



A 12-year-old boy presents with a history of abdominal discomfort of 11 month's duration. The discomfort pain is located in the right, left, and mid-upper abdomen. There is no association of the pain with activity, position, meals or food type, nor any with bowel movements. The abdominal discomfort occurred more commonly in the morning. The pain may last as long as 4 hours. He often experiences nausea when he has the pain and vomits at least once a week. Bowel movements occur once a day and are not related to pain.

Dyspepsia refers to pain or discomfort centered in the upper abdomen. The symptom characteristics of dyspepsia in children are pain and discomfort in the upper middle region of the abdomen. Individuals often describe the pain as occurring around eating, after eating, or at night. The discomfort can be a sensation of fullness after meals, an early feeling of having had enough to eat (satiety), bloating, belching, nausea, retching, vomiting, regurgitation, anorexia, or food refusal.

Each of these symptoms can be due to either an organic disease or functional gastrointestinal disease. In children, an organic cause is suggested if the following circumstances are present:

- Young age (less than 5 years of age)
- Fever, weight loss, or slowing of growth
- Bile-stained or blood-stained vomitus
- Pain that awakens the child from sleep
- Referred pain to the back, shoulders or arms
- Pain with urinating
- Blood in the urine
- Side ache (flank pain)
- Inflammation or tears in the anal area (Perianal disease)
- Blood in the stool
- Abnormal screening laboratory tests
- A family history of inflammatory bowel disease or peptic ulcer disease

The list of causes that must be ruled out before a diagnosis of functional dyspepsia is made is lengthy and includes upper gastrointestinal inflammation; motility disorders; pancreatic, biliary or urinary disease; and psychiatric disease.

Functional dyspepsia is not rigorously defined in children. Therefore, the adult criteria developed in Rome in September 1997 were adopted for children. In children mature enough to provide an accurate history, the criteria for diagnosis of dyspepsia are: 1) Persistent or recurrent pain or discomfort centered in the upper abdomen, and 2) No evidence (including an upper *endoscopy*) that organic disease is likely to explain the symptoms, and 3) No evidence that dyspepsia is exclusively relieved by defecation or associated with the onset of a change in stool frequency or stool form. Pain or discomfort in the upper abdomen has to be present at least 12 weeks, which need not be consecutive, within the preceding 12 months.

Functional dyspepsia is divided into three subgroups depending upon the predominant symptom(s). In *ulcer-like dyspepsia*, the predominant symptom is pain centered in the upper abdomen; the pain is often relieved by food or antacid therapy and may wake the child from sleep. *Dysmotility-like dyspepsia* is distinguished by an unpleasant or troublesome but non-painful sensation or discomfort centered in the upper abdomen as the predominant symptom. This sensation may be characterized by or associated with upper abdominal fullness, early satiety, bloating or nausea. *Non-specific dyspepsia* occurs in individuals with symptoms that do not fulfill criteria for either ulcer-like or dysmotility-like dyspepsia.

There are limited data on the cause and development of dyspepsia in children, and the results are similar to those found in adults. A motility disorder has been suspected by some based on studies that show evidence for irregular gastric electrical rhythm and delayed emptying of the stomach and duodenum, or abnormal motility as evidenced by backwards movement of the stomach and duodenum. Whether these irregularities cause dyspeptic symptoms is not clear, but a slowly emptying stomach, or a backward flow of food from the duodenum to the stomach, may be important.

A study by Hyman, et al, demonstrated some of these abnormalities in 39 of 44 children and adolescents with functional upper gastrointestinal symptoms. A study by Pineiro Carrero et al, also demonstrated that patients with functional abdominal pain have more abnormal electrical activity in the stomach with slower movement of stomach contents as

compared to healthy controls. In addition, these patients also had high-pressure duodenal contractions that were associated with abdominal pain during the study period.

#### DIAGNOSIS

As with many other conditions, a thorough and detailed history taken by a physician is the most important component of the assessment and often leads to the correct diagnosis. The history needs to include dietary, psychological, and social factors. A history may disclose a relationship between symptoms and food, activity, or stressors. It is often helpful to have the child and parents maintain a symptom diary detailing the time, location, intensity and character of the pain or discomfort, time and content of the meals, daily activities, and stool pattern.

Considerable diversity of opinion remains among physicians regarding the extent of diagnostic tests to perform in a child who seems to have a symptom constellation pointing towards a functional cause of the dyspepsia. The diagnostic procedure needs to be individualized, according to the information obtained during the history taking and the physical examination.

#### DIAGNOSTIC TESTS

**Endoscopy** is an examination of the lining of the esophagus, stomach, and upper part of the small intestine using a thin flexible tube (endoscope) with a small video camera on the tip of the scope.

**Ultrasonography** is a diagnostic method that uses sound waves to create representative images.

Gastroduodenal *manometry* is a test that measures pressure changes that occur within the stomach and upper intestine.

*Urine evaluation and blood evaluation to screen for organic disease are usually necessary. Endoscopy allows the discovery of ulcerations or significant inflammation in the upper gastrointestinal tract. If the endoscopy is normal, then it may be helpful to monitor for acid reflux (back flow of stomach contents into the esophagus). Abdominal ultrasonography does not appear to be helpful in children. Upper gastrointestinal x-rays with small bowel follow-through are useful to exclude physical causes such as malrotation [incorrect position of the intestine in the abdomen], terminal ileitis [Crohn's Disease], and other obstructive or inflammatory lesions. Gastroduodenal manometry is a feasible and useful diagnostic tool in the clinical investigation of children when symptoms suggest altered upper gut function and may provide a basis for a treatment approach with drugs acting on motility of the stomach and the small bowel.*

#### TREATMENT

The management of dyspepsia revolves around an organic or functional cause. If an organic cause is found, the treatment can be specific to the underlying cause. For functional dyspepsia, the aim is to provide symptomatic relief.

Reduction or avoidance of spicy, fatty, or caffeine-containing food or drink may help if associated with symptom onset. Medications such as prokinetic agents [increase gastrointestinal motility], H2-blockers [reduce amount of acid produced in the stomach], proton pump inhibitors [limit amount of acid produced], and low dose tricyclic antidepressants [to help reduce pain] have been used with some success. It is now clear that ulcer-like dyspepsia has its basis in altered gastrointestinal motility and may respond to propulsive agents to help control movement.

H2-blockers and prokinetic agents are used in children when continued dyspeptic symptoms interfere with normal daily activities and school. There remains a proportion of children who may have a behavioral or psychological base to their complaint. For them, treatment that involves environmental modification, relaxation techniques, psychotherapy, stress reduction, hypnotherapy, or biofeedback have been used with variable success.

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