



Gastroesophageal Reflux in Infants and Children

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Introduction

This guide is intended to answer some commonly asked questions from parents/caregivers of infants and children with gastroesophageal reflux. Every child is an individual, and every family is different. We recommend that you discuss your child's problems with a health care professional.

What is GER?

Gastroesophageal reflux (GER) is the movement of stomach contents into the esophagus. In infants, the most common symptom of GER is regurgitation.

What is GERD?

Gastroesophageal reflux disease (GERD) refers to symptoms or tissue damage caused by GER.

What is gastrointestinal motility?

Gastrointestinal motility is defined by the movements of the digestive system, and the transit of the contents within it. Gastroesophageal reflux is considered a motility problem.

Is gastroesophageal reflux dangerous?

In most infants, GER is a benign condition. Spitting up is within the expected range of normal events for the developmental stage. In the great majority of "happy spitters" the symptoms resolve after six to eight months. A minority of healthy infants, and many with pre-existing conditions are at risk for developing GERD. In certain infants, and in older children, it is important to look for "alarm" signs and symptoms requiring the need for immediate evaluation and treatment. If an infant refuses to eat, or fails to grow at the expected rate, if there is blood in the regurgitated material or in the stool, medical attention should be sought. Other serious chronic medical problems, especially those involving the immune system (e.g., chronic infection, Lyme disease, chronic fatigue syndrome), gastrointestinal tract, lungs, nervous system, or muscles, may place a child at risk for gastroesophageal reflux disease. If there are no alarm signs or symptoms, then the task of the health care provider is to develop an

alliance with the parents/caregiver to guide them and their infant through a transient period of bothersome but harmless regurgitation.

For the infant with frequent regurgitation with no abnormal signs or symptoms ("happy spitter"), no tests are needed, but there are interventions which may decrease the regurgitations and reduce the chance of gastroesophageal reflux disease.

Lifestyle changes

- Thicken feedings: Use between 1/2 and 1 tablespoon of rice cereal to each ounce of formula. This meal may be more satisfying to the infant than formula alone. There may be a decrease in the frequency of spitups, and there is less fussing and crying.
- Provide frequent feedings every two to three hours while awake; do not overfeed. The stomachs of immature infants empty faster when they are not too full.
- Based on guidelines set forth by the American Academy of Pediatrics, the infant should be positioned with their right side down or with their head elevated in a supine position (on the back)—especially during the first hour after meals.
- Identify and attempt to reduce stress, especially around mealtime. Sometimes a parent/caregiver becomes so anxious about the spitting up that mealtime becomes extremely stressful.

Therapeutic comfort requires that the parent/caregiver and child change their daily routines to reduce stress, especially around feeding times. This means finding a way to provide the parent/caregiver some respite, and allowing the child to eat and digest in a relatively unstimulating environment.

Lifestyle changes should receive a trial for several weeks. When they work, they are continued for several months.

What is esophagitis?

Inflammation in an infant's esophagus is called esophagitis. Most often esophagitis results from frequent or prolonged contact with acid that is normally produced in the stomach. Esophagitis may cause refusal to eat, bleeding, and irritability. Arching the back is sometimes a sign of esophagitis in infancy.

Lung disease

Several groups are at risk for gastroesophageal reflux-associated lung disease. In some children with asthma, symptoms are caused in part by gastroesophageal reflux. Minute amounts of material from the stomach which come back up into the throat may be inhaled into the lungs (aspiration). Sometimes acid in the esophagus may stimulate nerves that cause wheezing. Children with cystic fibrosis often suffer from heartburn. Pre-term infants who develop bronchopulmonary dysplasia [abnormal development of the lungs and their air passages], the chronic lung disease of the newborn, may have gastroesophageal reflux adding to their problems. Children with nerve or muscle disorders (e.g., muscular dystrophy and cerebral palsy) that disturb their swallowing are at risk for pneumonia that results from refluxed material going down the trachea into the lungs. Children who have had successful surgery to repair a congenital blind end to the esophagus (esophageal atresia) are also at risk. Children with these conditions often benefit from treatment for gastroesophageal reflux.

Diagnostic tests

Often, the first test performed is a **barium swallow and upper gastrointestinal x-ray series** to assess for structural problems such as hiatal hernia [a small opening in the diaphragm that allows the upper part of the stomach to move up into the chest], pyloric stenosis [a narrowing of the opening between the stomach and the small intestine], and malrotation [twisting of the intestine that may result in obstruction]. The child must drink a chalky substance called barium, which shows up white on the x-ray. The most important reason for doing a barium swallow is to make sure there is normal anatomy, and not a hiatal hernia or some other anatomic cause predisposing to gastroesophageal reflux. However, the barium study is a poor test for reflux itself. In children with a hiatal hernia, the top of the stomach moves through a hole in the diaphragm into the chest. A hiatal hernia is not synonymous with gastroesophageal reflux disease but may be a contributing factor.

Gastroesophageal reflux may cause pulmonary complications. **Prolonged intraesophageal pH monitoring** may document that incidents of reflux immediately precede breathing difficulties, wheezing, or coughing episodes. To do this study, a thin plastic tube is

passed through a nostril and into the esophagus. It is taped securely to the nose, and attached to a portable recording device. After a day of recording, the results are analyzed. Since everybody has some reflux, often it is especially important to record the child's symptoms and activities in a diary, so that associations can be made between the episodes of reflux and the symptom.

Scintiscans (milk scans) over the lungs may detect aspiration. The child drinks formula with a tiny, harmless amount of radioactivity in it. Then the child must lie quietly on a hard table under a large metal disc that is a camera which measures the movement of the radioactivity.

If the child is inhaling formula, radioactivity shows up in the lungs. Neither pH monitoring nor scintiscanning is very sensitive for proving that reflux is causing lung problems, but they are worthwhile studies in some children with persistent symptoms. Most often when gastroesophageal reflux is considered to be involved in the development of pulmonary disease, a treatment trial is warranted, even if tests are unrevealing.

The best diagnostic test for esophagitis is the **esophageal biopsy**, which is often accomplished at the time of an **upper gastrointestinal endoscopy**. For endoscopy, the child is sedated, and a flexible plastic tube with a tiny camera on the end is inserted through the mouth, down the throat, and into the esophagus and stomach. During this test, which takes about 15 minutes to do (but several hours for preparation and recovery), the esophageal and stomach walls are carefully inspected for signs of inflammation. Biopsies are pinhead-sized pieces of the surface tissue layer that are inspected under a microscope. Results from the endoscopy are immediate: hiatal hernias, ulcers, and inflammation are readily identified. Precise diagnoses sometimes require the biopsy results, which are complete a day or two after the endoscopy.

Sometimes it is necessary to evaluate the possibility that gastroesophageal reflux disease is a consequence of a more generalized problem with the strength or coordination of the contractions which help to move food through the digestive system. A **gastric emptying study** measures the time it takes for food to leave the stomach. It is a useful screening test, especially when the results are normal. It is the same test as a scintiscan, but measurements are focused on the speed by which a meal leaves the stomach instead of detecting refluxed material in the lungs. (Both aspects can be measured simultaneously if need be.)

Many children find this test bothersome because they must be still under a camera for several minutes at a time. Therefore, mildly abnormal results must be interpreted cautiously in infants and toddlers, because anger, excitement, and fear may delay gastric emptying.

Treatment options

The advantage of lifestyle changes is that they cost nothing and have no associated risks. The disadvantages are that they limit the range of parent and infant behaviors, so that carrying out the advice may be difficult. For example, maintaining the recommended positioning after meals often is not possible after the first two months, as the infant becomes active.

Medications may be used to treat GERD. Be sure to discuss the use of any medication with your child's physician.

Antacids rapidly soothe heartburn, but are only effective for short periods of time. They have limited ability to treat esophagitis. A liquid suspension for children is available. Aluminum-based antacids should be avoided in young infants and children with renal disease.

Alginic acid (Gaviscon and Algicon) floats upon the liquid in the stomach after a meal. The alginate molecules bond together, increasing the surface tension at the top of the food, thereby diminishing reflux that occurs after a meal.

Promotility agents act in the esophagus and/or stomach to improve motility. However, the side effects associated with the use of promotility agents may be significant. Be sure to discuss this with your physician.

H₂-receptor antagonists suppress, or reduce, the amount of acid produced in the stomach. H₂-receptor antagonists differ from antacids because they are able to prevent heartburn, not just relieve it.

Proton pump inhibitors limit acid secretion in the stomach. In the adult population, proton pump inhibitors facilitate rapid resolution of symptoms and healing of the esophagus in 80-90% of patients. The use of proton pump inhibitors (PPI's) has been evaluated in the pediatric population. Published studies in adults and children indicate that PPI's are superior to H₂-receptor antagonists and promotility therapy in promoting the healing and preventing reoccurrence of esophagitis. It has been shown that the weight-based dose of these medications is higher than that used in adults. Recent evidence confirms nighttime break-through acid secretion in patients receiving PPI's may occur. Concomitant administration of an H₂-receptor antagonist in the evening appears effective in such individuals.

Sucralfate adheres to inflamed tissues—protecting the underlying tissue from the effects of refluxed acid. It also promotes the production of prostaglandins which facilitate healing of the esophageal tissue. Because of the timing of its administration, the use of sucralfate has been limited.

In otherwise healthy children, surgery is rarely needed for the treatment of gastroesophageal reflux disease. Be sure to discuss the risks and the benefits of surgery with your child's physician and surgeon. Many children with

pulmonary, neurological, and muscular skeletal disorders may benefit from anti-reflux surgery. The most common operation for gastroesophageal reflux disease is the fundoplication. The top of the stomach is wrapped around the bottom of the esophagus. Successful in a majority of children, fundoplication reduces gastroesophageal reflux for many years. A gastrostomy, or an opening in the side of the stomach, often is created during surgery to serve as an "escape valve" for gas and fluid in the first few postoperative days. The gastrostomy tube may be left closed or opened to remove stomach contents or infuse liquid food or medicines into the stomach. The gastrostomy tube may be removed when it is no longer needed, any time between several days and many years later. When the gastrostomy tube is removed, the opening into the stomach heals over within a few days.

Children with motility disorders involving the stomach and small bowel may have symptoms and signs of GERD. In the child with gastroesophageal reflux symptoms associated with a generalized gastrointestinal motility disorder, a gastrostomy alone is often useful. The gastrostomy may be used to empty the stomach of gas and fluid when the child is feeling bloated, nauseated, or in pain. A food supplement may be infused into the gastrostomy tube to provide nutrition for children who can't or won't eat. A longer, thin plastic tube may be threaded through the gastrostomy into the small bowel to provide a route for slow continuous tube feedings.

Fundoplication is often ill advised for children with generalized motility disorders, because the operation does not alter the abnormal delays in transit that are at the root of the problem.

Conclusion

Remember, in most infants, GER is a benign condition. If you suspect your child may be suffering from reflux, the first step is to consult a physician and obtain an accurate diagnosis. Then work in partnership with your child's physician to initiate the best treatment plan.

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