



Frequent stomachaches in children: a reason for concern?

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Most children will complain of a stomachache once in a while, because it is one of the most common childhood pain experiences. Complaints can range from a vague queasy feeling in the stomach to doubling over in pain accompanied by vomiting, diarrhea or constipation. Fortunately, in a majority of cases, the reasons for a stomachache are minor and relatively benign. Most often, the complaint settles without a specific diagnosis, even when a doctor is consulted.

However, some children are more prone to developing abdominal pain than others. These children experience frequent stomachaches over a period of several months to several years, which can be very disrupting in the child's life. Due to (a fear of developing) stomachaches, these children often miss out on family events, social outings with friends, and attending school. Stepping out of normal life in this way makes these children vulnerable to loneliness, anxiety, depression and low self-esteem.

In the late 1950's, the English pediatrician John Apley was one of the first to systematically study and describe this phenomenon of childhood stomachaches, which he named Recurrent Abdominal Pain (RAP). In his first monologue on RAP, Apley describes the typical situation of a child who complains of frequent stomachaches. This child has been sent home from school and may even have vomited however, by the time he arrives at the doctor's office, the pain is usually gone and upon examination nothing but indefinite tenderness in the abdomen is found. The doctor usually does not find anything definitive on which to base a diagnosis. Most likely, the child has had the stomach pain before as well as somebody in his immediate family. The pediatrician feels he or she can wait for further developments with the child but has doubts about having missed something. Was (s)he right to express only reassurances or should further investigations have been carried out? This description of the pain-prone family and doubtful physician is still true today.

What is RAP?

Apley defined RAP as at least three episodes of pain occurring within three months that are severe enough to affect the child's activities. This diagnosis is still widely used in clinical practice and research. Sometimes, Rome classification is used, with the most common diagnoses being Functional Dyspepsia (FD) or Irritable Bowel Syndrome (IBS). FD is diagnosed when there has been at least 12 weeks of persistent or recurrent pain in the upper abdomen, without evidence of organic disease and no relief with defecation or change in stool form or frequency. IBS is diagnosed when there has been at least 12 weeks of abdominal pain, without structural or metabolic abnormalities and at least two



of the following three features -- relief with defecation, change in stool frequency, or change in stool consistency. Upon careful review of RAP patients, it is found that pediatric IBS is very common - 45 to 70% of RAP patients meet Rome criteria for IBS and about 16% are ascertained to suffer from functional dyspepsia.

Nobody is in as much pain as my child

RAP patients and their parents often believe their symptoms are unlike "normal" stomachaches reported by other children. Pediatricians and gastroenterologists, on the other hand, perceive RAP as a problem that is overflowing their practices. The truth lies somewhere in between these two perspectives. RAP is one of the most common chronic pain complaints in childhood, but only 10 to 25% of children are affected. Symptoms often wane with time and spontaneous remission of RAP is likely. Yet, more than half of RAP children will continue to suffer from frequent somatic or psychological symptoms into adulthood. For example, Christensen and Mortensen reported that 11 out of the 18 RAP patients in their study suffered from abdominal pain 29 years later.

When RAP persists into adulthood, these patients are most likely to develop IBS. There are striking similarities between adulthood IBS and childhood RAP in terms of prevalence, course, medical and psychiatric co-morbidity, family medical and psychiatric history, and stressful life events. There is data to suggest that the prognosis is worse for children who have a parent who suffers from recurrent pain and for children who experience more negative life events. Therefore, although it is true that some children will eventually grow out of their stomachaches, there is a good chance that abdominal or other somatic symptoms will reoccur later in life.

Are RAP stomachaches real, imagined or faked?

Since stomachaches are notoriously used as an excuse for skipping school, they have gotten a bad reputation. A child with RAP is often thought of as a whiner who uses his bellyaches to get attention or get out of things, especially when a physiological cause for the pain cannot be identified. RAP children and their families face this type of prejudice almost daily, even among many health care professionals. However, it is important to understand that the pain of RAP is real and not faked or imagined. Even abdominal pain caused by stress or worry about going to school is usually real. Most children never think about faking it. Acknowledging the validity of RAP stomachaches is the right thing to do, but keeping a child who suffers from RAP out of school every time he or she complains is not necessary. If no other symptom, such as vomiting or fever is present, it is usually safe for the child to go to school.

Has a serious disease been overlooked?

Both parents and physicians are often doubtful about the diagnosis of RAP. There is no marker or test to identify RAP; the diagnosis is made purely on the basis of symptom characteristics. Common organic causes of abdominal pain are usually ruled out before giving a diagnosis of RAP. The list of



disorders that can cause abdominal pain is lengthy and, generally, it is neither ethically nor financially possible to test every child for all possibilities. Serious illnesses can sometimes explain recurrent stomachaches and it is important to rule these out as early as possible. Depending on the symptoms, a physician can order blood, urine and stool tests to rule out some common conditions. But, the use of X-rays, CTscans and endoscopies are usually restricted to cases in which the history or physical exam raises questions as to the diagnosis. Even with extensive testing, the odds are against finding an organic cause for a child who meets symptom criteria for RAP. In only one out of 10 cases, an organic cause can be identified and misdiagnosis is extremely rare. Even up to 20 years after an initial diagnosis of RAP, the chance of identifying an initially undiagnosed organic disorder is very low.

Is it all in your head?

Apley believed that if there is no organic cause for the pain, then the stomachaches are psychogenic. In other words, RAP patients suffer from an emotional disorder. He came to this conclusion because stress seemed to exaggerate or precede pain attacks and psychotherapy was usually effective in relieving attacks. In trying to explain the absence of abnormal physiological findings, many have followed Apley's lead and suggested these children suffer from psychological problems. RAP patients have been described as fussy, perfectionistic, high strung and anxious, and several studies have shown they suffer from more psychological problems than healthy children.

However, the landmark work of Walker & Greene has shown that anxiousness is a consequence of the presence of abdominal pain rather than a cause. RAP patients are not necessarily more anxious or depressed than patients suffering from peptic ulcer or IBD, in which the abdominal pain is caused by inflammation of the GI tract. These findings suggest that chronic abdominal pain affects patients in similar ways regardless of etiology, and the notion that RAP is a psychogenic disorder has now fallen largely out of favor. Psychosocial factors are assumed to influence GI functioning and can exacerbate symptoms, but they play only a limited causal role.

Suffering from abdominal pain does, however, generate psychological distress. It can produce not only anxiety but also increased depressive symptoms, somatization and lower self-esteem. Now it is understood that the cause of RAP is neither organic nor psychogenic, but there is close interplay between physiology and psychology.

What is causing RAP?

Although no structural abnormalities or diseases may be found, RAP patients do show some abnormal physiological characteristics. There is growing evidence that a disruption in the functioning of the GI tract is one of the major causes of RAP. This basically means that the bodies of children with RAP work somewhat differently.

This etiological model has been adapted largely from research findings on adulthood IBS. As discussed earlier, childhood RAP has many similarities with adulthood IBS and many young RAP



patients will have or develop abdominal pain in their adult life. RAP is therefore often seen as a precursor to adulthood IBS and identical etiological mechanisms have been suggested. It is important to realize, however, that few studies to date have focused on etiological mechanisms of childhood RAP compared to the extensive literature on adult IBS, and findings have not always been identical.

It has been suggested that the Autonomic Nervous System (ANS) is disrupted in RAP. The ANS consists of neurons that run between the central nervous system (e.g., the brain) and various internal organs, such as the bowels and stomach. The ANS is responsible for monitoring conditions in the internal environment and bringing about appropriate changes in them.

For example, after eating, the ANS acts to ensure the stomach and bowel contract to move the food through the digestive tract. This happens largely involuntary, although we do have some control over our bowels as is shown by people practicing yoga or under hypnosis.

It has been suggested that the ANS in RAP is weak -- it does not adapt to changes as effectively as in healthy children. For example, after stimulation of the rectum, RAP patients show slower recovery than children who do not suffer from RAP.

A second mechanism that could explain RAP is disruptions in motility (the speed with which food moves through the digestive system). In many cases, RAP is associated with either diarrhea or constipation. This seems to suggest that food is either moving too quickly or too slowly through the bowels and that this motility problem could account for the pain. Some studies have observed increased transit time in RAP patients, but these findings have not been found in all studies. Furthermore, adding fiber to the diet to slow transit time has been found to benefit only a subgroup of RAP patients.

Lately, visceral hypersensitivity has received considerable attention as one of the major pathways that causes RAP symptoms. Visceral hypersensitivity means that nerves in the gut are very sensitive: RAP patients feel pain in areas of the GI tract much more easily. Because of this heightened sensitivity, RAP children perceive 'normal' gastrointestinal events -- such as small increases in motility or gas -- as painful.

There is convincing evidence of visceral hypersensitivity in many adult IBS patients and it has been reported in children with RAP, as well. This abnormal perception of pain (low pain threshold) can be due to changes in both the central (brain) and enteric (gut) nervous system. Nerves in the gut can become overly sensitive and start reacting to events that would otherwise be ignored. The brain, on the other hand, can overreact by not inhibiting as much information coming from the gut as usual, thereby enabling more pain stimuli to pass through into our awareness. Psychological distress can augment these processes.



It should be emphasized that there might be different etiologies explaining RAP. In some children abdominal pain might be caused by disruptions in the ANS, while for others the pain is due to an increase in motility or visceral hypersensitivity, and for a third group the pain may be largely psychogenic. It is very likely that in most RAP patients multiple mechanisms can be identified that influence each other. For example, frequent severe pain due to increased motility may eventually lead to hypersensitivity for motility which, in turn, generates more pain due to heightened sensitivity to changes in motility.

What about stress?

Many parents, children and physicians understand that stress can exacerbate the pain. However, most studies so far have failed to find a clear relationship between major stressors (such as death or illness in the family, a divorce, or a move) and the occurrence of RAP. It might be possible that minor chronic stresses or daily hassles -- such as having to wait in line at the store, quarrels with siblings, constantly stopping for bathroom visits, or vigilantly monitoring what one's eating -- may be far more significant than the stress of major life events. Unfortunately, there is still little research on the effects of minor chronic stress.

Effectiveness in coping may be even more important in explaining RAP than exposure to stress. When a child is an effective coper, even high levels of stress might not affect him or her very much. By contrast, an ineffective coper is likely to become distressed when faced with only minor setbacks in life. Coping with abdominal pain and other stresses is often difficult for children who suffer from RAP. Many RAP children use avoidance strategies such as denial, avoiding thinking about it and wishful thinking which, in turn, can result in elevated levels of pain, somatic symptoms and distress. By contrast, effectively adapting to (coping with) the pain by regulating attention and cognitions (e.g., distraction, acceptance of the pain or positive thinking) are associated with less pain, fewer somatic symptoms and less distress. Acting directly on the pain in an attempt to change the environment or one's emotions (e.g., taking medications, visiting a physician, reducing stress in one's life) can be somewhat helpful, but these actions do not appear to influence the pain very much.

Are non-GI symptoms related to RAP?

Children with RAP can present with a multitude of other unexplained symptoms (co-morbidity), and the physician may wonder if these are related to the stomachaches. Co-morbid symptoms are important since they may be indicative of: (1) psychological problems that could either drive the GI symptoms or be a consequence of coping with multiple pains, or (2) more severe or longer duration of pain which can trigger pain in other areas. Relatively little is known about co-morbid somatic symptoms in RAP. About half the children who report stomach pain indicate more than one pain location. Multiple pain sites are more commonly reported by girls than boys, and they increase with age. The most common combination is headache and abdominal pain and is reported in 25% of cases with two sites of chronic pain.



In a study of RAP patients consulting a physician, the number of co-morbid symptoms was found to increase with the duration of RAP. In other words, one pain might initiate other pain. But, it could also be possible that only those patients who have multiple symptoms are seen by a doctor over a longer period of time. Another study did not find a relationship between the duration of stomachaches and the occurrence of other symptoms during a three-month follow-up of patients. However, three months might have been too short a period of time to see an effect. More research into associated symptoms, who is at increased risk, and what is causing the co-morbidity is needed.

Do more severe symptoms result in more disability?

RAP has a large impact on suffering, health care costs and functional disability. School absences are one of the most common and obvious effects of RAP, and often one of the first goals in therapy is to resume school attendance. The RAP child who misses school also tends to use more health care services. Health care resource use is particularly high among RAP patients, but not all children who suffer from RAP consult a doctor or miss school. Currently, there is little research-based insight into the characteristics of the child who is most likely to miss school and consult a physician for stomachaches.

In a study by Hyams and colleagues, only 9% to 10% of middle and high school students with RAP reported they had seen a doctor for abdominal pain within the last year. But, students who did visit a doctor for abdominal pain reported increased pain severity, frequency and duration and more disruption of their lives. In a study by Venepalli and colleagues, health care consulting and school attendance of middle school children could not be predicted by pain intensity or psychosocial distress of either the mother or the child. Identification of children who show high levels of functional disability is important, because this would allow for targeting (preventive) interventions, determining cost-effectiveness of care, and preventing poor academic performance due to school absences.

Are the parents to blame?

Physicians confronted with an anxious parent of a child with RAP often feel these parents play a major role in the maintenance and exacerbation of the symptoms.

Parents for RAP children, on the other hand, feel they have no control over the situation and do not appreciate being 'blamed' for their child's symptoms. It is important to understand that a disorder seldom affects only the patient. People around the person in pain are affected, as well -- they can be stressed about the pain and its meaning. In fact, many parents of children who suffer from abdominal pain show increased levels of anxiety and somatization themselves. This is a normal reaction and does not imply that parents cause RAP. However, parental beliefs, stress, and coping strategies are of great influence on the child's pain perception of pain. Children are still developing their coping repertoires and look to adults for guidance about when to get anxious or worried and



how to deal with symptoms. When a child is sick, in pain or discomfort, parents have the difficult task of interpreting the seriousness of the symptoms and deciding how to take action. Any parental action or reaction will influence how their children approach future illness and health.

How can a doctor help a child who suffers from RAP?

Standard medical care for RAP consists of (1) limited medical tests to rule out organic diseases, (2) acknowledgment that the pain is real, (3) reassurance that there is no illness causing the pain, and (4) advice on how to cope with the symptoms. Parents and children need to be partners with their physician in their health and health care. Since most patients visit a physician in search of a 'cure,' it is important for physicians to explain that RAP is a chronic condition and that returning to normal life as much as possible is the goal, rather than complete pain relief. Medications can be given to treat accompanying symptoms, such as constipation. Many RAP patients may come to the doctor's office with questions about diet. In fact, most of them will have changed their eating behavior before seeing a doctor.

They may propose that food sensitivities, unhealthy diets or dysfunctional eating patterns are possible causes of the symptoms. At this time, there is only limited data on the effects of diet on RAP symptoms. The most extensively studied are the influence of lactose malabsorption and lack of sufficient fiber in the diet. Many parents will have placed their children on a lactose-free diet, but the majority of patients do not report benefits from this dietary restriction. Even lactoseintolerant children do not necessarily see a significant improvement in their RAP symptoms, suggesting that lactose intolerance might be an additional dysfunction the child is dealing with but it is not a major cause for the stomachaches. As mentioned above, fiber therapy can be helpful in some cases, but the currently limited research data is conflicting with regard to its benefit. Nevertheless, some suggest that because of its low cost and low risk, it might be worthwhile to try high fiber therapy in children presenting with RAP.

Although standard medical care can result in significant improvements, many RAP patients need additional therapy. Psychological therapies such as Cognitive Behavioral Therapy (CBT) have been found to be effective in treating RAP. CBT teaches children and/or their parents to change unhelpful thoughts about the disorder and learn effective coping skills, and it is often combined with relaxation exercises. CBT has been shown to produce significant improvements in pain, health care utilization and school attendance. Unfortunately, these therapies are not available to a majority of the RAP patients. They require multiple meetings with a highly trained therapist, insurance often does not necessarily cover these costs, and most physician offices lack the time and resources to implement such a program. There is a need for effective psychological treatments for RAP that are more accessible.



There is no quick fix for RAP and the road to recovery can be bumpy and challenging for all parties. Patients and their families may feel misunderstood and discouraged by relapses. Physicians might feel they are not able to convey their message to the family or lack the time to give adequate coping advice. Although RAP is a very challenging disorder, there are many ways in which children, their parents and physicians can help to ease the pain. No one approach will work in every child, but the right combination of understanding the disorder and its causes, medications, reduction of stress, changes in eating and bowel movement patterns, coping advice, and encouragement to fully participate in school and social life can be of great benefit in managing, reducing and controlling the pain. For many children, the care and encouragement of a good physician will be sufficient to take control over the symptoms.

However, for children needing additional care, it can be challenging to find the right therapist or therapies. This gap is recognized and more research is being done in developing behavioral interventions. For example, the UNC Center for Functional GI & Motility Disorders is currently partnering with Dr. Rona Levy at the University of Washington to test a short Cognitive Behavioral Therapy for RAP in which both the children and parents are involved. At UNC, we are also in the process of developing a hypnosis program for RAP that can be used by any health care professionals without extensive training, making it more widely available to many patients. Some pediatric gastroenterologists are already teaming up with therapists who have specialized in pediatric GI disorders.

In sum, the most important intervention for children who suffer from recurrent abdominal pain is to reassure them that we understand their pain is real but also that it can be managed with appropriate medical care and/or psychological therapy.

Selected reading (a complete reference list can be obtained from the author)

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