



## **Abdominal Migraine as a Differential Diagnosis of Abdominal Pain in Children: A Case Report**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author VA wrote the manuscript with input from all authors. All authors contributed to the diagnosis and the treatment of the patient. All authors read and approved the final manuscript.*

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**Case Study**

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### **ABSTRACT**

**Aims:** To illustrate abdominal migraine as a possible and often unrecognized cause of recurrent abdominal pain in children.

**Study design:** Case report.

**Place and duration of study:** Department of Propaedeutics of internal diseases, "Heratsi" N1 University Hospital Complex, Yerevan, Armenia, August 2017.

**Methodology:** The differential diagnosis of abdominal pain in children can be difficult. We present a case of a 12 years old girl who was complaining of recurrent abdominal pain and nausea during the last year, which was affecting her regular activity. After many diagnostic procedures, every possible somatic disease was ruled out, and a diagnosis of abdominal migraine was made. As of now, four years after the initial diagnosis, the abdominal migraine transitioned into migraine headaches, as often occurs in patients with this diagnosis.

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## 1. INTRODUCTION

Abdominal migraine (AM) is an important but under-recognized cause of recurrent abdominal pain mainly seen in children. Most children with this disease outgrow it by their teen years but get migraine headaches afterward. There has also been discovered a link between AM and migraine headaches in other family members. [1-4] A correct diagnosis of AM allows to avoid unnecessary diagnostic and therapeutic procedures. [3,5] Abdominal migraine is a functional disorder in which no structural or metabolic abnormalities have been detected. [6] There is no single diagnostic test to confirm the diagnosis of abdominal migraine, as there are not with other types of migraine. The diagnosis is made by ruling out other possible causes of symptoms and analyzing the patient's medical history, physical examination, and family history. It should be emphasized that not all patients will meet all of the standard criteria for an abdominal migraine diagnosis [5-11].

### 1.1 Recommended Pragmatic Clinical Definition of Abdominal Migraine\*

Recurrent attacks of moderate to severe midline abdominal pain, coupled with vasomotor symptoms, nausea, and vomiting, lasting 2–72 hours and with good health in between episodes, are reported primarily in children.

Diagnostic criteria:

A. At least five episodes of abdominal pain that meet the criterion B–D

B. Pain has at least two of the three traits listed below:

1. Midline, periumbilical position, or poorly localized
2. 'just sore' or dull pain
3. moderate or severe intensity

C. At least two of the four symptoms or indicators listed below:

1. pallor
2. anorexia
3. nausea
4. vomiting

D. Untreated or unsuccessfully treated attacks last 2–72 hours.

E. Complete symptom-free intervals between attacks

F. Isn't caused by another illness. (Note: 1. There are no symptoms of gastrointestinal or renal disease in the history or physical examination, or such disease has been ruled out by appropriate investigations.)

\* Based on latest classification of ICHD-3, Cephalalgia, 2018.

Although the evidence is being limited, acute and preventive treatments exist.

The aim of the study is to illustrate abdominal migraine as a possible and often unrecognized cause of recurrent abdominal pain in children.

## 2. CASE REPORT

A 12-year-old girl presented to the clinic with complaints of abdominal pain and nausea during the last year, which were recurring nearly once a month, lasting a few hours and affecting her normal activity. However, between the episodes, she was feeling completely healthy. The pain was described as a cramping sensation in the central abdominal area, usually preceded or accompanied by nausea and, occasionally, non-bilious vomiting. It was not associated with bowel movements or any other triggers.

The patient was a student who did not use tobacco, alcohol, or recreational drugs. The rest of her medical history was unremarkable. Her mother was suffering from hypertension, and her father had diabetes mellitus type II and a history of chronic headaches.

Physical examination did not reveal any abnormality. The patient denied having a weight loss or changes in bowel habits. Her growth and development were within normal limits. The workup included blood, stool, urine analyses, abdominal and pelvic ultrasound, fructose hydrogen breath test and lactose tolerance test, celiac antibodies, pregnancy test. They failed to reveal any abnormality. Because of the Armenian heritage, an option of Familial Mediterranean Fever (FMF) was considered. However, the patient did not have a fever, arthritis, or rash, and genetic analysis did not reveal any mutations specific to FMF. She did not respond to FMF treatment colchicine.

After ruling out the other possible options, the clinical diagnosis of abdominal migraine was considered. The patient started on 10mg of sumatriptan as a treatment, with a notable positive response. An abdominal migraine diagnosis was made. On the 4-year follow-up, the patient transformed from abdominal form of migraine to an adult form of migraine with aura. The latter once again assured the diagnosis.

### 3. DISCUSSION

A child with abdominal migraine usually appears with the symptoms listed in the introduction to general practice or an emergency room. It can be distinguished from organic and other functional causes of recurring abdominal pain by confirming positive signs and removing "red flags," which are organic causes of abdominal pain. (Table 1.) [12] These children should be referred to an expert at once. [13].

All of the criteria mentioned in ICHD-3, Cephalalgia, 2018 were met in our patient. It's also worth noting that her father's chronic

headache pointed us in the right direction in terms of diagnosis.

Other contemporaneous or prior episodic syndromes are common in individuals with abdominal migraine (in hospital series of Farquhar et al. and Tarantino et al. in 60% of 84 patients and 30.6% of 1134 patients respectively), including cyclical vomiting (66-76%) and migraine limb pain. [1-17]. Carson et al. found that 142 (24%) of 600 children with recurrent abdominal pain (ages 1-21 years; 59% females) initially were misdiagnosed. [18] A total of 1824 patient office visits were reviewed from the 458 patients who met the inclusion criteria. 388 patients (84.6%) did not match AM requirements, 20 patients (4.4%) fulfilled ICHD-2 formal AM requirements, and another fifty (11%) had evidence that lacked at least one requirement but was otherwise consistent with AM (probable AM). During the observation time of the study, no children seen in this gastroenterology practice were diagnosed with AM.

**Table 1. Symptoms of childhood abdominal pain that might be considered red flags (adapted from Rome III16 and Rome IV9 classification)**

Red flag symptom	Common associated conditions
<b>Acute</b>	
Dehydration or shock symptoms*	Any pathology that is rapidly deteriorating
Polyuria, thirst	Diabetic ketoacidosis
Localized pain with tenderness or guarding	"Surgical" (appendicitis, volvulus, intussusception)
Fever	Infection (gastroenteritis† mesenteric adenitis)
Vomiting bile	Obstruction
Blood in the vomit	Bleeding in the upper gastrointestinal tract
Bloody stool	Gastrointestinal bleed, infection
Change in bowel habits (diarrhea)	Gastroenteritis†
Hematuria, dysuria	Infection of the urinary tract
Pain that radiates to the groin	Torsion of the testes
<b>Chronic or recurrent</b>	
Odynophagia	Peritonsillar abscess, tonsillitis
Dysphagia	Reflux, developmental delay, metabolic, genetic
Right upper or right lower abdominal pain that persists	Celiac disease, malignancy, Inflammatory bowel disease (IBD)
A mass in the abdomen	Storage disease, malignancy,
Persistent vomiting	Reflux, malignancy, allergy to cow's milk protein
Loss of weight	Celiac disease, malignancy, metabolic, genetic, IBD
Night sweats, fever	Infection, malignancy, IBD
A change in bowel habits (bloody stool or chronic diarrhea)	Celiac disease, malignancy, allergy to cow's milk protein, IBD
Growth retardation and puberty delay	Malignancy, genetic, metabolic, IBD
Abnormalities of the perianal region (fistulae, fissures, skin tags)	Celiac disease, IBD
Arthritis or a history of IBD in the family	IBD

\* A table of progressive symptoms of dehydration and shock is provided by NICE CG84

† If there are any other red flags. Expert opinion is needed if there is acute gastroenteritis

In the British and Indian hospital series, missing the diagnosis led to unnecessary surgeries (mostly appendectomy) in 4% and 5% of patients with abdominal migraine (AM), respectively. [3,5] This is why, to properly manage the disease and avoid unnecessary examinations and wrong therapies, is critical to evaluate migraine as a possible cause of recurrent abdominal pain in children.

Apart from vasomotor alterations (pallor, dark rings under the eyes), our patient's physical examination, laboratory tests, including blood, urine, and stool analysis, were normal. [3,4] As patients with diabetic ketoacidosis or a urinary tract infection may present with abdominal pain, urine analysis is an important aspect of the physical examination. Neurological causes of abdominal discomfort, aside from abdominal migraine, are uncommon. The discomfort/pain in abdominal epilepsy is usually transient (seconds to minutes) and linked with altered cognition, with a tonic-clonic seizure occurring occasionally. [14] Children with a firm clinical diagnosis of abdominal migraine, according to consensus guidelines, don't need any further investigation. [9 –20].

#### 4. CONCLUSION

It is crucial to consider migraine as a possible cause of recurrent abdominal pain in children to appropriately manage the disease and avoid unnecessary investigations and incorrect treatments.

#### CONSENT

Written and signed consent for publication has been obtained from the patient and her parents involved in the case report.

#### ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Tarantino S, Capuano A, Torriero R, et al. Migraine equivalents as part of migraine syndrome in childhood. *Pediatr Neurol.* 2014;51(5):645-649. DOI: 10.1016/j.pediatrneurol.2014.07.018
2. Abu-Arafeh I, Russell G. Prevalence and clinical features of abdominal migraine compared with those of migraine headache. *Arch Dis Child.* 1995;72(5):413-417. DOI: 10.1136/adc.72.5.413
3. FARQUHAR HG. Abdominal migraine in children. *Br Med J.* 1956;1(4975):1082-1085. DOI: 10.1136/bmj.1.4975.1082
4. Symon DN. Is there a place for "abdominal migraine" as a separate entity in the IHS classification? Yes!. *Cephalalgia.* 1992;12(6):345-346. doi:10.1111/j.1468-2982.1992.00345.x
5. Drossman DA. Functional GI disorders: what's in a name?. *Gastroenterology.* 2005;128(7):1771-1772. DOI: 10.1053/j.gastro.2005.04.020
6. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia.* 2013;33(9):629-808. DOI: 10.1177/0333102413485658. PMID: 23771276.
7. Symon DN, Russell G. Abdominal migraine: a childhood syndrome defined. *Cephalalgia.* 1986;6(4):223-228. DOI: 10.1046/j.1468-2982.1986.0604223.x
8. Drossman DA. Functional Gastrointestinal Disorders: History, Pathophysiology, Clinical Features and Rome IV [published online ahead of print, 2016 Feb 19]. *Gastroenterology.* 2016;S0016-5085(16)00223-7. DOI: 10.1053/j.gastro.2016.02.032
9. Dignan F, Abu-Arafeh I, Russell G. The prognosis of childhood abdominal migraine. *Arch Dis Child.* 2001;84(5):415-418. DOI: 10.1136/adc.84.5.415
10. Naphthali K, Koloski N, Talley NJ. Abdominal migraine. *Cephalalgia.* 2016;36(10):980-986. DOI: 10.1177/0333102415617748
11. Angus-Leppan H, Saatci D, Sutcliffe A, Guiloff RJ. Abdominal migraine. *BMJ.* 2018 Feb 19;360:k179. DOI: 10.1136/bmj.k179. PMID: 29459383.
12. American Academy of Pediatrics Subcommittee on Chronic Abdominal Pain; North American Society for Pediatric Gastroenterology Hepatology, and
13. Tarantino S, Capuano A, Torriero R, et al. Migraine equivalents as part of migraine

- Nutrition. Chronic abdominal pain in children. *Pediatrics*. 2005;115(3):e370-e381.  
DOI: 10.1542/peds.2004-2523
14. Franzon RC, Lopes CF, Schmutzler KM, Morais MI, Guerreiro MM. Recurrent abdominal pain: when should an epileptic seizure be suspected?. *Arq Neuropsiquiatr*. 2002;60(3-A):628-630.  
DOI: 10.1590/s0004-282x2002000400021
15. Angus-Leppan H. Migraine: mimics, borderlands and chameleons. *Pract Neurol*. 2013;13(5):308-318.  
DOI: 10.1136/practneurol-2012-000502
16. Goadsby PJ, Holland PR, Martins-Oliveira M, Hoffmann J, Schankin C, Akerman S. Pathophysiology of Migraine: A Disorder of Sensory Processing. *Physiol Rev*. 2017; 97(2):553-622.  
DOI: 10.1152/physrev.00034.2015
17. Kakisaka Y, Uematsu M, Wang ZI, Haginoya K. Abdominal migraine reviewed from both central and peripheral aspects. *World J Exp Med*. 2012;2(4):75-77.  
Published 2012 Aug 20.  
DOI: 10.5493/wjem.v2.i4.75
18. Carson L, Lewis D, Tsou M, et al. Abdominal migraine: an under-diagnosed cause of recurrent abdominal pain in children. *Headache*. 2011;51(5):707-712.  
DOI: 10.1111/j.1526-4610.2011.01855.x
19. Angus-Leppan H, Olausson B, Boers P, Lambert GA. Convergence of afferents from superior sagittal sinus and tooth pulp on cells in the thalamus of the cat. *Cephalalgia*. 1995;15(3):191-199.  
DOI: 10.1046/j.1468-2982.1995.015003191.x
20. Sutherland HG, Griffiths LR. Genetics of Migraine: Insights into the Molecular Basis of Migraine Disorders. *Headache*. 2017; 57(4):537-569.  
DOI: 10.1111/head.13053. Epub 2017 Mar 8.  
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