

RECURRENT OR CHRONIC ABDOMINAL PAIN OF DIGESTIVE CAUSE. WHAT IS USEFUL IN THE DIAGNOSTICS?

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ABSTRACT

The objective of this study was to find out which are the most frequent diseases diagnosed in our medical unit in patients presenting with recurrent or chronic abdominal pain as the main symptom and to assess the usefulness of the investigations performed to make a final diagnosis.

Material and method. We included in the study group children admitted in our medical unit between January 2019 and December 2019 for chronic or recurrent abdominal pain and who were diagnosed with organic or functional digestive disorders. It was a retrospective, descriptive study. The study group included 86 children, aged between 2 and 18, mean age±standard deviation (SD) = 10.4±3.8 years, 49 girls (57%).

Results. Twenty-nine (34%) patients were diagnosed with organic and 57 (66%) with functional digestive disorders. Alarm signs or symptoms were present in 16/29 (55%) patients diagnosed with organic digestive disorders and 14/57 (37%) of those with functional disorders. Gastritis or gastroduodenitis and gastroesophageal reflux disease were the most frequent organic gastrointestinal disorders, in 16% and 14 % of the cases, respectively. Functional abdominal pain-not otherwise specified (23%) and functional dyspepsia (20%) were the most frequently diagnosed functional gastrointestinal disorders. Abdominal ultrasound was performed in 80% of the patients, but the findings lead to a final diagnosis in only 7% of these cases. Anti-tissue transglutaminase antibodies (IgA) and fecal calprotectin were indicated only in a small number of cases (7% and 6%, respectively).

Conclusions. The clinical peculiarities of abdominal pain and associated alarm signs or symptoms are not enough to differentiate between organic and functional gastrointestinal disorders. Many of the investigations performed in children with recurrent or chronic abdominal pain are not helpful in finding a cause for abdominal pain.

Keywords: abdominal pain, children, causes, digestive tract

Abbreviations

SD – standard deviation

ESR – erythrocyte sedimentation rate

CRP-C – reactive protein

BACKGROUND

In 1957, John Apley defined recurrent abdominal pain as at least 3 episodes of pain in the last 3 months that are severe enough to interfere with daily activities (1). The recurrent abdominal pain described by

Apley affected approximately 10% of the school-age children (1). There are many causes of abdominal pain, either digestive or extra digestive, and digestive ones can be organic, motility, or functional disorders (2-4). More than that, lately, evidence shows that functional gastrointestinal disorders can be associat-

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ed in a patient diagnosed with an organic digestive disorders (5-7). A possible explanation could be that organic diseases make the patient susceptible to visceral hypersensitivity, triggering the symptoms of a functional digestive disorder (8).

The peculiarities of abdominal pain (localization, duration, intensity recurrence, onset during the night or the day, association with other symptoms, connection with feeding or defecation, and factors that trigger it, accentuate or alleviate the pain) are difficult to quantify in children, especially in small ones. Abdominal pain, either chronic or recurrent, is a frequent cause of presentation at the family physician, pediatrician, or the specialist in pediatric gastroenterology (9). On the other hand, many times, the patient is repeatedly brought to the emergency departments (10,11). Smith et al. report that 5-10% of the emergency department visits are for abdominal pain (10).

The first steps taken in diagnosing a patient who comes in for abdominal pain consist of gathering information through the anamnesis and physical examination, with particular attention to alarm signs and symptoms that could suggest an organic pathology. Depending on these data, investigations will be indicated to confirm or exclude a disease with an anatomic, biochemical, or inflammatory background. If this background is not found, the diagnostic algorithm is diverted towards the functional gastrointestinal disorders, classified at present according to clinical data in the Rome IV classification (12,13), in the sections dedicated to pediatric pathology in different age groups.

The prevalence of functional abdominal pain is approximately 13.5% (9). It is more frequent in girls and is associated with psychological disorders and events with emotional impact (14,15).

In functional gastrointestinal disorders, the etiology and physiopathological mechanisms are unknown. Alterations in the intestinal microbiota, visceral hypersensitivity, dysfunctional interaction between the enteric nervous system and the central nervous system, psychosocial factors, disturbances in the immune system's activity are possible explanations for the symptoms of these diseases (16).

The objective of the study was to find out which are the most frequent diseases diagnosed in our medical unit in patients presenting with recurrent or chronic abdominal pain as the main symptom and to assess the usefulness of the investigations performed to make a final diagnosis.

MATERIAL AND METHOD

In the study, we included children admitted in our medical unit for chronic or recurrent abdominal pain

between January 2019 and December 2019 and who were diagnosed with organic or functional gastrointestinal disorders. It was a retrospective, descriptive study.

The study group included 86 children, aged between 2 and 18, mean age±standard deviation (SD) = 10.4±3.8 years, 49 girls (57%). We collected from the medical observation sheets of patients the clinical data (frequency, localization, duration, the intensity of the abdominal pain, factors that aggravate or alleviate the abdominal pain, connection with feeding or defecation, other associated signs or symptoms, pathological findings in the physical examination), the results of the investigations, and the final diagnosis.

We excluded from the study children who had other diseases than digestive ones manifested with recurrent or chronic abdominal pain. We also excluded children with chronic neurological, psychiatric, respiratory, cardiac diseases.

The processing of the clinical data and results of the investigations were performed by creating a database using Microsoft 365 Excel 2010. For the statistical analysis, we used measurements of the central tendency (mean), variability (SD), and percentages.

RESULTS

Peculiarities of the abdominal pain

Recurrent or chronic abdominal pain of digestive cause was the reason of admission in 8 patients aged under 5 years (9.3%), 25 patients (29.1%) aged between 5 and 9, 28 children (32.5%) aged between 9 and 13 and 25 patients (29.1%) over 13 years. Organic diseases were the cause of abdominal pain in 15/29 children (52%) aged over 13 years, and functional disorders were diagnosed in 23/57 children (40%) aged between 5 and 9 and in 17/57 (30%) children aged between 9 and 13.

The duration of the disease, localization, frequency, and length of the pain episodes are synthesized in Table 1.

Alarm signs and symptoms

29 patients (34%) were diagnosed with organic and 57 (66%) with functional digestive diseases. Alarm signs or symptoms were present in 16/29 (55%) of the patients diagnosed with organic gastrointestinal disorders. Table 2 shows the number of children and the alarm signs or symptoms they had. Of the 57 children diagnosed with functional gastrointestinal disorders, 14 (37%) associated alarm signs or symptoms.

TABLE 1. Peculiarities of recurrent/chronic abdominal pain in the patients included in the study group

Duration of the symptoms	2-5 months	6-12 months	≥12 months	≥ 2 years		
Total number of children (%)	42 (49%)	19 (22%)	7 (8%)	18 (21%)		
Number of children with organic/functional disease	11/31	7/11	3/4	7/11		
Frequency of the episodes	Daily	4-6 times/week	1-3 6 times/week	1-3 times/month		
Total number of children (%)	49 (57%)	6 (7%)	25 (29%)	6 (7%)		
Number of children with organic/functional disease	18/31	3/2	6/19	1/3		
Duration of the episode of pain	1-15 minutes	15-30 minutes	30-60 minutes	≥60 minutes	≥120 minutes	
Total number of children (%)	10 (12%)	18 (21%)	29 (34%)	22 (25%)	7 (8%)	
Number of children with organic/functional disease	1/8	6/12	12/17	2/19	5/1	
Localization of the pain	Periumbilical	Epigastric	Left hypochondrium	Right hypochondrium	Left flank	Right flank
Total number of children (%)	45 (52%)	42 (49%)	3	1	5 (6%)	1 (1%)
Number of children with organic/functional disease	6/39	24/18	3/0	0/1	3/2	0/1

TABLE 2. Alarm signs or symptoms

Sign/symptom	Lower digestive hemorrhage	Persistent vomiting	Involuntary weight loss	Failure to thrive	Nocturnal diarrhea
Number of children from the study group	2	8	4	9	7
Number of children diagnosed with organic diseases	1	6	2	5	2

Gastroesophageal reflux disease was diagnosed in 12/86 children (14%), gastritis or gastroduodenitis in 14/86 (16%) (6 of them associated gastroesophageal reflux disease), 1 patient had a duodenal ulcer (1%), 2 patients were diagnosed with intestinal parasitosis (2%), mesenteric lymphadenitis was diagnosed in 3 children (3.5%), celiac disease in 1 patient (1%) and ulcerative colitis in 2 patients (2%). Two of the patients diagnosed with gastroesophageal reflux disease had hiatal hernia. Infection with *Helicobacter pylori* was diagnosed in 1 patient with gastritis (positive fecal antigen). Table 3 lists the functional gastrointestinal disorders diagnosed in patients who presented for abdominal pain and their number.

TABLE 3. Functional gastrointestinal diseases

Diagnosis	Number of patients (% of the total number of patients)
Functional dyspepsia	17 (20%)
Irritable bowel syndrome	9 (10.5%)
Abdominal migraine	4 (5%)
Functional abdominal pain not otherwise specified	20 (23%)
Functional constipation	7 (8%)

There were 10 patients with functional dyspepsia in which the subtype was specified (5 children with postprandial distress syndrome and 5 children with epigastric pain syndrome). Among the patients with

irritable bowel syndrome, 2 had a subtype manifested predominantly with constipation, 4 with diarrhea, 1 mixed symptoms, and 2 patients with unspecified subtype.

Investigations

Complete blood count was performed in 81/86 patients (94%), inflammatory markers (ESR, CRP) in 54/86 children (63%), liver enzymes in 82/86 patients (95%), blood glucose and amylasemia in 24/86 (24%) children, respectively. The number of pathological findings was as follows: complete blood count 5/81 patients (6%); inflammatory markers 15/54 children (28%); liver enzymes 9/82 patients (11%).

Table 4 lists some of the investigations performed in the studied patients and the number of patients with pathological findings that were suggestive for the final diagnosis.

DISCUSSION

The study aimed to assess the causes of chronic or recurrent abdominal pain in children admitted in our medical unit and the clinical data and investigations results that were useful in establishing a diagnosis.

Alarm signs and symptoms were present in little over half of the patients diagnosed with organic dis-

TABLE 4. Investigations and number of patients in whom they were performed

Investigation	Number of patients (%)	Number of patients who had pathological findings suggestive for the final diagnosis (% of the number of patients in whom the investigation was performed)
Parasitological stool examination	10 (12%)	2 (20%)
Fecal calprotectin	5 (6%)	3 (60%)
<i>Helicobacter pylori</i> fecal antigen	9 (10%)	1 (11%)
Anti-tissue transglutaminase antibodies (IgA)	6 (7%)	1 (17%)
Abdominal ultrasound	69 (80%)	5 (7%)
Upper digestive endoscopy	21 (24%)	18 (86%)
Colonoscopy	4 (5%)	3 (75%)
Esophageal pH/multichannel intraluminal electrical impedance	1 (1%)	1 (100%)

orders (55%), but at the same time, they were described in 37% of the children diagnosed with functional gastrointestinal disorders. Tolone et al. also find an organic cause in more than half of the patients assessed for chronic or recurrent abdominal pain without alarm signs (17). Gijsbers et al. (18) reported similar results regarding organic pathology (alarm signs in 54% of the children diagnosed with organic disorders) and even higher percentages in children diagnosed with functional disorders (59%). Gijsbers et al. study concluded that the alarm signs are not reliable enough to distinguish between an organic and a functional digestive disorder (18). For instance, the authors notice that lower digestive hemorrhage, caused by anal fissures, is not uncommon in patients with functional constipation (18).

Although the determination of fecal calprotectin and anti-tissue transglutaminase antibodies are recommended (9,16) in the assessment of patients with recurrent or chronic abdominal pain, they were indicated in a small number of patients. The prevalence of celiac disease increases, and signs and symptoms present differ from those included in the classical description of the disease (19,20). Khatib et al. report recurrent or chronic abdominal pain in 53% of the patients diagnosed with celiac disease (19). Kansu et al. (5) notice celiac disease's association in patients diagnosed with irritable bowel syndrome or functional dyspepsia. On the other hand, Turco et al. communicate a higher prevalence of functional gastrointestinal disorders in patients with celiac disease who were already on a gluten-free diet for 1 year compared with healthy controls (6).

Devanarayana et al. mention that most studies regarding chronic or recurrent abdominal pain were conducted in secondary or tertiary centres (3). Here, patients are selected, and the probability of them being diagnosed with an organic disease is higher. Gijs-

bers et al. show that more thorough investigations increase the possibility of finding an organic substrate of the symptoms (18,21). In our study, an organic disorder was diagnosed in 34% of the patients, a smaller number than that reported by Størdal et al. (45%) (4), but higher than that published by Devanarayana et al. (24%) (2). The situation is very different in primary care centres. Spee et al. find that in almost 90% of the children aged 4-17 years consulting for abdominal pain an organic cause was not suspected (22).

Abdominal ultrasound helped in finding a cause to explain abdominal pain in a small number of cases. However, it was an investigation indicated in many cases. The fact that it is non-invasive makes it easily accepted by children and parents, even though its diagnostic value in recurrent or chronic abdominal pain is low, a fact known for a long time (23).

Upper digestive endoscopy was indicated in almost a quarter of the patients evaluated for abdominal pain. The study published by Adeniyi et al. reports different numbers, performing this procedure in 76% of the patients they assessed for abdominal pain (24). Wahid et al. report data from a regional centre in which they performed endoscopy (upper and lower) in 17% of the children, pleading for appropriate and efficient use of these invasive procedures (25).

The limits of the study are given by the relatively small number of patients and its retrospective nature. The results could also be influenced by the fact that in our clinic, we perform upper and lower digestive endoscopy, esophageal and anorectal manometry and esophageal intraluminal electrical impedance, so patients are referred by family physicians or specialists in pediatrics after some less invasive investigations were already performed. There were no patients with associated organic and functional disorders.

CONCLUSIONS

The clinical peculiarities of abdominal pain and associated alarm signs or symptoms are not enough to differentiate between an organic and functional

gastrointestinal disorder. Many of the investigations performed in children with recurrent or chronic abdominal pain are not helpful in finding a cause for abdominal pain.

REFERENCES

- Apley J, Naish N. Recurrent abdominal pains: a field survey of 1,000 school children. *Arch Dis Child*. 1958;33(168):165-170.
- Devanarayana NM, de Silva DG, de Silva HJ. Recurrent abdominal pain syndrome in a cohort of Sri Lankan children and adolescents. *J Trop Pediatr*. 2008 Jun;54(3):178-83.
- Devanarayana NM, Rajindrajith S, De Silva HJ. Recurrent abdominal pain in children. *Indian Pediatr*. 2009 May;46(5):389-99.
- Størdal K, Nygaard EA, Bentsen B. Organic abnormalities in recurrent abdominal pain in children. *Acta Paediatr*. 2001 Jun; 90(6):638-42.
- Kansu A, Kuloğlu Z, Demir A, Yaman A; Turkish Celiac Study Group. Yield of coeliac screening in abdominal pain-associated functional gastrointestinal system disorders. *J Paediatr Child Health*. 2015 Nov; 51(11):1066-70..
- Turco R, Boccia G, Miele E, Giannetti E, Buonavolontà R, Quitadamo P, Auricchio R, Staiano A. The association of coeliac disease in childhood with functional gastrointestinal disorders: a prospective study in patients fulfilling Rome III criteria. *Aliment Pharmacol Ther*. 2011 Oct;34(7):783-9.
- Saps M, Adams P, Bonilla S, Nichols-Vinueza D. Abdominal pain and functional gastrointestinal disorders in children with celiac disease. *J Pediatr*. 2013 Mar;162(3):505-9.
- Langshaw AH, Rosen JM, Pensabene L, Borrelli O, Salvatore S, Thapar N, Concolino D, Saps M. Overlap between functional abdominal pain disorders and organic diseases in children. *Rev Gastroenterol Mex*. 2018 Jul-Sep;83(3):268-274.
- Reust CE, Williams A. Recurrent Abdominal Pain in Children. *Am Fam Physician*. 2018 Jun 15;97(12):785-793.
- Smith J, Fox SM. Pediatric Abdominal Pain: An Emergency Medicine Perspective. *Emerg Med Clin North Am*. 2016 May;34(2):341-61.
- Magnúsdóttir MB, Róbertsson V, Þórgrímsón S, Rósmundsson Þ, Agnarsson Ú, Haraldsson Á. Abdominal pain is a common and recurring problem in paediatric emergency departments. *Acta Paediatr*. 2019 Oct;108(10):1905-1910.
- Hyams JS, Di Lorenzo C, Saps M, Shulman RJ, Staiano A, van Tilburg M. Functional Disorders: Children and Adolescents. *Gastroenterology*. 2016 Feb 15:S0016-5085(16)00181-5.
- Benninga MA, Faure C, Hyman PE, St James Roberts I, Schechter NL, Nurko S. Childhood Functional Gastrointestinal Disorders: Neonate/Toddler. *Gastroenterology*. 2016 Feb 15:S0016-5085(16)00182-7.
- Kortnerink JJ, Diederik K, Benninga MA, Tabbers MM. Epidemiology of pediatric functional abdominal pain disorders: a meta-analysis. *PLoS One*. 2015 May 20;10(5):e0126982.
- Bouziou I, Chouliaras G, Chrousos GP, Roma E, Gemou-Engesaeth V. Functional gastrointestinal disorders in Greek Children based on ROME III criteria: identifying the child at risk. *Neurogastroenterol Motil*. 2017 Mar;29(3).
- Kortnerink J, Devanarayana NM, Rajindrajith S, Vlieger A, Benninga MA. Childhood functional abdominal pain: mechanisms and management. *Nat Rev Gastroenterol Hepatol*. 2015 Mar; 12(3):159-71.
- Tolone C, Pellino V, Piccirillo M, Letizia M, Belfiore I, Tolone S. Recurrent abdominal pain in children: underlying pathologies in the absence of "alarm" symptoms. *Minerva Pediatr*. 2017 Aug; 69(4):239-244.
- Gijsbers CF, Benninga MA, Schweizer JJ, Kneepkens CM, Vergouwe Y, Büller HA. Validation of the Rome III criteria and alarm symptoms for recurrent abdominal pain in children. *J Pediatr Gastroenterol Nutr*. 2014 Jun;58(6):779-85.
- Khatib M, Baker RD, Ly EK, Kozielski R, Baker SS. Presenting Pattern of Pediatric Celiac Disease. *J Pediatr Gastroenterol Nutr*. 2016 Jan;62(1):60-3.
- Rosén A, Sandström O, Carlsson A, Högberg L, Olén O, Stenlund H, Ivarsson A. Usefulness of symptoms to screen for celiac disease. *Pediatrics*. 2014 Feb;133(2):211-8.
- Gijsbers CF, Kneepkens CM, Schweizer JJ, Benninga MA, Büller HA. Recurrent abdominal pain in 200 children: somatic causes and diagnostic criteria. *Acta Paediatr*. 2011 Nov;100(11):e208-14.
- Spee LA, Lisman-Van Leeuwen Y, Benninga MA, Bierma-Zeinstra SM, Berger MY. Prevalence, characteristics, and management of childhood functional abdominal pain in general practice. *Scand J Prim Health Care*. 2013 Dec;31(4):197-202. .
- Yip WC, Ho TF, Yip YY, Chan KY. Value of abdominal sonography in the assessment of children with abdominal pain. *J Clin Ultrasound*. 1998 Oct;26(8):397-400.
- Adeniyi OF, Odeghe EA, Lawal MA, Olowu AO, Ademuyiwa A. Recurrent abdominal pain and upper gastrointestinal endoscopy findings in children and adolescents presenting at the Lagos University Teaching Hospital. *PLoS One*. 2019 May 23; 14(5):e0216394.
- Wahid AM, Devarajan K, Ross A, Zilbauer M, Heuschkel R. Paediatric gastrointestinal endoscopy: a qualitative study. *Eur J Gastroenterol Hepatol*. 2016 Jan;28(1):25-9.