

GUT FEELING

GASTROLAB NEWS FOR GPs

THIS ISSUE Recurrent Abdominal Pain of Childhood

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Recurrent Abdominal Pain of Childhood and Fructose Intolerance

In this edition of *GUT FEELING*, paediatric gastroenterologist **Dr Marcelo Leal** summarises two research studies investigating the occurrence of fructose malabsorption in children with chronic abdominal pain (determined by breath hydrogen test), and symptom improvement with a low-fructose diet.



Recurrent abdominal pain in children is a common presenting complaint, yet simply ruling out organic causes by running through any red flags in the history and through a careful examination often leads to a diagnosis of functional abdominal pain, irritable bowel syndrome or recurrent abdominal pain of childhood (RAPC).

Nevertheless, persistent pain can lead to ongoing anxiety in both the parents and the patient, and in some cases will lead to an impairment in their participation of normal activities, or even exploration of “alternative” methods to alleviate the pain.

Abdominal pain secondary to nonmyelinated pain receptors activated via stretching of the bowel leads to dull, poorly localised/periumbilical pain. This stretching is often due to gaseous distension, and there is growing evidence that a significant percentage of children with RAPC have fructose intolerance. Fructose, a monosaccharide, is thought to be absorbed through two passive mechanisms in the small bowel: via facilitated diffusion (ie down a concentration gradient through a luminal transporter), and through paracellular transport with glucose. As such, the first mechanism imposes a limit on fructose absorption, and the second is dependent on the ingested fructose/glucose ratio.

Fructose that isn't able to be absorbed can lead to bowel distension, and therefore pain, by providing a direct osmotic gradient bringing fluid into the lumen; and by fermentation by bacteria with production of hydrogen/methane, carbon dioxide and small chain fatty acids. Hydrogen and methane dissolve through the intestinal wall, into the blood stream, and are exhaled. As these gases are not produced by humans, they are evidence of sugar fermentation by intestinal bacteria. A certain percentage of the population have a faecal microbiota that produce low/no hydrogen, and so will have a false negative breath test result if not also tested for methane.

Although fructose is naturally occurring, it is also increasingly being added to food and drink as a sweetener. Fructose intolerance has been described in adults for longer than in children, and the first report in the paediatric literature was in 2008 by Gomara et al in



New York, USA. 11 out of 32 patients aged 7 to 17 with a diagnosis of functional abdominal pain had positive fructose breath hydrogen tests, and 9 out of those 11 reported an almost immediate improvement in symptoms with a low-fructose diet.

More recently, a publication by Escobar et al (2014) reported the largest trial looking at the prevalence of fructose intolerance in the specific population of paediatric functional abdominal pain. They found that in 222 patients between the ages of 2-19 who had been diagnosed with functional abdominal pain, 54.5% had a positive breath test indicating fructose malabsorption. These went on to have a nutritional assessment and were recommended a low-fructose diet. 76% of these reported resolution of symptoms and were reported to be compliant with the diet two months later. Although 54% of those with a negative hydrogen breath test (note that methane was not tested in this study) also reported eventual improvement in their symptoms despite no dietary change, the odds ratio between these two groups remained significant at 2.43 (95% CI 1.32-4.45, $P=0.004$).

In conclusion, although functional abdominal pain can be a difficult to treat, it seems that carbohydrate malabsorption is contributing to a significant proportion of the paediatric patients presenting with these symptoms. Identifying this, and then treating it with the appropriate dietary modifications can help with management.

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