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Recurrent Abdominal Pain and Irritable Bowel Syndrome in Children

Mark E. McOmber, M.D. and **Robert J. Shulman, M.D.**
Baylor College of Medicine, Texas Children's Hospital, Children's Nutrition Research Center

Abstract

Purpose of Review—Recurrent abdominal pain (RAP) continues to be one of the most ubiquitous conditions faced by the healthcare team and has a significant emotional and economic impact. We have moved from considering it a psychological condition to recognizing the physiological and environmental contributions and considering the condition in the framework of a biopsychosocial model where biology, psychology, and social environment interact. Here, we review current studies addressing etiologies, diagnostic techniques, and treatment options for RAP in children.

Recent Findings—Studies continue to highlight the role of visceral hypersensitivity in RAP. However, the psychological state of the child and the parent (most often the mother) in terms of their anxiety, somatization, and coping skills can modulate the expression of symptoms. Diagnosis still is made by history and physical examination. Newer treatment options include relaxation and distraction therapies as well as medications. The role of probiotics in children remains to be defined.

Summary—The approach to the child with RAP must include the recognition of the physiological contributions and this information must be relayed to the child and parents. Acknowledgement also must be paid to the role of psychological state in the parent as well as in the child in modulating the severity of symptoms.

Keywords

recurrent abdominal pain; functional abdominal pain; irritable bowel syndrome

Introduction

Recurrent abdominal pain and irritable bowel syndrome are two examples of functional gastrointestinal disorders (FGID) which are conditions that include a combination of symptoms that are chronic or recurrent and cannot be explained entirely with current structural or biochemical investigations. The term ‘functional’ highlights that many of these symptoms may accompany normal development (e.g., infant regurgitation) or may be a response to otherwise normal internal or external cues (e.g., constipation after painful stooling) (1). The term ‘non-organic’ often is used in combination with these disorders, describing the lack of positive results on tests with our current practice technology.

In 2006, the pediatric ROME III committee summarized current consensus regarding functional disorders in infants, toddlers, children, and adolescents. One of the major categories for functional GI disorders in older children and adolescents includes the report of abdominal pain.

Address correspondence and reprint requests to: R.J. Shulman, Children's Nutrition Research Center, 1100 Bates Street, Houston, Texas 77030, Phone (713) 798-7145; FAX (713) 798-7187; rshulman@bcm.edu.

In 1958, Apley described a group of children in the community that complained of abdominal pain that persisted and interfered with daily activities (2). With this description came the term recurrent abdominal pain (RAP), a term that still finds common usage. Using Apley's definition, 10-17% of school-aged children have RAP (3);(4);(5);(6);(7);(8);(9);(10). Now, however, using the pediatric ROME criteria, we can subdivide and reclassify RAP into more defining groups [e.g., functional abdominal pain (FAP), irritable bowel syndrome (IBS)]. In a study investigating the characteristics of children with RAP, we noted that 35% of the children could be more specifically classified as having FAP and the other 65% as having IBS (11).

Pathophysiology

Several factors are thought to contribute to FGIDs. Although early evidence suggested motility disturbances as a major culprit, current evidence suggests that patients with functional bowel disease may have abnormal gastrointestinal reactivity to physiologic stimuli (dietary, gut distension, hormonal), noxious stimuli (inflammation), and/or psychological stress. This is termed visceral hypersensitivity and is thought to stem from a dysregulation in the interaction between the enteric nervous system and the central nervous system (12). The question that is to be answered is whether the lack of coordination is predominantly enteric or central in origin.

A recent study by Naliboff et al. demonstrated that adult patients with IBS have hypersensitivity to rectal distension that gradually normalizes with time, suggesting a process of habituation to visceral sensation. However, these patients' reports of IBS symptoms did not change over that same time period. Using functional brain imaging (positron emission tomography- PET testing) they found that visceral input was consistent during the time of the study, but the functional connectivity within the central networks (specifically those areas of the brain associated with vigilance and arousal) was reduced (13). This suggests that despite consistent input from the visceral afferents, processing and perception of this input can be modified via habituation of central brain regions; the presence of the balloon is noted but the brain doesn't respond as it did before. Whether these findings are also true in children has not been studied. However, children with FGID do have visceral hypersensitivity. Faure and colleagues studied children with FAP and IBS compared with Control children and those with functional dyspepsia (14). Using rectal balloon distention with a barostat (a device that maintains constant compliance as it distends) they demonstrated that children with FAP and IBS sensed rectal pain at a lower pressure threshold (median 16 mm Hg and 19.5 mm Hg, respectively) compared with Controls and children with dyspepsia (42 mm Hg and 41.5 mm Hg, respectively). Further, the pain referred to the T8 to L1 dermatomes (i.e., abdominal projections) in the FAP and IBS children whereas it referred to the S3 dermatome (perineal) in the Control and dyspepsia groups (14). These findings of visceral hypersensitivity fit with the observations of Crandall et al. who measured pain symptoms after colonoscopy in 20 children with FGID (19 IBS, 1 FAP) compared with 20 children with inflammatory bowel disease (15 Crohn, 5 ulcerative colitis). Children with FGID had greater baseline pain scores and a longer duration of pain postprocedure than did children with inflammatory bowel disease (15).

Another important factor involved in the pathophysiology of FGIDs is the psychosocial component. It has been clear for some time that there is a relationship between the psychological state of the parent and child and the experience of RAP (16). Walker et al. have extended these findings to show that compared with Control children, children with RAP were less confident about their ability to deal with daily stress. Further, they were less likely to use accommodative coping strategies such as accepting the stressor, reframing its significance, or encouraging themselves to keep going (17). These observations fit with those of Kaminsky and colleagues who showed that depressive symptoms in children with RAP directly related to passive coping and inversely related to self-efficacy and social support (18). How a child handles stressors may be one of the key factors in chronic abdominal pain and depressive

symptoms as well. They surmised that children who are able to deal with pain appropriately are less likely to experience depressive feelings of helplessness (18).

Psychological factors also may play a role in healthcare seeking. Levy and colleagues have shown, based on retrospective questioning, that the decision to take a child to the clinic for abdominal pain relates to the child's self-report of perceived pain severity as well as the mother's psychological distress (19). These data fit with our own observations that pain interferes with activity in children with and without RAP but that those with RAP were more likely to report interference of activities across all levels of pain, showing that the stressor was present in both groups but response to the stressor was different in those children with FGIDs (11).

Campo and colleagues compared mothers of children with FAP to those whose children did not have recurrent pain. Mothers of FAP children were more likely to have anxiety, depressive, and somatoform disorders, and fitting with the observation of Levy et al., i.e., greater use of ambulatory healthcare services. Indeed, multivariate logistic regression found children's FAP to be most closely associated with a maternal history of anxiety and depression (20).

Given these psychological contributions to the experience of RAP, it comes as no surprise that these children often experience a poor quality of life. Varni et al., in a multicenter study, compared the quality of life of children with IBS to Controls and those with diagnosed organic disease using the PedsQL™ Generic Core Scales, Family Information Form, and Gastrointestinal Symptom Scale. Children with IBS had significantly lower physical, emotional, social, and school functioning compared with Controls. Of great concern, their impairment in quality of life was comparable to children with organic GI diseases (21).

Diagnosis

The diagnosis of a FGID such as FAP or IBS by definition precludes the ability to do a simple diagnostic test. Thus, the diagnosis must rely upon the history and physical examination with a modicum of supporting tests. The definition of FAP, as laid out by the Pediatric Rome criteria, is *episodic or continuous abdominal pain* that does not meet the criteria for any other FGID (e.g., gastroesophageal reflux, constipation). Additionally, IBS is defined as abdominal pain or discomfort *associated with a change in frequency or form of stool or relieved with defecation*. Both FAP and IBS require symptoms to be present at least once per week for at least two months before diagnosis and without evidence of inflammatory, anatomic, metabolic, or neoplastic process to explain the symptoms (22).

A recent review carried out by the American Academy of Pediatrics (AAP) and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) resulted in a recommendation that in *absence* of “alarm symptoms or signs” in the history and physical examination, the primary care physician can diagnose and address a functional disorder. Alarm features include (but are not limited to) presence of blood in the stool, involuntary weight loss, deceleration of linear growth, significant vomiting (bilious or protracted), chronic severe diarrhea, persistent pain away from the umbilicus, unexplained fever, family history of inflammatory bowel disease, or abnormal physical exam finding (e.g., organomegaly, tenderness away from the umbilicus, costovertebral angle tenderness, perianal abnormalities). In the *presence* of these findings, it is generally indicated to pursue further diagnostic testing (12). Although the usefulness of these alarm signs seems self-evident, their validity has not been tested. Indeed, our study showed that the location of the abdominal pain does not differentiate between children with RAP and normal children without RAP who occasionally have abdominal pain (11).

Fishbein et al. surveyed charts and found that most primary care physicians limited diagnostic tests in patients who present with typical findings of FAP. They did note, however, that

physicians were more likely to order an abdominal ultrasound despite their belief that it would not change the diagnosis. The hypothesized rationale was that primary care physicians were using negative results of a non-invasive ultrasound as a transition from a diagnostic discussion to reviewing treatment options for patients (23). Although a plain radiograph of the abdomen commonly is performed in the evaluation of FGID, Bongers et al. reviewed the available literature and concluded that it does not have a role in the evaluation of FAP (24). Even for the diagnosis of constipation, the inter- and intraindividual variation among radiologists is too great for a radiograph to provide useful information.

In adults, video capsule endoscopy has proved to be a useful method for diagnosing small intestinal lesions beyond the reach of the endoscope and too superficial for contrast studies (25). In this technique the patient swallows a camera imbedded in a pill that records images as it traverses the gastrointestinal tract. Much less data are available regarding its utility in pediatrics. Nevertheless, in a small number of subjects (n=10), Shamir et al. used video capsule endoscopy (VCE) in children with presumed functional abdominal pain and concluded that VCE also is not indicated unless there is other evidence of small bowel disease (i.e., alarm signs of weight loss or blood in stool) (26).

Given the observation of visceral hypersensitivity in IBS and RAP, Walker and colleagues tested whether a symptom provocation test could predict symptoms in children with FAP and discriminate them from well children Controls (27). They carried out a water load test in which children drank water through a tube from a hidden container until they were full. The water load test produced symptoms in the FAP children similar to those they normally experienced when they were having pain. Further, children with FAP had greater symptoms compared with Controls suggesting that the test can discriminate between groups (28).

Treatment

As noted above, psychological factors contribute to (but do not cause) the experience of FGID. Cognitive-behavioral therapy has been useful in improving pain and disability outcome over the short term. This therapy is most effective when the education includes the parent and the child and focuses on self-coping and care-giving strategies (29);(30);(31);(32). Recent work by Weydert et al. has expanded these findings. After obtaining baseline pain diaries and psychological testing (depression, anxiety, somatization scales in children and parents), children with RAP were randomized to receive either breathing exercises alone or guided imagery therapy with progressive muscle relaxation. Guided imagery is a form of self-regulation therapy wherein deep relaxation is induced using progressive muscle relaxation allowing the subject to be guided in creating images that facilitate resolution of identified problems. Compared to children treated with breathing exercises alone, children who learned guided imagery with progressive muscle relaxation were more likely to achieve functionality (no missed days of school and less than 4 days of pain per month) (33).

As many parents recognize, distraction can be a powerful tool in diminishing anxiety! Using the water load test described earlier, Walker et al. evaluated the effect of parental distraction on symptom complaints. Children with RAP and Controls were randomized into either a group where the parents attended to the child's symptoms with apologies, reassurance, and sympathy, or a group that tried to distract the child. Compared to a control group where no specific therapy instruction was given, symptom complaints nearly doubled in the “attention” group but reduced by half in the “distraction” group. The negative effect from attention was greatest in RAP girls. Ironically, parents in the distraction group felt that this technique had greater potential negative impact on their children (27).

Probiotics are live microorganisms that when administered in adequate amounts confer a beneficial health effect on the host. Studies in adults have suggested a benefit for some strains

of probiotics in treating individuals with IBS (34). Gawronska et al. performed a randomized double-blind placebo-controlled study using Lactobacillus GG in children with dyspepsia, FAP, or IBS. The results suggested a moderate benefit in increasing the number of children with no pain but there was no reduction in pain frequency or severity and the confidence intervals were large (35). These results generally fit with those of Bausserman and Michail who found no benefit with Lactobacilllus GG in children with IBS (36). Further studies with different strains of probiotics will be needed to come to definite conclusions.

Functional GI disorders occur in 50% of children with migraine headaches (37). Given the overlap that exists between migraine headaches and abdominal pain disorders, Boccia et al. investigated the benefit of using flunarizine, a calcium channel blocker in children with migraines and FGIDs. Flunarizine decreased the frequency of migraines and abdominal pain episodes as well as enhanced gastric emptying rate and decreased vomiting episodes (37). Larger randomized, placebo-controlled studies are awaited.

Conclusions

Functional gastrointestinal disorders are a cause of great morbidity and emotional distress in pediatrics. We have come a long way from considering these conditions “psychological” (e.g., school phobia). As more data become available we will be able to offer these children and their families a better understanding of the conditions and more effective treatments to overcome them.

Acknowledgments

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