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CASE REPORT

# Abdominal migraine with acute watery diarrhea and dehydration: Successful treatment with Valproic acid in a pediatric case

**Mohammad Ashraful Amin**[1,2,3] | **Ridwana Maher Manna**[1,2] | **Sabrina Nahin**[4] | **Mohammad Delwer Hossain Hawlader**[1]

[1]Department of Public Health, North South University, Dhaka, Bangladesh

[2]Public Health Professional Development Society (PPDS), Dhaka, Bangladesh

[3]Department of Clinical Trials, London School of Hygiene and Tropical Medicine, UK

[4]Department of Physiology, Green Life Medical College Hospital, Dhaka, Bangladesh

**Correspondence**
Mohammad Ashraful Amin,
North south university Bashundhara,
Plot# 15, Block# B, Bashundhara R/A,
Dhaka-1229, Bangladesh.
Email: mohammad.amin02@northsouth.edu

**Key Clinical Message**

Abdominal migraine (AM) is a prevalent pediatric condition that rarely affects adults. Multiple diagnostic criteria have been established, but in general, AM is characterized by unprovoked episodes of acute central abdominal pain with migrainous characteristics and periods of respite. Recurrent stomach pain is a prevalent symptom globally, with a significant portion of cases falling under the category of functional gastrointestinal disorders (FGIDs) due to the absence of identified biological causes. There is a notable prevalence of migraines among individuals with a family history of the condition, indicating a genetic predisposition. A descriptive report has been prepared on the participant who had AM associated with acute watery diarrhea (AWD) on January 2023. The patient's parents had given written informed consent for publishing this case report. In this case report, we present the clinical scenario of a 12-year-old male child who experienced AM symptoms alongside a history of absence seizures. The child presented with episodes of abdominal pain and AWD. Despite extensive investigation and treatment, there was no improvement in abdominal pain. However, after 1 week of oral valproic acid administration, the patient remained symptom-free during the follow-up period. Dehydration, along with other factors, has been identified as a triggering factor for AM. Acute watery diarrhea has the potential to disrupt the normal functioning of the gastrointestinal system, and dehydration may lead to subsequent abdominal symptoms.

**KEYWORDS**

abdominal migraine, acute watery diarrhea, dehydration, valproic acid

## 1 | INTRODUCTION

Abdominal migraine (AM) is a disorder that affects children in mid-childhood, with the highest occurrence between the ages of five to nine. It is estimated to affect 1%–4% of school-aged children.[1] It is a subtype of migraine predominantly affecting children and young adults[2] and presents a unique challenge within the domain of pediatric neurology. Recurrent stomach pain is a common symptom observed in children worldwide, with a significant proportion falling under the category of functional gastrointestinal disorders (FGIDs) due to the absence of identified biological etiologies.[3,4] However, diagnosing AMs remains challenging due to the lack of standardized diagnostic criteria and the overlap of symptoms with other gastrointestinal disorders.[3] There is a notable prevalence of migraines among affected individuals or their families, suggesting a genetic predisposition to the condition. Notably, individuals experiencing gastrointestinal[3] symptoms such as diarrhea or constipation may exhibit a higher susceptibility to migraines.[5]

Acute watery diarrhea (AWD) is the passing of three or more liquid or loose stools within a 24-hour period.[6] AWD has been observed as a manifestation in several neurological conditions, highlighting the complex and interconnected relationship between the gut and the nervous system. Recognizing the occurrence of latent AM following the occurrence of AWD offers an opportunity for a more accurate diagnosis, as the presence of may aid in distinguishing AMs from other gastrointestinal disorders. However, our understanding of this intricate association remains limited, necessitating a comprehensive review of the existing literature.

## 2 | CASE HISTORY

A 12-year-old child who was known to be absent-seizure had been experiencing AWD followed by abdominal pain for 12 h. For AWD, he had taken syp azithromycin, and diarrhea ceased 2 days later, but the pain was predominantly umbilical, moderate in intensity, dull in nature and non-radiating. No aggravating or relieving factors were reported, and the pain was neither radiating nor related to food intake. For the history of absence seizures, he was on irregular valproic acid (VPA) medication. There was no previous history of vomiting but had nausea and anorexia He had no history of headaches, photophobia, or loss of consciousness, and his other systemic assessments were normal. There was no migraine predisposition in this family. Over the course of the 2 days, the patient was somewhat dehydrated but otherwise stable and without a fever. His vitals were normal, and he showed no evidence of dysmorphic characteristics like pallor or icterus. His pain was located largely in the periumbilical area with dull in nature, as determined by an examination of his abdomen.

## 3 | METHODS

Multiple visits to an outside medical clinic were made after the patient recovered from diarrhea, but the analgesics and muscle relaxants failed to alleviate the symptoms. Over the past 3 months, the patient has undergone a series of tests, all of which have yielded negative results. A full blood count, serum amylase, liver function tests, renal function tests, urine R/M/E, and stool analyses with stool culture are all part of these test were within normal limit which exclude other infectious disease. Before now, the electroencephalogram examination had shown nothing unusual. He had complete freedom from symptoms between attacks previously and the pain usually persists for around 2 h. He had known of no other disorder.

## 4 | CONCLUSION AND RESULTS

The patient was diagnosed with AM after ruling out alternative organic causes through a general, all-systematic examination and other relevant tests (X-rays and ultrasounds) for this stomach discomfort. After taking VPA orally for 1 week, the patient showed no symptoms during the follow-up.

## 5 | DISCUSSION

The sensation of pain in AM can be classified as periumbilical or poorly localized and is typically described as dull, varying in intensity from moderate to severe. The duration of pain can range from as short as 1 h to several days. It is often accompanied by additional symptoms such as pallor, anorexia, nausea, or vomiting. In some cases, there is a simultaneous occurrence of headaches and AM attacks.[1] Despite the widespread acceptance of AM among medical professionals, the understanding of its treatment remains limited. However, a few studies have reported successful treatment using VPA, a preventive medication commonly used for migraines.[7]

VPA, known for its antiepileptic properties, has undergone significant advancements as a therapeutic agent for various pathologies, including bipolar disorder, migraines, and neuropathic pain.[8] The efficacy of VPA, a preventive medication for migraines, in the treatment of AM has been supported by a limited number of studies.[7]

In this case, the administration of VPA resulted in the subsidence of recurrent abdominal pain, providing further support for the hypothesis of AM. Valproate has demonstrated efficacy as a prophylactic treatment for migraines. However, investigating its specific mechanism of action in alleviating migraines poses challenges due to its broad range of biochemical effects and the complex nature of migraine pathophysiology. One proposed mechanism is its ability to increase brain levels of gamma-aminobutyric acid (GABA), which may contribute to the suppression of migraine-related events. Experimental evidence also suggests that valproate may exert its therapeutic effects by suppressing neurogenic inflammation associated with migraines.[9] In this case, the effectiveness of VPA in alleviating abdominal pain suggests a potential link between the child's abdominal symptoms and the underlying migraine pathophysiology. These findings highlight the multifaceted nature of valproate's antimigraine action and provide insights into its potential therapeutic benefits for individuals with AM.

The occurrence of AM following an episode of AWD is an intriguing aspect of this case. AWD can disrupt the normal functioning of the gastrointestinal system, potentially leading to alterations in gut-brain communication and subsequent abdominal symptoms. There is a belief that the brain-gut axis demonstrates abnormal secretion of excitatory neurotransmitters, wherein serotonin plays a prominent role in influencing gastrointestinal sensation, potentially leading to episodes of abdominal pain. Furthermore, serotonin also affects the motility and secretion of the gastrointestinal system.[7] The dehydration resulting from diarrhea could potentially act as a trigger, provoking the subsequent occurrence of AM in this child.[7] It is worth noting that the irregular medication adherence for absence seizures may have contributed to symptom recurrence and the delayed diagnosis of abdominal seizure in this case. In limitation, the patient did not undergo any endoscopy or coloscopy for abdominal pain to exclude any congenital cause.

This case study underscores the importance of identifying AM in individuals with a history of epilepsy or seizure disorders, particularly when they experience recurrent unexplained stomach discomfort. The significant improvement in symptoms observed after VPA treatment further emphasizes the potential therapeutic benefit of the drug in treating AM. To better understand the underlying mechanisms linking AM, AWD, and abdominal seizures, further research is warranted. Larger case series and prospective investigations would provide valuable insights into the prevalence, clinical characteristics, and optimal treatment strategies for individuals experiencing stomach symptoms in the context of underlying seizure disorders.

In conclusion, this case report highlights the occurrence of AM in a child with a history of absence seizures after experiencing AWD. The resolution of recurrent abdominal pain following the use of VPA suggests its potential usefulness in treating AMs. These findings underscore the importance of increased clinical awareness and consideration of epilepsy-related etiologies in cases of unexplained abdominal pain, leading to prompt diagnosis and effective therapeutic approaches for improved patient outcomes. We aim to provide insights that will inform future research directions, paving the way for optimized clinical care and improved quality of life for pediatric patients affected by AMs and their associated gastrointestinal symptoms.

## AUTHOR CONTRIBUTIONS

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

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## CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known 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.

## ETHICS 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.

## ORCID

*Mohammad Ashraful Amin* https://orcid.org/0000-0001-9142-9176

*Mohammad Delwer Hossain Hawlader* https://orcid.org/0000-0002-1443-6257

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