

CASE REPORT

DOI: <https://doi.org/10.18502/fem.v9i1.18070>

Pediatric abdominal migraine as a recurrent emergency department presentation: a case report

Maria Leis^{1*}, Rajani Vairavanathan^{1,2}

1. University of Toronto, Faculty of Medicine, 1 King's College Cir, Toronto, ON, CA, M5S 1A8.

2. Michael Garron Hospital, 825 Coxwell Ave, Toronto, ON, CA, M4C 3E7.

*Corresponding author: Maria Leis; Email: maria.leis@mail.utoronto.ca

Published online: 2024-12-29

Abstract: Pediatric functional abdominal disorders are some of the most commonly encountered disorders in childhood, and a recurrent presentation in the emergency department. Distinguishing functional disorders from organic causes is crucial to safe patient care and to identify optimal treatment strategies.

We present a case of a 9-year-old boy with recurrent presentations of diffuse abdominal pain associated with nausea, recurrent vomiting and headache. He had no red flag symptoms, and his mother had a history of migraine headaches. Emergency department investigations demonstrated normal bloodwork, with ultrasound demonstrating only trace small volume deep pelvic ascites of unknown etiology. He was subsequently diagnosed with pediatric abdominal migraine, and counselled on the cornerstones of nonpharmacologic management. This case highlights the importance of assessing for red flags of abdominal pain and using strict diagnostic criteria when considering functional abdominal disorders in childhood.

Keywords: Abdominal Migraine; Functional Abdominal Pain; Pediatric Emergency

Cite this article as: Leis M, Vairavanathan R. Pediatric abdominal migraine as a recurrent emergency department presentation: a case report. *Front Emerg Med.* 2025;9(1):e8.

1. Introduction

Children with chronic, recurrent abdominal pain have a high utilization of healthcare resources (1). Abdominal migraine is a poorly understood and underdiagnosed subtype of functional abdominal pain that affects 0.2-4.1% of children (2,3). It is a clinical diagnosis that is characterized by paroxysmal, recurrent and acute abdominal pain attacks typically associated with pallor, nausea, vomiting, anorexia, headache and photophobia (4). Although the pathophysiology is poorly understood, it is thought to include a combination of visceral hypersensitivity, gut-brain enteric nervous system dysfunction, and psychological components.

Underdiagnosis is linked to poorer functional outcomes in pediatric populations, including reports of lower qualities of life (5). Prompt and accurate diagnosis is critical to optimizing patient outcomes, as well as decreasing emergency department presentations.

2. Case presentation

A 9-year-old healthy male presented with a one-day history of sudden onset diffuse abdominal pain and vomiting starting in the afternoon. He described the abdominal pain as diffuse, non-radiating, with no associated urinary symptoms, diarrhea or constipation. He had about ten episodes of non-bloody, non-bilious vomiting that afternoon, the last vomitus about thirty minutes before presenting to the emergency department. Review of systems was otherwise negative, in-

cluding no chest pain, shortness of breath, fever or chills, dysuria, sick contacts, upper respiratory symptoms or recent travel. The patient and his mother reported similar recurrent episodes since the age of three, and chart review demonstrated at least three similar presentations within the last 18 months which seem to exacerbate with stress and are sometimes associated with migraine headaches. The migraines were not associated with photophobia or visual disturbances. Otherwise, past medical history was only significant for an uncomplicated appendectomy two years ago. The patient took no medications, had no allergies and no significant past medical history. He lived with his parents and his sister, and his mother had a history of hypothyroidism and migraine headaches. Further, his maternal grandfather had irritable bowel syndrome. The patient received acetaminophen at 10mg/kg for analgesia and ondansetron 4mg orally as an anti-emetic, as he was not tolerating any oral fluids.

On physical examination, he was alert and oriented with moderate abdominal discomfort. Vitality, his temperature was 35.6 degrees Celsius, heart rate 82 beats per minute, blood pressure 118/80 mmHg, respiratory rate 18 breaths/minute, oxygen saturation 100% on room air. Abdominal examination was soft, nondistended, non-peritonitic, no hepatosplenomegaly, no costovertebral angle tenderness, with moderate diffuse tenderness but no guarding, no right lower quadrant (RLQ) rebound tenderness and negative Murphy's sign. The remainder of the physical examination was unremarkable, including cardiac and respiratory

Table 1 Abdominal migraine diagnostic criteria

1. Paroxysmal episodes of intense, acute periumbilical, midline or diffuse abdominal pain lasting 1 hour or more (should be the most severe and distressing symptom)
 2. Episodes are separated by weeks to months
 3. The pain is incapacitating and interferes with normal activities
 4. Stereotypical pattern and symptoms in the individual patient
 5. The pain is associated with two or more of the following:
→ Anorexia, nausea, vomiting, headache, photophobia, pallor
 6. After appropriate evaluation, the symptoms cannot be fully explained by another medical condition
- *Must include all of the following occurring at least twice
*Criteria fulfilled for at least 6 months prior to diagnosis (10)

Table 2 Red flags of recurrent abdominal pain in children

- Persistent symptoms in the right upper and lower quadrants
 - Dysphagia, heartburn
 - Unintended weight loss >10% of body weight
 - Impaired growth
 - Recurrent vomiting
 - Chronic diarrhea, particularly at night
 - Evidence of gastrointestinal blood loss
 - Fever of unknown origin
 - Abnormal physical exam findings, i.e. palpable mass, hepatosplenomegaly, guarding
 - Family history of chronic inflammatory bowel disease, celiac disease, peptic ulcer disease, or other abdominal conditions
 - Arthritis
 - Disturbances of micturition
 - Delayed puberty
 - Disturbances of female reproductive system (dysmenorrhea, amenorrhea)
 - Waking up at night because of pain
- *if any of these red flags are present, further diagnostic tests should be performed to rule out organic causes (11)

Table 3 Nonpharmacologic treatment of pediatric abdominal migraine: STRESS mnemonic

- S: stress management ± cognitive behavioural therapy
- T: travel tips (i.e. avoid motion sickness)
- R: rest and adequate sleep hygiene
- E: look out for emergency symptoms
- S: avoid sparkling and flashing lights; rest in dark, quiet room
- S: snacking – avoid prolonged fasting and high-amine foods

systems.

Bloodwork demonstrated hemoglobin of 12.6 g/dL (normal value: 12-16 g/dL), white blood cells $10.8 \times 10^9/L$ (normal value: 4.8-10.8), platelets $305 \times 10^9/L$ (normal value: 130-400), ALT 10 U/L (normal value: <25 U/L), ALP 283 U/L (normal value: 215-446 U/L), and bilirubin 9 $\mu\text{mol/L}$ (normal value: 2-12 $\mu\text{mol/L}$). Urinalysis was unremarkable. Formal ultrasound demonstrated small volume deep pelvic ascites of unknown etiology, but was otherwise unremarkable. To note, his previous presentations yielded similar results. The patient's pain improved with acetaminophen, and he was able to tolerate oral rehydration.

Considering his multiple presentations, the patient was seen by pediatric gastroenterology. Further investigations were completed, including albumin 44 g/L (normal value: 35-55 g/L), ferritin 47 ng/mL (normal value: 7-140 ng/mL), C reactive protein (CRP) 7.8 mg/L (Normal value: <10 mg/L), erythrocyte sedimentation rate (ESR) 9 mm/hr (Normal value:

0-10 mm/hr), and tissue transglutaminase IgA (TTG IgA) was normal.

Based on the pattern of episodic abdominal pain with absence of red flags he was diagnosed with abdominal migraine. Treatment included taking oral ondansetron 8mg and oral ibuprofen every eight hours when a prodrome starts for a full day in an attempt to shorten the episode and decrease severity. He was counselled to avoid common triggers for abdominal migraines (same as regular migraines), and follow up was arranged.

3. Discussion

Pediatric functional abdominal disorders are some of the most commonly encountered disorders in childhood, and can affect up to 25% of all children (6). Within this diagnostic category are four clinically distinct entities, including irritable bowel syndrome, functional dyspepsia, abdominal migraine, and functional abdominal pain not otherwise speci-

fied. Similar to adults, it is a clinical diagnosis of exclusion and based off of the ROME IV criteria (Table 1). These relatively underdiagnosed conditions are critical to identify and treat early, and are often associated with other conditions in pediatric populations such as lactose intolerance (6). It is particularly important for emergency physicians to be vigilant of functional conditions, as recurrent presentations of abdominal pain can lead to increases in radiation, delays in diagnosis and improper treatment. In terms of prognosis, there are limited studies examining the long-term effects of abdominal migraine, although the majority seem to resolve by adulthood. They are at higher risk of developing migraine headache past their teenage years (4).

Our case highlights the chronic and recurrent nature of abdominal migraine as a representing encounter in the emergency department.

Functional disorders are particularly difficult for emergency physicians, as they can be challenging to differentiate from more insidious, potentially deadly conditions. A careful history, thorough physical examination, and use of well-defined, symptom-based guidelines are crucial to diagnosis (7). To differentiate from more sinister causes of recurrent presentations of abdominal pain, a common approach is identifying red flags for abdominal pain (Table 2). If any red flags are present, thorough investigations should be undertaken to assess for organic pathology.

Important differential diagnoses not to be missed in children should include appendicitis, cholecystitis, bowel obstruction, intussusception, malrotation, testicular torsion, ovarian torsion, pyelonephritis, and urinary tract infection.

Treatment of abdominal migraine mainly centers on non-pharmacologic management, and often uses the STRESS mnemonic (Table 3) (4).

Pharmacologic treatment focuses on both preventative and abortive treatment. Abortive treatment centers on analgesics like ibuprofen, acetaminophen and sumatriptan. Preventative treatment is used as a last-line resort, with some reports of propranolol, cyproheptadine, flunarizine and pizotifen being beneficial (4,8,9).

4. Conclusion

This case demonstrates that a thorough history with chart review, astute clinical judgement and appropriate diagnostic criteria must be applied when evaluating recurrent presentations of pediatric abdominal pain, including assessing for the presence of any red flags. If pediatric abdominal migraine is diagnosed, the STRESS mnemonic may be used to counsel patients on current management strategies.

5. Declarations

5.1. Acknowledgement

None.

5.2. Authors' contribution

Conceptualization, data collection, initial manuscript draft and editing: ML; Conceptualization, manuscript editing, supervision: RV

5.3. Conflict of interest

None.

5.4. Funding

None.

References

1. Di Lorenzo C, Colletti RB, Lehmann HP, Boyle JT, Gerson WT, Hyams JS, et al. Chronic abdominal pain in children: a technical report of the American academy of pediatrics and the North American society for pediatric gastroenterology, hepatology and nutrition. *J Pediatr Gastroenterol Nutr.* 2005;40(3):249-61.
2. Winner P. Abdominal migraine. *Semin Pediatr Neurol.* 2016;23(1):11-3.
3. Uc A, Hyman PE, Walker LS. Functional gastrointestinal disorders in African American children in primary care. *J Pediatr Gastroenterol Nutr.* 2006;42(3):270-4.
4. Azmy DJ, Qualia CM. Review of abdominal migraine in children. *Gastroenterol Hepatol.* 2020 ;16(12):632-9.
5. Carson L, Lewis D, Tsou M, McGuire E, Surran B, Miller C, et al. Abdominal migraine: an under-diagnosed cause of recurrent abdominal pain in children. *Headache J Head Face Pain.* 2011;51(5):707-12.
6. Thapar N, Benninga MA, Crowell MD, Di Lorenzo C, Mack I, Nurko S, et al. Paediatric functional abdominal pain disorders. *Nat Rev Dis Primer.* 2020 ;6(1):1-23.
7. Mani J, Madani S. Pediatric abdominal migraine: current perspectives on a lesser known entity. *Pediatr Health Med Ther.* 2019;9:47-58.
8. Russell G, Abu-Arafeh I, Symon DNK. Abdominal migraine. *Pediatr Drugs.* 200;4(1):1-8.
9. Angus-Leppan H, Saatci D, Sutcliffe A, Guiloff RJ. Abdominal migraine. *BMJ.* 2018;360:k179.
10. Full article: The pediatric Rome IV criteria: what's new? [Internet]. [cited 2024 Nov 20]. Available from: <https://www-tandfonline-com.myaccess.library.utoronto.ca/doi/full/10.1080/17474124.2017.1282820>
11. Bufler P, Gross M, Uhlig HH. Recurrent abdominal pain in childhood. *Dtsch Arztebl Int.* 2011;108(17):295-304.