
Recurrent Abdominal

Painⁱⁿ Children



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Recurrent abdominal pain (RAP) is usually defined as three or more bouts of abdominal pain, severe enough to interfere with a child's normal activities, occurring over a period of not less than three months during the year preceding the examination.^{1,2}

In children under two years of age, abdominal pain is often associated with an organic cause.³ In older children, an organic cause is only found in approximately 10% of cases.³ With recent advances in technology and our improved diagnosis abilities, the percentage of children diagnosed as having RAP with no identifiable cause is likely to decrease.^{4,5}

RAP is one of the most common and challenging diagnostic and therapeutic problems encountered in general pediatrics. It is a frustrating concern for the child, parents and physician. It can lead to significant suffering and limitations in daily living for both the child and the family. This article reviews the etiology of RAP in children and suggests an approach to the evaluation and management of this problem.

Prevalence

RAP is perhaps the most common painful health problem in school-aged children. An estimated 10% to 15% of these children will experience RAP at some point.^{1,6-8} The condition has an essentially equal gender ratio in young children with a female predominance increasing over time, especially in early adolescence.¹

Etiology

The causes of RAP in children are listed in Table 1.^{1,9,10}

Functional RAP

Functional abdominal pain is by far the most common cause of RAP in children.¹ The Rome II criteria for the diagnosis of functional RAP are shown in Table 2.¹¹ The cause of functional RAP is controversial and it is most likely multifactorial. However, functional RAP may result from an alteration in gastrointestinal motility or visceral hypersensitivity.^{2,7,12,13}

Onset often occurs between five and 10 years of age.¹ Typically, the pain is vague, poorly localized or periumbilical and may be crampy or sharp. Episodes of pain tend to cluster, alternating with pain-free periods of variable length. Most episodes last for less than an hour, and are sometimes only minutes long.⁸ On cessation of the pain, the child is up and about as if nothing had happened. Episodes are discrete, paroxysmal and often unexpected.¹⁴

Excitement, worry or vague indisposition may precede the onset of pain.¹ Although the



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pain may affect daily activities, the child can often be distracted from it.³ RAP rarely awakens the child from sleep, but it is not uncommon for evening pain to affect the child's ability to fall asleep. There may be associated dysfunction in the autonomic nervous system, which may include nausea, vomiting, pallor, dizziness, perspiration, palpitations

Table I

Causes of recurrent abdominal pain in children

I. Functional RAP

II. Organic causes

Gastrointestinal disorders

- | | |
|--|---|
| • Constipation | • Intussusception |
| • Lactose intolerance | • Celiac disease |
| • Recurrent pharyngitis | • Inflammatory bowel diseases (Crohn's disease, ulcerative colitis) |
| • Mesenteric lymphadenitis | • Recurrent pancreatitis |
| • Aerophagia | • Appendiceal colic |
| • Esophagitis | • Post-surgical adhesions |
| • Peptic ulcer disease/gastritis | • Superior mesenteric artery syndrome |
| • Recurrent gastroenteritis | • Cholelithiasis |
| • Giardiasis/parasitic infestation | • Choledochal cyst |
| • Malrotation with or without volvulus | |

Urogenital disorders

- | | |
|----------------------------|-------------------------------|
| • Urinary tract infection | • Endometriosis |
| • Renal calculi | • Mittelschmerz |
| • Hydronephrosis | • Pregnancy |
| • Posterior urethral valve | • Hematocolpos |
| • Wegener granulomatosis | • Pelvic inflammatory disease |
| • Dysmenorrhea | • Ovarian cyst |

Neurological disorders

- | | |
|----------------------|----------------------|
| • Abdominal migraine | • Riley-Day syndrome |
| • Abdominal epilepsy | • Spinal cord tumour |

Metabolic migraine

- | | |
|-------------------------|----------------------------------|
| • Hypoglycemia | • Hereditary angioneurotic edema |
| • Diabetic ketoacidosis | • Lead poisoning |
| • Hyperparathyroidism | • Familial hyperlipidemia |
| • Porphyria | |

Hematologic disorders

- | | |
|-----------------------|----------------------------|
| • Sickle cell disease | • Henoch-Schönlein purpura |
|-----------------------|----------------------------|

Drugs

Mental disorders

- | | | |
|------------------------|--------------------------|------------------------|
| • Factitious disorders | • Somatization disorders | • Conversion disorders |
|------------------------|--------------------------|------------------------|

Modified from Leung AK, Wong BE, Cho HY, et al: Recurrent abdominal pain in childhood. Singapore Paediatr J 1996; 38:44-8.

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* Based on a data analysis from 4 large 3-year osteoporosis treatment trials involving 2,725 patients (Relative risk [RR] = 5.1, presence of ≥ 1 fracture, $p < 0.001$)

† Randomized, double-blind, placebo-controlled study of 2,458 postmenopausal women with at least one vertebral fracture. All patients received 1 g/d calcium and, if baseline levels were low, 500 IU/d vitamin D.

‡ Three-year clinical study (VERT-MN) in 1,226 postmenopausal women (18.1% vs 29%; $p < 0.001$). All patients received 1 g/d calcium and, if baseline levels were low, 500 IU/d vitamin D.

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Table 2

Rome criteria for the diagnosis of functional RAP

In the preceding 12 months, at least 12 weeks of:

- Continuous or nearly continuous abdominal pain in a school-aged child or adolescent;
- No or only occasional relationship of pain with physiological events (e.g. eating, menses, or defecation);
- Some loss of daily functioning;
- The pain is not feigned (e.g. malingering); and
- Insufficient criteria for other functional gastrointestinal disorders that would explain the abdominal pain.

Adapted from Drossman DA, Corazziari E, Talley NJ, et al (eds): *Rome II: The Functional Gastrointestinal Disorders: Diagnosis, Pathophysiology and Treatment: A Multinational Consensus*. Degnon Associates, McLean, 2000, pp. 551-4.

Table 3

Signs and symptoms suggesting an organic basis for RAP

- Presentation at < 3 years or > 15 years of age
- Pain located away from the umbilicus
- Nocturnal pain that awakens the child from sleep
- Radiation of pain to the back, shoulder, and extremity
- Changes in bowel habit (constipation, diarrhea)
- Billious or bloody emesis
- Bloody stools
- Urinary tract symptoms such as dysuria, frequency, and urgency
- Menstrual problem
- Constitutional symptoms of chronic illness (ill-appearance, poor weight gain or involuntary weight loss, growth deceleration, recurrent fever, anemia, lack of energy)
- Family history of peptic ulcer disease or inflammatory bowel disease
- Organomegaly
- Abdominal mass
- Abdominal guarding
- Perianal disease
- Joint pain or swelling
- Unusual skin rashes (pyoderma gangrenosum, erythema nodosum, purpura)

Modified from Leung AK, Wong BE, Cho HY, et al: Recurrent abdominal pain in childhood. *Singapore Paediatr J* 1996; 38:44-8.

and flushing.^{1,7} Other nonspecific symptoms, such as headache, fatigability and limb pains, also may occur.¹⁵

These children are usually bright and alert.¹ They have been described as being high achievers, overconscientious, strong, nervous or fussy, and timid or apprehensive.¹⁵ They have poor tolerance for failure and are chronic worriers.^{1,3} Some of these children have difficulties meeting the expectations of parents and teachers, and school absences are relatively common.^{1,16} The family may reinforce the symptom by demonstrating excessive concern.

These children have more emotional problems than do children in the general population.^{1,17} Relatively high incidences of concurrent stressful life events are often reported, including death, separation, physical illness or chronic handicap in a significant family member, birth of a sibling, financial problems, rigid parenting styles, and a recent geographic move.^{1,18} A family history of migraine headaches, peptic ulcer, or irritable bowel syndrome can often be elicited.^{1,3,18} Results of physical examinations of children with RAP are usually unremarkable.

Organic causes

Gastrointestinal and urogenital disorders are the most common organic causes of RAP.^{1,15} It is beyond the scope of this article to review all the conditions that may cause RAP, however, a number of these conditions merit specific comment.

Constipation

Some children with chronic constipation present with RAP.¹⁹ The pain is usually intermittent and has a predilection for the

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left lower quadrant of the abdomen or periumbilical area.^{1,19} There is often an associated urge to defecate.^{1,15} The pain is presumed to be due to colonic distension or spasm.¹

Lactose Intolerance

In certain ethnic groups (Oriental, African-American or Mediterranean), the activity of intestinal lactase tends to decline from approximately four to six years of age, so that the prevalence of lactose malabsorption increases during childhood and adolescence.^{1,15,20} The gas that is produced from colonic fermentation may cause intestinal distension and abdominal pain.²¹ Typically, children with lactose intolerance present with bloating, crampy abdominal pain, flatulence and watery diarrhea.¹

Peptic Ulcer Disease/Gastritis

Primary gastric ulcers are extremely rare in children. When a gastric ulcer does occur, it is usually secondary in nature.²² Primary duodenal ulcers are rare in children under 10 years of age, but the prevalence increases during adolescence.²² Secondary ulcers are usually secondary to stress (such as burns or head injury) or may be induced by the ingestion of medications such as corticosteroids, nonsteroidal anti-inflammatory agents and alcohol.²² Only 50% of children with peptic ulceration manifest the typical meal-related characteristics common with the adult presentation.¹⁵

The association of *Helicobacter pylori* and RAP is controversial.²³⁻²⁶ While early studies noted a high rate of infection with *H. pylori* among children with RAP, subsequent studies showed the seroprevalence of *H. pylori* is comparable in children with RAP and healthy children.²³⁻²⁶ *H. pylori* infection alone is rarely the cause of RAP in children, unless peptic ulcer disease is present.²⁷

Urinary Tract Infection

Urinary tract infection is a common organic cause of RAP, especially in girls. Other symptoms include malaise, irritability, poor feeding, fever, dysuria, frequency and urgency.^{28,29} The younger the child, the less the symptoms are localized.^{28,29}

Inflammatory Bowel Disease

RAP is a prominent feature in children with Crohn's disease.³⁰ In Crohn's disease, the pain tends to be localized, most commonly in

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the right lower quadrant, awakens the child at night and can be associated with anorexia, fatigue, weight loss, anemia and growth failure.^{15,30} Abdominal pain in ulcerative colitis is usually associated with defecation and is less pronounced than in Crohn's disease.³⁰ In ulcerative colitis, the diarrhea is often bloody.



Clinical Evaluation

It is important to realize that, just as an organic disorder may present in a child who is emotionally disturbed, so may an emotional disturbance be superimposed on organic disorders.¹ A detailed history and a complete physical examination are of utmost importance in the evaluation of a child with RAP. Table 3 lists clues found in the history and physical examination that would indicate the pain is not functional, but rather has an organic basis.

History

The onset, character, duration, frequency, time of occurrence, intensity and location of pain should be determined.¹ Aggravating and alleviating factors, as well as any associated symptoms, such as fever, rash, joint pain, anorexia, vomiting, diarrhea, weight loss or growth deceleration, should be elicited. A psychosocial history is essential and stressful events should be explored. It is important to look beyond the home and check into the neighborhood and school.¹ Improvement in symptoms during weekends and school vacations suggests functional RAP.³ A detailed

drug history is important, as certain medications such as erythromycin, acetylsalicylic acid, and corticosteroids can cause abdominal pain.¹ A thorough gynecologic history is essential in the postpubertal female, including a menstrual history and a history of sexual activity and contraception.

A family history of peptic ulcer, irritable bowel syndrome, anxiety attacks, migraine headaches and mental illness may give clues to the diagnosis. The ethnic background should be noted to determine if an ethnic propensity for certain disorders exist. For example, sickle-cell anemia is most common in African Americans.

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In general, the longer the duration of symptoms and the more numerous the episodes, the greater the likelihood of functional RAP if the child appears otherwise well.^{1,31} Nevertheless, the diagnosis of functional RAP on a psychosomatic basis must rest on positive evidence of emotional disturbance, as well as exclusion of organic diseases.

Physical examination

The general appearance, nutritional status, weight, and height of the child should be carefully documented. The abdomen should be evaluated for distension, tenderness, bruises, guarding, abnormal bowel sounds, organomegaly, masses, scars and hernias.¹ The perianal area should be examined for evidence of fecal soiling, skin tags, fissures, fistulas, erythema and induration. A rectal examination may be helpful to rule out retained stool. The examination should extend beyond the abdomen, as RAP may be a manifestation of many systemic disorders. Signs such as rash, digital clubbing, lymphadenopathy and mouth ulcers should be noted.

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Laboratory evaluation

Laboratory studies may not be necessary if the history and physical examination clearly point to the diagnosis of functional RAP.³ Screening laboratory tests to detect other potential causes of RAP may include a complete blood count, peripheral blood smear, erythrocyte sedimentation rate, urinalysis and, perhaps, stool test for ova and parasites.^{1,3} Additional laboratory studies should be directed by the history, physical

examination and abnormal laboratory findings.

A hydrogen breath test is helpful if lactose intolerance is suspected.

The diagnostic value of abdominal ultrasonography in unselected children with RAP is low.^{1,32,33} When there are clinical grounds to suspect an abdominal mass or abdominal pathology, however, abdominal ultrasonography is warranted.^{1,34} This applies especially when the pain is lateralized, when there are abnormalities found during urinalysis or when the pain is localized to the lower quadrants in a female.²⁷ Laparoscopy may have a limited role in the evaluation of carefully selected children with very reproducible, localized, well-characterized RAP when all the standard tests have not led to a diagnosis.^{3,5}

Management

Treatment should be directed at the underlying cause. For children with functional RAP, thorough and confident reassurance and frank explanations are the cornerstones of management.¹

The doctor should act confidently and consistently to reassure the child and the parents that no serious illness is present.¹ Instead, the child's pain should be validated by the physician as real. As an analogy, the child's abdominal pain can be compared to that of a headache, to which parents can relate. This will help explain that although the pain is real, there is no disease causing the acute episode of pain. This analogy illustrates how anxiety, stress or emotional upheaval may be trigger factors for the abdominal pain.

The child should be encouraged to air out his or her concerns. Underlying stress should be removed if possible. Parents should be guided to lower their expectations. They also should avoid suggestion of symptoms, anxiety about them or detailed discussion with the child about his or her health. The parents should be instructed to avoid reinforcing the symptoms with secondary gains. For example, if the child is



sick enough to stay home from school, he or she is sick enough to stay in bed without television, toys, or other special privileges.³⁴ Normal activity between times of pain should be encouraged.

A high fibre diet has been used with some success, particularly in children with constipation.^{33,35,36} Biofeedback and relaxation techniques have been useful in some children with functional RAP.³ It is important to establish a supportive working relationship with the family and to provide ongoing follow-up and care.⁸ Medications are usually not indicated. For those who continue to have significant breakthrough pain, short-term use of anticholinergic medications such as dicyclomine hydrochloride may be considered.⁷


Some pediatric gastroenterologists are starting to use low-dose tricyclic antidepressants (imipramine and amitriptyline) for their anticholinergic and central analgesic properties.² There has been some anecdotal success, however, their clinical efficacy in childhood RAP has not been substantiated in the literature.

Prognosis

The prognosis depends on the underlying etiology. About 50% of children with functional RAP will have no symptoms when they reach adulthood, 25% will continue to have RAP and the remaining 25% will be free of RAP, but develop other painful symptoms such as headaches, irritable bowel syndrome, or psychiatric disorders such as anxiety and depression.^{1,37,38} Thus, functional RAP in children may not be as benign as it appears, but may delineate a group of children who have difficulties adapting to their environment, both as children and as adults.¹


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