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Dietary Issues in Recurrent Abdominal Pain

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The term recurrent abdominal pain (RAP), based on the pioneering work of Apley and Naish, describes children who have chronic abdominal pain without an identifiable organic basis (1). Community-based studies worldwide show that 10% to 46% of children 4 to 16 years old meet the criteria for RAP (2–5). Based on other reports and data from our institution, RAP accounts for approximately 25% of visits to a pediatric gastroenterologist/nurse practitioner (4,6,7). The pediatric Rome III committee introduced the term *abdominal pain–related functional gastrointestinal disorders* (APFGIDs) to supersede the term RAP (8). APFGIDs include 4 phenotypic subtypes: functional abdominal pain (FAP), irritable bowel syndrome (IBS, essentially, FAP with changes in stooling pattern), functional dyspepsia, pain in the upper abdomen), and the relatively rare disorder, abdominal migraine (8). APFGIDs are associated with variable levels of symptoms and distress, ranging from episodic mild to severe abdominal pain, often disruptive to school and other activities. Evidence demonstrates that 30% to 66% of children with RAP experience pain similar to that of adults and meet the adult Rome criteria for IBS (9–12).

Although the etiology of APFGIDs is likely multifactorial, in some patients diet may play a critical role. This is an important area for study because the symptoms of APFGIDs (eg, abdominal pain, diarrhea, constipation) also can be caused by nutrient malabsorption (eg, lactose intolerance) or inadequate intake (eg, lack of dietary fiber leading to constipation). There are, however, a limited number of large, well-controlled studies of the role of diet in children and adults with APFGIDs. Because of space limitations, only FAP and IBS are discussed in this brief review.

Three pediatric studies prospectively evaluated the role of fiber in the pathogenesis of pain in APFGIDs. Christensen reported no benefit of psyllium in a randomized trial, but critical information from the report is missing (eg, *P* values, standard deviations), making interpretation of the results difficult (13). Corn fiber was suggested to be beneficial in a study by Feldman et al, but as in the Christensen article, critical information is lacking, limiting interpretation (14). In a study by Humphreys and Gevirtz, benefit was found for increasing dietary fiber (>10 g/day), but the type of fiber used was not described (15). Retrospective studies suggest a benefit of increased fiber intake in reducing the risk of abdominal pain in children (16,17). Even in adult studies of IBS, there is controversy regarding the effectiveness of psyllium fiber supplementation in patients with IBS (18,19).

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Fructose may cause osmotic diarrhea and be a substrate for colonic bacterial fermentation and gas production, resulting in abdominal pain; however, given a large enough dose, even healthy individuals will malabsorb fructose and develop symptoms (20,21). That said, studies in adults suggest that poorly absorbed, fermentable oligo-, di-, and monosaccharides and polyols contribute to gastrointestinal symptoms in some patients with IBS but not in controls (22). An open-label trial in children presented as an abstract suggests that approximately 20% of children with APF-GIDs may respond to a low fermentable oligo-, di-, and monosaccharides and polyols diet (23). A randomized, double-blind trial in children is under way.

The contribution of lactose malabsorption to APFGIDs was evaluated in 2 small ($n = 21$ and $n = 38$) prospective placebo-controlled trials in children (24,25). Although interpretation is limited by their study design, these investigations suggest that lactose malabsorption (ie, lactase deficiency) may play a role in some but not most children with APFGIDs.

The potential role of other carbohydrate digestive enzyme deficiencies, besides lactase, in the production of gastrointestinal symptoms in APFGIDs remains underexplored. Preliminary data in a small number of subjects ($n = 10$) suggest that starch maldigestion as measured by breath testing is more frequent in children with APFGIDs as compared with adult controls (26). Potentially supporting, in part, this observation, a small pilot trial ($n = 49$) of pancreatic enzyme supplementation in adults with diarrhea-predominant IBS suggested benefit (27). Children undergoing upper gastrointestinal endoscopy for the evaluation of abdominal pain, vomiting, or gastroesophageal reflux ($n = 44$) were evaluated for lactase, sucrase, and glucoamylase activities (28). Low enzyme activities were found in 32%, 34%, and 28% of children, respectively, with some children having a combination of enzyme deficiencies (28). There was no correlation, however, of abdominal pain symptoms or diarrhea with enzyme activities and no controls were evaluated (28). These results fit with another preliminary report (abstract) from the same group, suggesting that in children with APFGIDs ($n = 32$) mucosal maltase activity does not correlate with abdominal pain symptoms, diarrhea, or constipation (29).

Food allergies/intolerances may be a cause of FAP and IBS; however, the frequency with which they are to blame is somewhat obscure. A retrospective study suggests that they are infrequent etiologies (30). Milk allergy/intolerance specifically appears to be an infrequent cause (2% of cases) (31). Among other diagnostic considerations, lymphonodular hyperplasia on upper or lower gastrointestinal endoscopy has been reported to be suggestive of food hypersensitivity (32). Patients with celiac disease may have symptoms that suggest FAP or IBS (33). Appropriate testing should be carried out to exclude this disorder (33).

Given the ubiquity of APFGIDs and their associated emotional and economic costs, greater insight into the contribution of diet to these disorders is urgently needed. We await the results of large, prospective, well-controlled studies to clarify how diet may influence the expression of abdominal pain and stooling symptoms in children (and adults) with APFGIDs.

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References

1. Apley J, Naish N. Recurrent abdominal pains: a field survey of 1,000 school children. *Arch Dis Child*. 1958; 33:165–70. [PubMed: 13534750]
2. Apley, J. *The Child with Abdominal Pains*. London: Blackwell Scientific; 1975.
3. Zuckerman B, Stevenson J, Bailey V. Stomachaches and headaches in a community sample of preschool children. *Pediatrics*. 1987; 79:677–82. [PubMed: 3575021]
4. Levine M. Recurrent abdominal pain in school children: the loneliness of the long-distance physician. *Pediatr Clin North Am*. 1978; 31:969–91. [PubMed: 6384903]
5. Saps M, Seshadri R, Sztainberg M, et al. A prospective school-based study of abdominal pain and other common somatic complaints in children. *J Pediatr*. 2009; 154:322–6. [PubMed: 19038403]
6. Arnhold RG, Calllos ER. Composition of a suburban pediatric office practice: an analysis of patient visits during one year. *Clin Pediatr*. 1966; 5:722–7.
7. Miele E, Simeone D, Marino A, et al. Functional gastrointestinal disorders in children: an Italian prospective survey. *Pediatrics*. 2004; 114:73–8. [PubMed: 15231910]
8. Rasquin A, DiLorenzo C, Forbes D, et al. Childhood functional gastrointestinal disorders: child/adolescent. *Gastroenterology*. 2006; 130:1527–37. [PubMed: 16678566]
9. Apley J, Hale B. Children with recurrent abdominal pain: how do they grow up? *Br Med J*. 1973; 3:7–9. [PubMed: 4717440]
10. Walker LS, Guite JW, Duke M, et al. Recurrent abdominal pain: a potential precursor of irritable bowel syndrome in adolescents and young adults. *J Pediatr*. 1998; 132:1010–5. [PubMed: 9627595]
11. Christensen MF, Mortensen O. Long term prognosis in children with recurrent abdominal pain. *Arch Dis Child*. 1975; 50:110–4. [PubMed: 1130815]
12. Jarrett M, Heitkemper M, Czyzewski DI, Shulman RJ. Recurrent abdominal pain in children: forerunner to adult irritable bowel syndrome? *J Soc Pediatr Nurs*. 2003; 8:81–9.
13. Christensen MF. Recurrent abdominal pain and dietary fiber. *Am J Dis Child*. 1986; 140:738–9. [PubMed: 3014862]
14. Feldman W, McGrath P, Hodgson C, et al. The use of dietary fiber in the management of simple, childhood, idiopathic, recurrent abdominal pain. Results in a prospective, double-blind, randomized, controlled trial. *Am J Dis Child*. 1985; 139:1216–8. [PubMed: 2998181]
15. Humphreys PA, Gevirtz RN. Treatment of recurrent abdominal pain: components analysis of four treatment protocols. *J Pediatr Gastroenterol Nutr*. 2000; 31:47–51. [PubMed: 10896070]
16. Huang RC, Palmer LJ, Forbes DA. Prevalence and pattern of childhood abdominal pain in an Australian general practice. *J Paediatr Child Health*. 2000; 36:349–53. [PubMed: 10940169]
17. Paulo AZ, Amancio OM, de Morais MB, et al. Low-dietary fiber intake as a risk factor for recurrent abdominal pain in children. *Eur J Clin Nutr*. 2006; 60:823–7. [PubMed: 16452916]
18. Ford AC, Talley NJ, Spiegel BM, et al. Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: systematic review and meta-analysis. *BMJ*. 2008; 337:a2313. [PubMed: 19008265]
19. Ruepert L, Quartero AO, de Wit NJ, et al. Bulking agents, antispasmodics and antidepressants for the treatment of irritable bowel syndrome. *Cochrane Database Syst Rev*. 2011; (8):CD003460. [PubMed: 21833945]
20. Jones HF, Butler RN, Brooks DA. Intestinal fructose transport and malabsorption in humans. *Am J Physiol Gastrointest Liver Physiol*. 2011; 300:G202–6. [PubMed: 21148401]
21. Kyaw MH, Mayberry JF. Fructose malabsorption: true condition or a variance from normality. *J Clin Gastroenterol*. 2011; 45:16–21. [PubMed: 20818234]
22. Ong DK, Mitchell SB, Barrett JS, et al. Manipulation of dietary short chain carbohydrates alters the pattern of gas production and genesis of symptoms in irritable bowel syndrome. *J Gastroenterol Hepatol*. 2010; 25:1366–73. [PubMed: 20659225]
23. Chumpitazi BP, Weidler EM, Shulman RJ. A multi-substrate carbohydrate elimination diet (MCED) decreases gastrointestinal (GI) symptoms in a subpopulation of children with irritable bowel syndrome (IBS). *Gastroenterology*. 2011; 140:S746.

24. Dearlove J, Dearlove B, Pearl K, et al. Dietary lactose and the child with abdominal pain. *Br Med J*. 1983; 286:1936. [PubMed: 6407644]
25. Lebenthal E, Rossi TM, Nord SK, et al. Recurrent abdominal pain and lactose absorption in children. *Pediatrics*. 1981; 67:828–32. [PubMed: 7195004]
26. Robayo-Torres CC, Opekun AR, Quezada-Calvillo R, et al. Carbohydrate digestion in congenital sucrase isomaltase deficient and recurrent abdominal pain children assessed by 13C- starch breath test. *Gastroenterology*. 2010; 138:S139.
27. Money ME, Walkowiak J, Virgilio C, et al. Pilot study: a randomised, double blind, placebo controlled trial of pancreatic lipase for the treatment of postprandial irritable bowel syndrome-diarrhoea. *Frontline Gastroenterol*. 2011; 2:48–56. [PubMed: 22095308]
28. Karnsakul W, Luginbuehl U, Hahn D, et al. Disaccharidase activities in dyspeptic children: biochemical and molecular investigations of maltase-glucoamylase activity. *J Pediatr Gastroenterol Nutr*. 2002; 35:551–6. [PubMed: 12394383]
29. Chumpitazi BP, Robayo-Torres CC, Diaz-Sotomayor M, et al. Elevated duodenal maltase activities in childhood recurrent abdominal pain (RAP) suggest starch maldigestion. *Gastroenterology*. 2011; 140:S744–5.
30. Gijsbers CF, Kneepkens CM, Schweizer JJ, et al. Recurrent abdominal pain in 200 children: somatic causes and diagnostic criteria. *Acta Paediatr*. 2011; 100:e208–14. [PubMed: 21575052]
31. Kokkonen J, Haapalahti M, Tikkanen S, et al. Gastrointestinal complaints and diagnosis in children: a population-based study. *Acta Paediatr*. 2004; 93:880–6. [PubMed: 15303801]
32. Mansueto P, Iacono G, Seidita A, et al. Review article: intestinal lymphoid nodular hyperplasia in children—the relationship to food hypersensitivity. *Aliment Pharmacol Ther*. 2012 Mar 20. [Epub ahead of print].
33. Turco R, Boccia G, Miele E, et al. The association of coeliac disease in childhood with functional gastrointestinal disorders: a prospective study in patients fulfilling Rome III criteria. *Aliment Pharmacol Ther*. 2011; 34:783–9. [PubMed: 21790684]