarrhea (a frequent side effect). Usually, one oral dose of ondansetron is administered, as the vomiting is transient, thereafter allowing earlier discharge. Further research and focus on the subgroup of patients who can benefit from the antiemetics by determining a suitable choice are needed. Optimal management for restoration of body fluid balance is always the key to good treatment of children with acute gastroenteritis. Shifting back the patient into normal feeding after ORT should be the aim, with proper electrolyte formula monitoring, continuation of breast-feeding during diarrhea, and ORS for subsequent losses [7].

Hospitalization of patients is indicated in complications (like septic shock and hypotension) and in severe dehydration cases because they need IV rehydration therapy.

Antibiotics have a role in the management of the acute phase in this disease (when a bacterial cause is probable), and the physician can start empirical antibiotics like ciprofloxacin, azithromycin, and rifaximin. Nevertheless, a more focused antibiotic prescription based on stool cultures, sensitivity testing is advised once the results are available. The physician should keep in mind antibiotic-associated diarrhea (and other side effects) and antibiotic resistance in his mind when prescribing antibiotics to his patient [12, 13].

Other elements of health care such as teaching the patient (or their parents) about the exact ORT regimen, documentation, and general advice (especially when to come back) can help in better compliance and better overall care [14]. Recent studies have suggested new modalities of prevention such as rotavirus vaccination, with reduced rates of hospitalizations. This was noted in regards to complications (seizures) but more studies providing significant results are needed [15].

## CONCLUSION:

The key to approach gastroenteritis lies in proper patient assessment, a thorough history, and a properly carried physical examination, as ruling out other causes is essential. This is vital due to the tendency of patients (especially pediatrics) to get worse quickly thus escalating the problem. Investigations including CBC and stool analysis can be used not only to detect the pathogen but also to assess the severity of the patient's condition. Although gastroenteritis is common and is usually a self-limited disease, well management is of utmost importance to avoid deleterious consequences in such cases. Generally, the first line of treatment in acute gastroenteritis is oral rehydration with IV, antibiotics, and hospitalization all playing role in more complicated cases. New breakthroughs such as viruses' vaccines are being suggested in the approach to this disease, however, larger clinical studies and better investigations are required to elicit significant results.

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