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CASE REPORT

A child on a high-FODMAP diet with chronic abdominal pain

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Abstract

Abdominal pain affects up to 45% of children aged 4 to 18 years. Functional disorders rank as the main cause. There is no consensus over what constitutes "minimal" investigation for the management of pediatric patients with chronic abdominal pain. This case report presents and discusses a case of long-term chronic abdominal pain involving a child previously submitted to extensive complementary investigation, in which detailed clinical evaluation found the patient was in a high-FODMAP diet. The introduction of dietary interventions led to symptom remission. This report demonstrates how thorough anamnesis and careful physical examination are essential in elucidating the etiology of abdominal pain.

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INTRODUCTION

In 1958, Apley defined recurrent abdominal pain as three or more episodes of abdominal pain that occur over at least three months in children aged three years or older, which are severe enough to interfere with daily activities[1]. A broader definition of chronic abdominal pain currently accepted includes intermittent or constant functional or organic abdominal pain present for at least two months[2]. This condition is found in up to 45% of children[3]. Functional disorders are the primary cause, with functional constipation and abdominal migraine occurring more frequently[4].

Differential diagnosis includes a wide range of conditions, including but not limited to functional causes; gastroesophageal reflux disease; constipation; intestinal motility disorder; food allergies; peptic disease and H. pylori infection; celiac disease; inflammatory bowel disease; dysmenorrhea; pancreatitis; and hepatobiliary diseases. The pathophysiology of abdominal pain is complex. Inflammation, infection, and allergy may act as sensitizers, altering the way pain is processed. The coexistence of different etiologies and pain mechanisms must be considered. Functional symptoms also occur in patients with organic gastrointestinal diseases. A recent international study reported a similar prevalence of chronic abdominal pain in pediatric patients with celiac disease compared to controls[5].

Low-FODMAP diet is one of the most studied dietary interventions for functional abdominal pain in children. FODMAP stands for Fermentable Oligosaccharides, Disaccharides, Monosaccharides And Polyols, an acronym termed by a group at Monash University in Melbourne, Australia (Gibson and Shepherd)[6], in a reference to non-digestible carbohydrates with high osmolarity which may acrt as substrates rapidly fermented by intestinal microorganisms.

CASE REPORT

A 7-year-old girl with abdominal pain for four years was taken to our service. She had been followed by a pediatric gastroenterologist in another country, where extensive investigation was performed, including upper gastrointestinal (UGI) endoscopy and evaluation of serological markers for celiac disease, with inconclusive results. The patient experienced one to three episodes a week of pain of moderate intensity in the periumbilical region, without irradiation and unrelated to bowel habit. She had no history of nausea, vomiting, fever, blood in the stool, urinary disease, weight loss or waking up at night with pain. She occasionally had a distended abdomen and soft stools (type 4 on the modified Bristol scale)[7]. She did not have cases of inflammatory bowel disease (IBD) in her family, but her maternal grandfather was diagnosed with irritable bowel syndrome (IBS).

When asked about her eating habits, the patient said she did not eat a wide variety of foods and that her favorites included beans, lentils, apples, and soy products. She stopped having dairy products and cut down on gluten since they were, although not consistently, triggers of pain. When asked specifically about how much juice and fluid she had, the patient said she drank more than a liter of artificial juice a day. She was well nourished on physical examination, with a distended abdomen and increased abdominal noises, bloating, but no tenderness.

A low-FODMAP diet was recommended, with decreased juice intake. At first, the patient improved significantly from her symptoms as she partially followed the recommendations, with abdominal examination producing normal findings. Subsequently, pain episodes subsided completely and stool consistency improved (type 3 on the modified Bristol scale)[7].

DISCUSSION

Despite the importance of abdominal pain in pediatrics, there is no consensus over what constitutes “minimal” investigation or a validated algorithm on how to investigate and manage it. The use of IgA and anti-transglutaminase antibody testing to rule out celiac disease and abdominal X-ray images to assess the presence of stool/signs of fecal retention when a likely cause has not been not identified remain controversial. Fecal calprotectin, a test widely used in the evaluation of patients with IBD, has been recently considered a potential tool to distinguish between functional gastrointestinal disorders and gastrointestinal diseases such as eosinophilic esophagitis, gastroesophageal reflux disease, food allergies, and IBD[8].

The relevance of juice intake has been discussed since 2017. The American Academy of Pediatrics published recommendations contraindicating fruit juice intake before one year of age and limiting it to 120 mL for children aged one to three years, 175 mL for children aged four to six years, and 240 mL for children and adolescents aged seven to 18 years. The recommendations also categorize as mandatory for pediatricians to describe fruit juice intake in children with malnutrition, overweight, obesity, chronic diarrhea, excessive flatulence, abdominal pain, or gastric discomfort[9,10].

Excessive carbohydrate intake may be related to chronic abdominal pain in children. Although FODMAPs include several types of foods, each poorly absorbed carbohydrate has a different effect on the gut. The main pain mechanisms describe are increased small bowel water content; excessive gas in the colon; and altered bowel motility[6,11]. Foods such as fruit juices, beans, lentils, apples, and soybeans, all present in large quantities in the diet of the patient described in the present case, have moderate to high FODMAP content, as shown in Table 1.

Low-FODMAP diets have been studied primarily in adults with IBS. Improvement from symptoms has been described in up to 75% of patients, with patient complaints decreasing by at least 50%[12]. Low-FODMAP diets must be prescribed by a qualified healthcare professional to well

Table 1. FODMAP content in the main food groups, with the main types of food ingested in large quantities by the patient, highlighted in bold and in red.

Food Groups	High FODMAP foods	Low FODMAP foods
Fruit	Apple, pear, peach, water melon, nectarine, cherry Juices, dried and/or canned fruit	Banana, blackberry, starfruit, grape, pineapple, melon, kiwi, lemon, lime, orange, tangerine, strawberry, passion fruit
Milk and dairy products	Cow or goat milk, ice cream, yogurt, condensed milk, fresh or creamy cheeses	Milk or lactose-free yogurt, rice or almond products, butter and cured cheeses
Vegetables and legumes	Beans, lentils, chickpeas, artichokes, asparagus, garlic, onions, beets, broccoli, okra, mushrooms, cauliflower	Lettuce, kale, spinach, carrots, corn, eggplant, radish, turnip, cucumber, pumpkin, zucchini, tomatoes, potatoes, sweet potatoes, nuts
Cereals and pasta	Bread, cake, cookies or cereals containing wheat, cereals with corn syrup	Gluten-free flours, breads, noodles and cookies Products with corn, cassava and oat flour Quinoa, rice, tapioca

FODMAP content in the main food groups, with the main types of food ingested in large quantities by the patient, highlighted in bold and in red.
Source: Brazilian Federation of Gastroenterology website - guidelines about FODMAPs: http://www.fbg.org.br/Publicacoes/noticia/detalhe/5 (modified)[13].

selected patients, ideally under the supervision of a nutritionist. If symptoms do not improve within six to eight weeks, the diet should be ceased, since the symptoms are probably caused by another condition. If symptoms improve, the excluded foods must be gradually reintroduced in small amounts. Low-FODMAP diets have their qualifications and limitations. There is no standardized quantification of FODMAPs in foods; many foods are not listed; extensive and prolonged dietary restrictions may lead to insufficient intake of fiber, carbohydrates, calcium, iron, zinc, folate, vitamins B and D, and natural antioxidants. Finally, the consequences of this type of diet on the colonic microbiome and metabolism are poorly understood, and the absence of serological markers for functional diseases and the impossibility of evaluating patients for the placebo effect make it difficult to objectively assess the outcomes of low-FODMAP diets[14].

The role of low-FODMAP diets in pediatric chronic abdominal pain has been widely discussed and several factors should be considered, such as carbohydrate intake, gastric emptying and bowel motility, microbiome and host-related factors, to name a few. Many are the elements considered in dietary guidance for this specific population, including psychological, behavioral, social, family, and biological aspects associated with growth and development[15].

CONCLUSION

The role of FODMAPs in pediatric chronic abdominal pain has not been fully established, and further studies on the subject are needed. Evidence indicates that excessive FODMAP intake may be associated with abdominal pain in some individuals. Diagnostic and therapeutic approaches must be individualized. The prescription of low-FODMAP diets must be overseen by a multidisciplinary team, considering all aspects of the patient; patients on low-FODMAP diets must be assessed constantly for potential developments.

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