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CASE REPORT

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Multidisciplinary strategies for managing acute watery diarrhea in children with congenital anorectal malformation and colostomy: A case study

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Key clinical message

Congenital anorectal malformation (ARM) is a diverse group of anomalies affecting the development of the anal and rectal regions, with an estimated incidence of one in every 5000 live births. The colostomy is commonly performed as part of the staged management of children with ARM to prevent complications. However, the presence of acute watery diarrhea in children with ARM and colostomy poses significant management challenges due to the altered anatomy and physiology affecting stool regulation and absorption, exacerbated by various factors including infections, dietary issues, medication side effects, and underlying gastrointestinal complications.This case study explores the complexities involved in managing acute watery diarrhea in children with congenital ARM and colostomy. A comprehensive literature review was conducted to examine the existing evidence on the subject. The study highlights the multidisciplinary approach required, involving pediatricians, surgeons, and other specialists, to provide comprehensive care and support for these children. Effective management of acute watery diarrhea in children with congenital ARM and colostomy necessitates collaboration between pediatricians and surgeons. Pediatricians play a crucial role in assessing hydration status, monitoring electrolyte balance, and providing appropriate fluid and nutritional management. Surgeons address the surgical aspects of care and coordinate interventions with the management of acute diarrhea. The study underscores the importance of a multidisciplinary approach to deliver comprehensive care, optimize outcomes, and improve the quality of life for affected children. The management of acute watery diarrhea in children with congenital ARM and colostomy presents significant challenges due to the complex interplay of anatomical, physiological, and clinical factors. A multidisciplinary approach involving pediatricians, surgeons, and other specialists is vital for providing comprehensive care and support. This case study emphasizes the need for further research,

guidelines, and collaborative efforts to enhance the management strategies for this vulnerable population.

KEYWORDS

acute watery diarrhea, anorectal malformation, colostomy, management challenges, multidisciplinary approach

1 | INTRODUCTION

The development of the anal and rectal areas is impacted by a variety of congenital defects known as anorectal malformations (ARM). From simple anal malformations to complex anorectal malformations including various cloacal components, they exhibit a wide spectrum of severity. ARM is estimated to occur in approximately one out of every 5000 live births[1] It is intriguing that about 50% of ARM instances are classed as non-syndromic, and the remaining 50% are associated with complex multiple congenital abnormalities, chromosomal aberrations, or recognized genetic syndromes. It is yet unknown what leads to non-syndromic instances.[2] The colostomy is a commonly employed intervention in the staged management of children with anorectal malformation (ARM) aimed at preventing complications.[3] Acute watery diarrhea (AWD) is the passing of three or more liquid or loose stools within a 24-h period.[4] The presence of acute watery diarrhea in children with congenital anorectal malformation (ARM) having done colostomy presents notable management complexities for pediatricians and surgeons. After a colostomy surgery, stool from the colon is directed into a colostomy pouch or bag. It is important to note that the consistency of stool is often more liquid than it was prior to the surgery. The specific type of colostomy and the level of colon activity will also play a role in determining the consistency of the stool.[5] The management of acute watery diarrhea becomes more complex when a colostomy is present, necessitating focused attention from both pediatricians and surgeons. Acute watery diarrhea in this population can be attributed to various factors, including infections, dietary issues, medication side effects, or underlying gastrointestinal complications.[6] The presence of an anorectal malformation and a colostomy creates a unique set of challenges for healthcare providers involved in the care of these children.

Pediatricians bring their expertise in diagnosing and treating acute diarrhea, assessing nutritional status, and managing fluid and electrolyte imbalances. Surgeons contribute their knowledge of the underlying anorectal malformation, the impact of colostomy on bowel function, and potential complications related to surgical interventions. The objective of this case study is to shed light on the challenges faced by pediatricians and surgeons when managing acute watery diarrhea in a child with congenital anorectal malformation and colostomy. By delving into these complexities, this research aims to contribute to a deeper understanding of the management strategies required for optimal care in such cases. Thus, emphasizing the necessity for more research to produce evidence-based management options that meet the particular needs of these patients along with the significance of a collaborative and multidisciplinary approach in dealing with the problems provided by this distinct combination of illnesses.

2 | CASE HISTORY

A 2-year-old child was brought to the hospital by his parents due to complaints of acute watery diarrhea. According to the parents, the child history of watery stools for the past 3 days, with more than eight episodes daily, accompanied by abdominal discomfort and foul-smelling stools. The child appeared irritable, with a mild decrease in appetite. The parents had been maintaining the child's fluid intake but were concerned about the persistent diarrhea. The child's past medical history revealed a diagnosis of congenital anal canal anomalies shortly after birth, with previous two-stage of reconstructive surgeries performed to correct the deformities. The colostomy was performed before the pull-through procedure. The posterior sagittal anorectoplasty PSARP, for reposition in the correct location, and an anal opening will be created (Figure 1). The baby had a difficult time passing a stool, causing constipation and possibly discomfort before surgery. The developmental assessment indicated normal growth, motor skills, and cognitive development. The family history was unremarkable for gastrointestinal disorders or congenital anomalies, and the child resided in a clean and hygienic home environment with access to safe drinking water and proper sanitation facilities. During the physical examination, vital signs were within normal limits, although mild tenderness or distension may be observed during the abdominal examination. The surgical scars from previous reconstructive surgeries were evaluated, showing no signs of infection or abnormalities, and no perianal or perineal

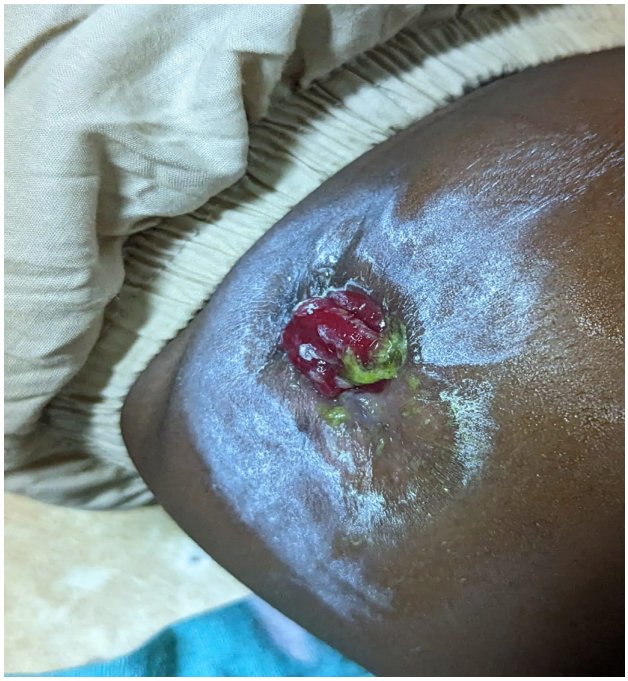

FIGURE 1 Colostomy in a pediatric patient.

skin irritation was noted. The patient was treated with oral rehydration solution (ORS) after each loose motion to correct dehydration and electrolyte imbalances, along with a five-day course of syrup azithromycin and syrup zinc supplementation. Additionally, recommendations were provided for adequate nutrition and dietary modifications based on the child's tolerance and nutritional requirements. Given the patient's history of previous reconstructive surgeries, surgical follow-up with the pediatric surgeon who performed the procedures was deemed essential. The surgeon will assess the healing of the surgical sites, address any complications, and determine the need for further interventions. Regular follow-up appointments were scheduled to monitor the resolution of acute diarrhea and assess the healing progress of the surgical sites.

3 | DISCUSSION

Diarrhea, characterized by frequent loose watery stools, can be attributed to various factors such as illness, stress, dietary choices, and certain medications. When experiencing diarrhea, particularly if it is severe or persists for more than 2 days, it is important to consider possible causes such as illness, gastrointestinal disturbances, or food poisoning.[7]

As food moves through the digestive system, it progresses from the small intestine to the large intestine or colon. During this journey, the indigestible residue transforms into stool, which is eventually eliminated through the anus. Typically, stool remains loose and liquid as it travels through the upper colon, where water is absorbed, resulting in firmer stool as it approaches the rectum. However, in the context of a colostomy, which alters the normal passage of stool, it can cause changes in stool consistency, potentially leading to loose or liquid stool.[5] Among the factors contributing to loose watery stool, nutritional deficiency is a common concern in patients with stomas. The presence of a stoma disrupts normal gut function with impaired digestion and absorption of nutrients. Furthermore, patients with stomas often have inadequate dietary intake due to underlying health conditions, socioeconomic factors, or as an attempt to manage the stoma output. These factors collectively increase the risk of nutritional deficiencies, including wasting, which is characterized by insufficient food intake and a higher incidence of diarrheal diseases.[8] Moreover, reducing surgical site infections is a complex task due to the numerous potential entry points for pathogens to contaminate wounds. The primary source of these infections is often attributed to the patient's own skin or other mucosal membranes and viscera.[9] When an infection occurs at the site of the colostomy, it can lead to inflammation and irritation of the surrounding tissues. This inflammation in turn can disrupt the normal absorption of fluids and nutrients in the colon, resulting in loose stools or diarrhea.[10] Furthermore, dietary changes can play a role in the occurrence of diarrhea in individuals with colostomies. While most people with ostomies can follow a regular diet, adjustments may be necessary if issues like diarrhea arise. While introducing new foods to such patients, it is recommended to do so one at a time, especially foods that may contribute to potential problems such as diarrhea.[10] Similarly, certain medications and supplements can contribute to diarrhea in individuals with a stoma for different reasons. Antibiotics, while helpful in eliminating harmful bacteria, can also disrupt the balance of healthy bacteria involved in digestion. Additionally, over-the-counter medications containing magnesium or calcium may also induce diarrhea due to their ability to relax the digestive tract and counteract stomach acids.[10]

Anorectal malformations encompass various abnormalities, including a narrow anal passage, the presence of an anal membrane, imperforate anus, and abnormal connections between the rectum and the urinary tract or reproductive system known as fistulas. The type and number of required surgeries vary based on the nature and severity of the anomaly.[11] Anorectal malformation (ARM) itself is not a direct cause of diarrhea. However, depending on the specific type and severity of the malformation and type of surgery conducted, it can indirectly contribute to the development of diarrhea through the following mechanisms: Bowel

obstruction: In some cases of ARM, there may be partial or complete obstruction of the gastrointestinal tract, which can prevent the normal passage of stool. When stool is unable to pass through the affected area, it can lead to bowel distention and the accumulation of fluid and stool above the obstruction. This can cause diarrhea-like symptoms due to leakage of fluid and stool around the obstruction. Impaired stool control: The primary cause of rectosigmoid emptying in individuals with an anorectal malformation is a forceful involuntary peristaltic contraction, occasionally aided by a Valsalva maneuver. Many patients with anorectal malformation experience a disruption in this complex bowel motility mechanism.[12] This in turn can result in difficulties with stool control and increased stool frequency, which may resemble diarrhea. Children with ARM are at higher risk of developing certain associated conditions or complications that can cause diarrhea. For example, they may be more prone to gastrointestinal infections, such as gastroenteritis, due to the altered anatomy and potential for bacterial overgrowth.

In regards to the management of such patients with colostomy having diarrhea, pediatricians and surgeons face difficulties in managing the acute watery diarrhea due to several factors. Firstly, the changes in the anatomy and physiology disrupt the natural mechanisms responsible for regulating stool consistency and absorption, posing challenges in effectively managing diarrhea. Secondly, the presence of a colostomy necessitates careful consideration of fluid and electrolyte balance, as rapid fluid loss can lead to dehydration and electrolyte imbalances. Thirdly, the underlying condition and previous surgical interventions may impact the choice of treatment options and necessitate tailored approaches to alleviate symptoms and manage complications. Thus, the occurrence of acute watery diarrhea after colostomy requires proper evaluation by a healthcare professional so that proper assessment of the specific factors contributing to the causation of diarrhea is done and appropriate management strategies are recommended. Moreover, treatment may involve addressing any underlying infections, adjusting diet or medication, providing fluid and electrolyte replacement, and optimizing colostomy care to minimize complications and promote healing. The involvement of a pediatrician would be in the overall management of the child's health, which is focusing on evaluating the child's hydration status, monitoring their electrolyte balance, and providing appropriate fluid and nutritional management, including the assessment and treatment of acute watery diarrhea. In addition to this, the pediatrician would also address any underlying causes of diarrhea and consider additional investigations or interventions if needed.

On the contrary, a surgeon would play a crucial role in managing the congenital absence of the anal canal and the subsequent colostomy. They would be responsible for the surgical aspects of the child's care, including the repair or reconstruction of the anorectal malformation. Close collaboration and communication in this complex case between the surgeon and the pediatrician is crucial to ensure the child's comprehensive care and the seamless coordination of surgical interventions with the management of acute diarrhea. To protect the wellbeing of children with congenital anorectal malformation (ARM), this calls for thorough post-operative care and handling challenges as well. After a successful procedure and the child restoring normal bowel function the surgeon's role subsequently shifts to long-term monitoring, complication treatment, surgical site care, surveillance, and potential future interventions. Nutritional support, in some cases, children with ARM and colostomy may require specialized nutritional support to address any ongoing dietary challenges. The surgeon may collaborate with a dietitian or nutritionist to ensure the child's nutritional needs are met. As such a comprehensive treatment plan that addresses both acute diarrhea and the long-term management of the anorectal malformation will be achieved. This may involve multiple interventions, including surgical procedures, nutritional support, and ongoing medical care. In some cases, a multidisciplinary team, including pediatric surgeons, pediatric gastroenterologists, and pediatric nurse specialists, may be involved in providing comprehensive care and support to the child and their family.

4 | LIMITATION

One limitation of this case report is the lack of a definitive diagnosis for the cause of acute watery diarrhea in the patient. Although stool analysis, blood tests, and imaging studies are important diagnostic tools, the specific pathogen or underlying gastrointestinal abnormality responsible for the diarrhea could not be identified in this case. Further investigations, such as molecular diagnostic tests or endoscopic procedures, may have provided more conclusive results. The study focuses on a single case, which may not represent the entire population of children with congenital anorectal malformation and colostomy. Each case of ARM and colostomy can vary in terms of severity, underlying conditions, surgical techniques, and individual responses to treatment.

5 | CONCLUSION

This case study emphasizes the importance of a collaborative and multidisciplinary approach in managing acute watery diarrhea in children with congenital anorectal

malformation and colostomy. The collaborative approach of pediatricians and surgeons is vital to develop comprehensive treatment plans considering various factors contributing to diarrhea. To develop evidence-based management options that correspond specifically to the special requirements of children with congenital anorectal malformation and colostomy, further study is required. The complexity of these disorders highlights the value of specific treatment and ongoing developments in understanding and resolving these difficult problems.

AUTHOR CONTRIBUTIONS

Mohammad Ashraful Amin: Conceptualization; methodology; resources; validation; visualization; writing – original draft; writing – review and editing. **Ridwana Maher Manna:** Validation; visualization; writing – original draft; writing – review and editing. **Sabrina Nahin:** Visualization; writing – original draft; writing – review and editing. **Mohammad Delwer Hossain Hawlader:** Supervision; visualization; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DATA AVAILABILITY STATEMENT

Data can be shared based on the reader's reasonable request and priority base and some restrictions will apply.

ETHICAL STATEMENT

The article is about a case study. As a result, our Ethics Committee's consent was not required.

CONSENT

The patient's parents had written informed consent taken for publishing this case report.

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