

A Case Report of Severe Dehydration and Complications in a 10 Month Old Baby Girl Presenting with Acute Diarrhoea in a Resource-Limited Hospital Setting

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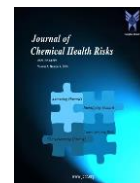
- Diarrhoea
- Childhood diarrhoeal diseases
- Pediatric dehydration
- Diarrhoeal management
- Resource-constrained healthcare
- Diarrhoeal complications
- Diarrhoeal epidemiology
- Healthcare interventions

ABSTRACT:

Introduction: Diarrhoea continues to pose a significant threat to child health, often resulting in severe complications such as hypovolemic shock, electrolyte imbalances, and metabolic acidosis, which can lead to morbidity and mortality. This case study aims to illustrate the management of diarrhoea in a resource-constrained hospital setting.

A 10 Month old Baby Girl presented with symptoms including frequent watery stools (10 times/day), vomiting (3 times/day), and fever. The child exhibited signs of dehydration, weakness, refusal to drink, rapid and labored breathing, and loss of consciousness. Physical examination revealed a high heart rate (165 beats per minute), impalpable peripheral pulse, elevated respiratory rate (44 breaths per minute), normal oxygen saturation (98%), and slight hypothermia (36.7°C). Additionally, the child displayed clinical signs of dehydration such as sunken eyes, reduced tear production, diminished bowel sounds, delayed skin turgor, and prolonged capillary refill time.

Laboratory investigations showed leukocytosis (23,600/ μ l), hyponatremia (127 mmol/l), and hypokalemia (2.66 mmol/l). Treatment commenced with rapid fluid resuscitation using Ringer lactate at 20 ml/kg BW over 20 minutes, followed by 30 ml/kg BW over the next 30 minutes, and finally 70 ml/kg BW over 2 hours and 30 minutes. Subsequently, the patient received D5% 500 cc with sodium bicarbonate and KCL 7.4% within 24 hours. Oxygen therapy, antibiotics, probiotics, and zinc supplementation were also administered.



After five days of hospitalization, the patient showed significant improvement and was discharged home. This case underscores the importance of promptly recognizing the signs and symptoms of severe diarrhoea and effectively managing it in resource-limited healthcare settings to prevent complications and reduce mortality rates associated with diarrhoeal diseases.

1. Introduction

Diarrhoea presents a formidable global health challenge, affecting approximately 1.7 billion children under the age of five annually, as documented by the World Health Organization (WHO). This widespread affliction results in an estimated half a million fatalities each year.¹ Of particular concern is its prevalence in India, where the Ministry of Health's 2018 data revealed a 17% prevalence rate among children under five, amounting to roughly 4 million cases.² Alarmingly, diarrhoea emerged as the leading cause of death among this age group, contributing to 10.7% of all child fatalities in 2019.

In Madhya Pradesh, India, a recent investigation into diarrhoeal incidence unveiled that a significant majority (83.2%) of cases occurred within the age bracket of 0 to 24 months.³ Complications such as hypovolemic shock, electrolyte imbalances, and metabolic acidosis significantly contribute to mortality rates in these cases. The heightened mortality often results from inadequacies in management strategies. Effective management of diarrhoea crucially relies on the prompt identification of early signs and symptoms, which dictate subsequent treatment protocols.⁴

Hence, this case study endeavors to delineate the identification of signs and symptoms and the management of diarrhoea within a hospital setting in Indore, Madhya Pradesh, India, recognizing potential resource constraints.⁵ It underscores the critical necessity for timely intervention and the adoption of appropriate treatment strategies to mitigate the adverse outcomes associated with childhood diarrhoea. This study holds significant implications for informing healthcare practices and policies aimed at alleviating the burden of diarrhoeal diseases in India.⁶

2. Case report

A 10-month-old baby girl, referred from primary healthcare, presented to the emergency room with a history of watery stools for the past four days, occurring

ten times a day without mucus or blood. Additionally, she experienced non-projectile vomiting three times daily, consisting of food material and water. Over the preceding two days, she had a fluctuating fever which was relieved by antipyretic medication. The mother noticed the child's weakness and refusal to drink since the previous night. Respiratory distress, rapid breathing, and loss of consciousness followed, unaffected by positional changes or accompanied by coughing. The patient, the second child of a mother who had previously delivered twins, was born via Cesarean Section due to the risk of preterm birth, weighing 1.9 kg at birth, and requiring NICU care for ten days without complications such as hyperbilirubinemia or cyanosis.

On examination, the child appeared severely ill and lethargic, weighing 7 kg, with a length of 71 cm, indicating poor nutritional status according to WHO growth curves. Physical findings included a heart rate of 166 bpm, impalpable peripheral pulse, respiratory rate of 44 bpm, oxygen saturation of 98%, and a temperature of approximately 36.7°C. Signs of dehydration were evident, with sunken eyes, absence of tears, reduced skin turgor, and a delayed capillary refill time of 5 seconds. Initial laboratory results revealed hemoglobin levels of 13.1 g/dl, leukocytosis (23,600/ μ l), and electrolyte imbalances (sodium 127 mmol/l, chloride 108 mmol/l, potassium 2.66 mmol/l).

Fluid resuscitation began with Ringer lactate at 20cc/kgBW over 20 minutes, followed by additional doses. Post-rehydration reassessment showed improvement in vital signs, leading to subsequent administration of D5% solution, sodium bicarbonate, and potassium chloride. Oxygen therapy and antibiotics (ceftriaxone) were initiated, alongside nasogastric administration of probiotics and zinc. Within 24 hours, the patient exhibited improved respiratory status, stable vital signs, and normalized electrolyte levels.

After ICU treatment, the patient was transferred to a high-care unit, receiving maintenance fluid therapy and



diet advancement. By the fifth day, significant improvement was observed, and the patient was discharged with oral therapy comprising probiotics, zinc, and vitamins.

3. Discussion

In this clinical case, a 10-month-old female infant presented with a clinical profile characterized by watery Diarrhoea devoid of mucus or hematochezia, accompanied by non-projectile vomiting and a two-day history of fever. Analysis of epidemiological data from Riskesdas reports in Madhya Pradesh indicated an uptick in Diarrhoea prevalence among children under five years old. While rotavirus infection stands as a common etiology for pediatric Diarrhoea, commonly exhibiting symptoms such as vomiting, fever, and dehydration, bacterial pathogens such as *Escherichia coli* and *Salmonella* can also provoke Diarrhoea, typically associated with bloody mucoid stools and pyrexia. Parasitic infections, such as giardiasis, present with acute watery Diarrhoea and abdominal discomfort.

Clinical evaluation of the patient revealed signs indicative of severe dehydration, including weakness, decreased consciousness, and metabolic acidosis. The utilization of assessment tools like the Clinical Dehydration Scale facilitates the determination of dehydration severity.⁷ Complications related to Diarrhoea encompass a spectrum ranging from shock to electrolyte imbalances and renal dysfunction. Of particular note, metabolic acidosis emerges as a prevalent complication, discernible through blood gas analysis or clinical symptomatology.⁸ Management entails fluid resuscitation tailored to the degree of dehydration and correction of electrolyte imbalances.⁸

Fluid administration adheres to World Health Organization (WHO) guidelines contingent upon the severity of dehydration. In this instance, the patient received maintenance fluids supplemented with dextrose, potassium, and sodium bicarbonate. Antibiotic therapy is rarely warranted for viral Diarrhoea; however, zinc supplementation and probiotics serve as adjunctive measures for symptom alleviation and mitigating the risk of recurrence. While not universally endorsed by WHO, probiotics have demonstrated efficacy in reducing the duration of Diarrhoea and hospitalization when administered promptly.^{10, 11, 12}

Differential diagnoses, including diabetic ketoacidosis and sepsis, merit consideration based on clinical presentation, warranting appropriate interventions as dictated by the underlying etiology. Timely recognition and management of dehydration and its associated complications are paramount for optimizing outcomes in pediatric patients afflicted with Diarrhoea.^{13, 14}

4. Conclusion

Diarrhoea poses a significant public health challenge, particularly in regions with limited access to adequate sanitation facilities. Children affected by Diarrhoea are particularly vulnerable to dehydration, emphasizing the critical need for early recognition of symptoms and signs to facilitate appropriate medical intervention. Without prompt treatment, Diarrhoea can lead to severe complications such as metabolic acidosis, hypovolemic shock, and disturbances in electrolyte levels.¹⁵

In healthcare settings with constrained resources, the management of Diarrhoea cases necessitates a comprehensive approach. This typically involves initiating fluid rehydration therapy to address dehydration, alongside interventions aimed at rectifying electrolyte and metabolic acidosis imbalances. Moreover, the administration of probiotics may be considered to restore a healthy balance of gut flora. Antibiotics are reserved for instances where bacterial infection is either suspected or confirmed.¹⁶

Through the implementation of these strategies, healthcare providers can effectively mitigate the impact of Diarrhoea and enhance patient outcomes, even in settings with limited resources. This holistic approach underscores the importance of timely and targeted interventions in combating the morbidity associated with Diarrhoeal diseases.^{17, 18}

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