CASE

Matthew is a 7-year-old, white boy who has experienced crampy, periumbilical, abdominal pain almost daily for the past 2 months. The symptom had not changed his activity level, appetite, or general behavior, so his mother did not make an earlier appointment for an evaluation. A very bright, articulate, and charming child, Matthew has been successful in school and in sports and has several close friends; the belly aches have not altered any of these activities. He denies constipation, diarrhea, nausea, vomiting, dysuria, urinary frequency, trauma, or headaches.

Matthew’s birth history and developmental course were uneventful. Described by his mother as a calm baby, he was her first child, and she seemed to enjoy nurturing him. An emergency room visit at 2 years of age for a simple chin laceration, a few episodes of reactive airway disease associated with viral illnesses, and an occasional bout with otitis media was the extent of his medical history. A comment in the chart at his 5-year health supervision visit was noted: “Bright and verbal child—inquisitive—enjoys drawing and play with friends—new sibling past year/ appears to have adjusted well.”

Family history was negative for gastrointestinal disorders, such as peptic ulcer, inflammatory bowel disease, food intolerance, or irritable bowel syndrome. The parents both worked and were successful in their jobs, and there was no financial stress or marital discord. Matthew, his younger brother, and his parents spent weekends together as a family.

When asked to describe the pain, he pointed to the periumbilical region and said it was “like the cramps—achy.” It lasted from 5 to 30 minutes, occasionally several hours. The pain never radiated, never awakened him at night, and was not accompanied by other symptoms. Lying down or sitting quietly usually resolved the pain.

Physical examination was normal, including a blood pressure determination, growth measurements, and a digital rectal examination. A mental status and neurodevelopmental screening test were normal. Matthew’s family drawing (completed while waiting in the office) revealed visual-motor skills and an active imagination, appropriate for his age and gender. Signs of anxiety or depression were not observed. The following laboratory studies were performed, all with normal results: complete blood count, erythrocyte sedimentation rate, urinalysis, and a stool examination for ova and parasites and occult blood.

At the initial visit and before the laboratory studies, the pediatrician emphasized the normal physical examination findings and the absence of associated symptoms that might suggest a specific cause for his pain. A brief discussion about the connection between “feelings and tummy aches” was initiated. A drawing of a transverse section of the intestinal tract was used to show Matthew how the smooth muscle lining constricts and dilates in response to the signals from the brain. Strong feelings, such as anger or sadness, could “change the tightness” of these muscles, causing pain. It was suggested that sometimes kids with belly aches may feel pain when they are really feeling a strong emotion. Matthew listened attentively and asked a few questions about the illustration of the intestinal tract. Empirical dietary recommendations were written down: limit dairy products, increase fiber and fresh fruits. A follow-up appointment was made for 2 weeks.

At the next visit, the abdominal pain pattern and frequency had not changed; it was neither worse nor improved. The pediatrician then interviewed the mother alone to explore the family constellation further. This 10-minute interview did not reveal any new information; she was given an opportunity to share her concern about her son. The family was emotionally healthy, and Matthew’s school performance and social development were on track. Periodic sibling rivalries with his 5-year-old brother were at times troublesome but were manageable and not out of the ordinary.

Matthew was then interviewed alone. When asked why he thought he experienced the pain, he said, “I guess some kids just get it. I don’t know why.” An assessment of Matthew’s affect and interpersonal interactions did not suggest either anxiety or depression.

Matthew’s pain persisted over the next month. An antispasmodic and antacid did not provide relief. Other symptoms did not surface, and a repeat physical examination was normal.

Index terms: recurrent abdominal pain.

Martin T. Stein, MD

The experience of recurrent episodes of abdominal pain over a period of several months is a common problem among school-age children. For primary care pediatricians, these children prove to be a challenging diagnostic exercise. Although the number of precisely defined organic causes are innumerable,
most of these youngsters do not have a distinct pathophysiological cause for their episodic pain. It is this delicate interface between organic and nonorganic forms of pediatric recurrent abdominal pain that challenges the clinician. Perhaps more than any other common pediatric problem, the initial medical evaluation of these children requires a simultaneous investigation for psychosocial etiologies and organic entities. The clinical process required for this kind of evaluation and the frequent need for the clinician to manage these children in the face of diagnostic uncertainty is illustrated in this case.

Pediatricians with potentially different approaches to the management of this youngster's recurrent pain have been asked to comment. Dr. Leonard Rappaport, Associate Chief of the Division of General Pediatrics at Boston Children’s Hospital, and Dr. Carolyn H. Frazer, a fellow in behavioral pediatrics working with Dr. Rappaport, comment on Matthew’s recurrent pain from the viewpoint of a primary care pediatrician. Dr. Lonnie Zeltzer, Professor of Pediatrics at the UCLA School of Medicine, reflects on the same problem from the perspective of a pediatrician with an interest in the etiology and management of chronic pain in children. Their discussions overlap and diverge in important and clinically useful ways.

Leonard Rappaport, MD and Carolyn H. Frazer, MD

Recurrent abdominal pain, or RAP, is a common clinical problem that can be frustrating and challenging for everyone involved. The vague symptoms and recurrent pattern, as well as the suspicion that there may be more serious pathology causing the pain, cause anxiety for parents and physicians. The physician’s job should be to exclude any serious organic disease while providing ongoing support and care for the child and family. Matthew’s case highlights many of the typical presenting features of RAP and outlines an appropriate management approach for the primary care pediatrician.

Matthew is a 7 year old with a 2-month history of crampy abdominal pain (unassociated with any constitutional symptoms) who appears to be functioning well at school and home despite his abdominal pain. RAP is most common in school-age children, and studies have shown that about 10 to 15% of school-age children will have RAP at some point. The pain usually occurs intermittently over a period of several months and may interfere with daily functioning. The pain is frequently described as vague, periumbilical, or poorly localized. The difficulty in localizing the pain reflects both the enervation pattern of the abdominal viscera and the verbal cognitive abilities of children in this age group.

The etiology of the pain is unknown in the majority of cases, but about 10% will have an identifiable organic disease. A careful history and physical examination, including a rectal and neurological examination, with attention to “red flags” (see Table 1), in addition to a limited laboratory evaluation consisting of a complete blood count, erythrocyte sedimentation rate, urinalysis, urine culture in girls, and stool for ova and parasites (or Giardia antigen if available), will help the physician determine if there is organic disease.

But what about the 90% of children with RAP for whom no etiology is identified? Recent studies have attempted to look at possible physiological explanations for RAP. There is some evidence that abnormal bowel motility, constipation, and lactose intolerance may play a role in some cases. More recent work has looked at abnormalities in regulatory peptides. One paper demonstrated elevations in cholecystokinin in children with RAP compared with controls; however, the clinical significance is not clear at this time. Studies looking at the relationship of Helicobacter pylori infection in RAP have been inconclusive. In most children with RAP, the etiology is probably multifactorial and represents a complex interaction of temperament, physiology, and environment.

In Matthew’s case, the history of pain is reassuring in that it did not radiate, did not awake him from sleep, and was not accompanied by other constitutional symptoms, such as weight loss, changes in bowel habit, or genitourinary symptoms. Strictly speaking, using Apley’s criteria, the child must have recurrent symptoms over a period of 3 months to make a diagnosis of RAP. Thus, the diagnosis cannot be confirmed until Matthew’s follow-up visit 1 month later. Matthew’s physical exam, normal growth and development, and the normal laboratory findings, however, support the diagnosis of RAP.

The pediatrician’s discussion of the normal physical findings and the validation of Matthew’s symptoms are important first steps in the management of RAP. It is essential to explain your working concept of RAP at the first visit so that parents and child have appropriate expectations regarding the problem and treatment. If this discussion is given only after pursuing multiple laboratory tests and diagnostic evaluations, the parents may feel the physician is giving up and therefore may not accept the diagnosis of RAP, continuing instead to search for an answer. The child should have an understanding of his or her pain and know that even though the pain is real, it does not mean that there is something wrong. Many children secretly worry that the pain represents a truly serious problem. Matthew’s pediatrician’s explanation to him of his abdominal pain at a cognitively appropriate developmental level is also key to

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**TABLE 1. “Red Flags:” Signs and Symptoms that Reflect an Organic Form of Recurrent Abdominal Pain**

<table>
<thead>
<tr>
<th>Symptom</th>
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<tbody>
<tr>
<td>Pain further away from the umbilicus</td>
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<tr>
<td>Fever</td>
</tr>
<tr>
<td>Weight loss</td>
</tr>
<tr>
<td>Blood in stools (guaiac-positive)</td>
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<tr>
<td>Changes in bowel function</td>
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<tr>
<td>Pain awakening the child at night</td>
</tr>
<tr>
<td>Anemia</td>
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<tr>
<td>Dysuria</td>
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<td>Elevated erythrocyte sedimentation rate</td>
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Matthew is a 7 year old with a 2-month history of crampy abdominal pain (unassociated with any constitutional symptoms) who appears to be functioning well at school and home despite his abdominal pain.
managing RAP. Some experts, however, would disagree that the pain is related to emotions even in the majority of cases. Perhaps it would be better to suggest that it is true in some cases, because Matthew seems to be neither stressed nor anxious.

The outcome in RAP varies; about one-third of cases resolve spontaneously, one-third continue to have recurrent abdominal pain, and about one-third develop other pain syndromes in adolescence and adulthood, such as irritable bowel syndrome or headaches. Close follow-up is essential. The physician should reassure the parents and child that he or she will continue to follow the problem and to investigate for organic etiologies should the symptoms change in the future. It is important for the parents and child to know that although the pain may not go away, there is nothing dangerous causing it and that the child should continue with as little disruption in daily routine as possible. The major objective after determining that the pain does not represent significant pathology is to limit the pain to a “simple syndrome” with pain only, rather than an “extended syndrome” that affects other facets of the child’s life.2

There are a few therapies outside of support and consistent medical follow-up that have proven beneficial for RAP. There is some evidence that dietary adjustment may help in some cases. Decreasing dairy intake may reduce symptoms related to lactose intolerance,3 and increasing fiber may reduce constipation or dysfunctional motility, which can contribute to RAP. In the only placebo-controlled trial for RAP to yield positive results, Feldman et al,7 showed that daily intake of 5g of fiber per day in the form of a cookie significantly decreased abdominal pain during the study period. Specific medications, such as antispasmodics and antacids, are rarely effective in RAP.

In general, psychiatric counseling is not necessary unless there is a clear relationship between psychological stimuli and the pain or an extended syndrome with social withdrawal. Referral may be indicated for children with affective symptoms, such as depression or anxiety, for conversion disorder or when family dysfunction prevents adequate coping. A recent study by Sanders et al3 demonstrated the efficacy of cognitive-behavioral therapy as an addition to standard pediatric care for children with RAP who did not have psychiatric symptoms. The therapy focused on creating a supportive family environment and teaching children active coping skills.

In summary, RAP is a common problem in the school-age child that can prove quite challenging for the primary care pediatrician. After an adequate work-up, the goals in management should be educating the parents and child and reassuring them that although the pain is real, it is not dangerous. Extensive medical diagnostic evaluations should be avoided in the absence of “red flags” for organic disease. The physician should provide ongoing support and management of the problem while encouraging the child to continue his or her regular daily routine. For now, good supportive care rather than cure best aid the child and family. Matthew’s pediatrician has clearly provided such support and should feel comfortable that further referral is not necessary at this time.

REFERENCES


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This case illustrates a common problem in pediatrics, RAP. The child in this case fits Apley’s original definition of RAP syndrome.1 That is, pains are paroxysmal, occur frequently over an extended period of time, and are severe enough to cause a change in the child’s activity. The peak age of onset is approximately 5 years. In this case, the physician has asked the pertinent questions regarding the nature of the pain, associated symptoms, and the impact of the pain on the child. The physician has also learned that this child is not particularly concerned about the pain, it does not awaken him from sleep, and, although it disrupts his routine temporarily, it does not stop him from carrying out his daily activities. History from the mother reveals what appears to be a well adjusted, developmentally appropriate child who has a well functioning, cohesive family. Past medical history is uneventful, and family history is negative for gastrointestinal disorders or other medical or emotional problems. Appropriate aspects of the physical examination have been duly noted, including evaluation of developmental and psychological status. Appropriate minimalistic laboratory studies were undertaken.

After the above evaluation that revealed no significant medical or emotional clues for a pathological etiology, the physician’s approach to treatment was to assure Matthew and his mother that there was nothing “wrong” with Matthew’s body. It should be noted here that what the physician said was that evaluation did not “suggest a specific cause” for the pain. The physician then continued to illustrate with...
drawings how the gut can constrict and dilate “in response to signals from the brain” and to discuss the relation between feelings and belly aches. After this explanation, dietary recommendations were given.

Let us pause here for a moment. First, if a physician tells a child and parent that no cause for the pain can be found, many children will feel that the doctor does not believe them or, for older children, that the doctor believes that they are “crazy,” especially if a referral to a mental health specialist is made. Some parents may feel similarly, and others will believe that this particular doctor has been unable to find the cause of the pain, and they will seek further evaluation elsewhere. What the physician likely meant in this case was to reassure the child and parent that the child did not have a specific disease that, if left unchecked, would lead to further, more serious problems. Thus, choice of words can be very important regarding discrepancies between what the physician intends and what is interpreted by the family.

Next, although the physician has just told the family that the child’s physical examination and lack of associated symptoms indicate no specific cause of the pain, he/she proceeds to give an explanation of one potential cause of the pain, intestinal contractions. The physician does not indicate whether the child’s intestinal contractions are “abnormal” but describes how strong emotions could “change the tightness” of intestinal musculature, causing pain. The child is then told that sometimes children feel belly aches when they are really feeling a strong emotion. So, which is it? Do strong emotions cause the intestines to constrict and the constrictions hurt, or are strong feelings “felt” as belly pain, perhaps having nothing to do with intestinal motility?

A third possibility, not discussed by the physician, is that some children are more aware of visceral sensations and interpret these sensory signals as “pain.” Depending on the type of child and context, some children will just “notice” these perturbations but not be disturbed by them, whereas others will complain and focus on these sensations, with pain-related disruption of daily activities, including eating and defecation. It is unclear whether adult visceral hyperalgesia, formerly called “irritable bowel syndrome” when involving the gut, emanates from a subset of children who have RAP. However, barometric studies in adults indicate that RAP may result from increased sensitivity to normal intestinal motility, rather than from increased motor activity. That is, at stomach balloon inflation volumes that typically are associated with feelings of fullness, for example, some people feel pain. Barometric studies in children are suggesting similar findings.

Having indicated no specific identifiable cause for the pain and having explained the relation between feelings and belly pain, the physician’s treatment approach is dietary. The case description did not indicate whether the physician explained this unusual link among “no cause . . . intestinal contractions . . . feelings . . . pain . . . food.” Likely, by recommending a reduction in milk products in the child’s diet, the physician was testing the possible contributor of incomplete carbohydrate absorption, such as lactose (sorbitol can be another offender), to the crampy pain. Similarly, the physician was attempting to reduce pain by increasing dietary fiber and perhaps increasing gut transit time through increased consumption of fresh fruit.

Unfortunately, the above treatment strategy did not eradicate the RAP. Because there were no changes in the pain, further history was pursued with both mother and son, separately. This evaluation confirmed the absence of likely emotional triggers and suggested that the child was not particularly worried about his pain. Follow-up evaluation indicated continued pain, no new symptoms or physical findings, and no changes in the pain with the administration of an antispasmodic or antacid over the next month. The latter medications were likely not effective because neither abnormal intestinal motility nor increased gastric acidity (or even abnormal amounts of normal gastroesophageal reflux) were perpetrators of the pain.

In fact, Matthew’s comments to the physician (“I guess some kids just get it. I don’t know why”) provide clues for diagnosis and treatment. The physician might have confirmed Matthew’s hypothesis that, indeed, some kids do “just get it.” The physician might have explained how sometimes “nerves from different parts of the body, such as from the intestines, that carry messages about feelings/sensations just start sending stronger signals for no particular reason.” The physician might have reassured Matthew that these are “feeling” nerves (e.g., visceral afferents) and that his intestines are working fine and contracting normally, as they should. However, Matthew might have noticed that sometimes during the day he is aware of strong feeling signals from his belly. The physician could have then suggested that these nerves that carry feeling signals “act up” every once in a while and then quiet down again. The physician might have suggested that Matthew has two possible choices regarding these nerve signals. The first is that he could do what he is doing now, lying down or sitting quietly until the sensations are gone but noticing that gradually these signals will come less and less often, last for shorter periods of time, get weaker over time, until one day Matthew will just notice that he hasn’t had them in a while.

Alternatively, it could be suggested that Matthew might be interested in learning to use the part of his brain that controls feelings/sensations in different parts of his body, the “central control station” for his body’s feelings. By exercising this part of his brain, Matthew might notice that the nerves that carry feeling signals from his belly might quiet down faster. As this happens, the strong feelings that he notices in his belly might get weaker and weaker until he no longer notices them. If Matthew is intrigued by this latter treatment strategy and shows interest in pursuing this further, he can be shown how to relax and allow his mind to imagine being fully immersed in something fun and interesting. While he is enjoying himself, he can find the “other” part of his brain that controls the signals for feelings in his body. Examples might be provided, such as the knobs and lights
that a pilot might see at the front panel when flying a plane. Matthew might then be asked to “signal” when he has found the central control station and to then find the knob or knob/switches that control the feelings to his belly. When he has done so and signaled the physician to indicate this, he might be asked to “turn the knob/switch just enough” to allow only the amount of feelings that Matthew wants to have in his belly but to be careful to not turn the knobs too much or his belly will become numb. He can then be given suggestions to notice the beginnings of changes in the feelings of his belly. Matthew should be reassured that whatever happens is fine but that he should pay special attention to times when his belly is feeling especially good. A follow-up session will indicate the need for a few more such sessions or whether the initial reassurance and planting of “the seeds of change” suffice to reduce or eliminate Matthew’s pain. For training in the pediatric use of hypnotherapy, readers are referred to Zeltzer and LeBaron8 and to the 3-day workshop provided by the Society for Behavioral and Developmental Pediatrics at their annual meeting.

As Zeltzer et al,2 Boyce et al,9 and Barr et al10 have indicated, pain in children is a complex phenomenon that involves individual child differences in reactivity both to the environment as well as to internal visceral stimuli. Early pain experiences, as well as caregiver responses to these experiences, may help to shape the child’s ability to cope with recurrent acute pain episodes. For example, pain-related dysfunction may get inadvertently reinforced when the child is permitted to stay home from school and receive extra parental attention, especially if that parental support is perceived by the child as not being received at other nonpain times. Parental role-modeling of catastrophizing symptoms, the seeking of medical intervention for relatively minor symptoms, and the non-direct expression of emotion helps to set up a home environment ripe for a child who somatizes feelings. Thus, the trajectory of children in relation to the development of RAP as a short-lived experience versus pain as a “problem” remains a delicate balance between child temperament and the type of supportive home environment that helps the child to enhance self-regulatory skills. The key to RAP as a “pain problem” may lie not so much in episodic awareness of visceral sensations in some children but rather in the extent to which this awareness incites arousal, the amount of dysfunction produced by this awareness, and the rapidity of recovery from this episodic state.3,11

REFERENCES

Martin T. Stein, M.D.

Drs. Rappaport and Frazer emphasize the importance of establishing the correct diagnosis and provide a useful list of red flags in the history and physical examination that suggest organic forms of RAP. Both commentators credit the British pediatrician, John Apley, for clarifying RAP as a distinct entity, more than just the absence of organic disease. In addition, both commentators emphasize the significance of careful communication of findings to the parent and child at the outset of the evaluation. Drs. Rappaport and Frazer’s use of the term “working concept” allows for gathering of further information while clarifying the existence of a specific diagnostic entity. It carries the message that the pain is real but may not “represent a truly serious problem.”

Dr. Zeltzer’s commentary introduces the reader to the concept of visceral pain. She provides a roadway for thinking about the origin and potential for self-regulation of pain sensations originating in abdominal viscera. When anxiety or situational stressors are absent, as in the case of Matthew, Dr. Zeltzer suggests that the clinician can conceptualize the pain in terms of the individual patient’s response to pain. One child’s sensation of hunger may be another child’s perception of pain. This intriguing model of pain perception can be extended to therapies that incorporate the clinical tools of imaging, relaxation, and self-regulation.

John Apley not only contributed to our understanding of RAP, he also wrote that “in diagnosis, the physician should be bold.” Drs. Rappaport and Frazer describe recent clinical investigations that attempt to define subgroups of children with RAP, e.g., the role of cholecystokinin and Helicobacter pylori and a therapeutic response to a specific cognitive-behavioral family intervention. Finally, Dr. Zeltzer’s important statement that “... pain in children is a complex phenomenon that involves individual child differences in reactivity both to the environment as well as to internal visceral stimuli” provides clues to both etiology and potential treatment strategies.
Recurrent Abdominal Pain
Martin T. Stein, Leonard Rappaport, Carolyn H. Frazer and Lonnie Zeltzer
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