

ENT SURGICAL CONSULTANTS

Thomas K. Kron, MD, FACS
Michael G. Gartlan, MD, FAAP, FACS
Rajeev H. Mehta, MD, FACS
Scott W. DiVenere, MD
Sung J. Chung, MD
Ankit M. Patel, MD

2201 Glenwood Ave., Joliet, IL 60435
(815) 725-1191, (815) 725-1248 fax

1300 Copperfield Ave., Suite 3060, Joliet, IL 60432
(815) 727-6031

119 E. Jefferson St., Morris, IL 60450
(815) 941-1972

REFLUX IN INFANTS & CHILDREN (12/05)

What is Reflux?

Food or liquids that are swallowed travel through the esophagus and into the stomach where acids help digestion. Each end of the esophagus has a valve, a ring of muscle, that helps keep the acidic contents of the stomach in the stomach or out of the throat. When these rings of muscle do not work properly, you may get gastroesophageal reflux (GER). Chronic GER is often diagnosed as gastroesophageal reflux disease (GERD). Sometimes, acidic stomach contents will reflux all the way up to the esophagus, past the ring of muscle at the top (upper esophageal valve), and into the throat. When this happens, acidic material contacts the sensitive tissue at back of the throat and even the back of the nasal airway. This is known as laryngopharyngeal reflux (LPR).

During the first year, infants frequently spit up. This is essentially LPR because the stomach contents are refluxing into the back of the throat. However, in most infants, it is a normal occurrence caused by the immaturity of both the upper and lower esophageal valves, the shorter distance from the stomach to the throat, and the greater amount of time infants spend in the horizontal position. In infants, more than 50 percent of children three months or younger have at least one episode of regurgitation a day. This rate peaks at 67 percent at age four months. But an infant's improved neuromuscular control and the ability to sit up will lead to a spontaneous resolution of significant reflux in more than half of infants by age ten months and four out of five at age 18 months. One important thing to remember, over 90% of children who have reflux will outgrow it.

Only infants who have associated airway (breathing) or feeding problems require evaluation by a specialist. This is most critical when breathing-related symptoms are present. Researchers have found that 10 percent of infants (younger than 12 months) with GERD develop significant complications. It is estimated that some five to eight percent of adolescent children have GERD.

What are symptoms of LPR?

There are various symptoms of LPR. Adults may be able to identify LPR as a bitter taste in the back of the throat, more commonly in the morning upon awakening, and the sensation of a "lump" or something "stuck" in the throat, which does not go away despite multiple swallowing attempts to clear the "lump." Some adults may also experience a burning sensation in the throat. A more uncommon symptom is difficulty breathing, which occurs because the acidic, refluxed material comes in contact with the voice box (larynx) and causes the vocal cords to close to prevent aspiration of the material into the windpipe (trachea). This event is known as "laryngospasm."

Infants and children are unable to describe sensations like adults can. Therefore, LPR is only successfully diagnosed if parents are suspicious and the child undergoes a full evaluation by a specialist such as an otolaryngologist. Airway or breathing-related problems are the most commonly seen symptoms of LPR in infants and children and can be serious. If your infant or child experiences any of the following symptoms, timely evaluation is critical.

- Crying/irritability along with other symptoms one hour, or more a day
- Failure to thrive (a severe deficiency in growth such that an infant or child is less than five percentile compared to the expected norm)
- Baby has poor weight gain or weight loss
- Frequent regurgitation, wet burps, spitting up or vomiting
- Hiccups
- Stomach aches or chest pain (heartburn)
- Baby shows discomfort eating (i.e. refusal to eat, stiffens up, arches back (opisthotonus), tries to push away from the bottle)
- Poor appetite/feeding and swallowing difficulties
- Frequent choking episodes

- Aspiration
- Turning blue (cyanosis)
- Pauses in breathing (apnea)
- Apparent life threatening event (ALTE)
- Laryngeal and tracheal stenoses
- Chronic cough
- Hoarseness
- Noisy breathing (stridor)
- Croup
- Reactive airway disease (asthma)
- Sleep disordered breathing (SDB)
- Recurrent pneumonias
- Sore throat
- "Sour" breath
- Chronic nasal and/or sinus congestion (from aspiration), chronic sinusitis
- Ear infections/fluid
- Dental caries

What are the complications of LPR?

In infants and children, chronic exposure of the laryngeal structures to acidic contents may cause long term airway problems such as a narrowing of the area below the vocal cords (subglottic stenosis), hoarseness, and possibly eustachian tube dysfunction causing recurrent ear infections, or persistent middle ear fluid, and even symptoms of "sinusitis." The direct relationship between LPR and the latter mentioned problems are currently under research investigation.

How is LPR treated?

Since LPR is an extension of GER, successful treatment of LPR is based on successful treatment of GER. In infants and children, basic recommendations may include smaller and more frequent feedings and keeping an infant in a vertical position after feeding for at least 30 minutes. A trial of medications including H2 blockers or proton pump inhibitors may be necessary. Similar to adults, those who fail medical treatment, or have diagnostic evaluations demonstrating anatomical abnormalities may require surgical intervention such as a fundoplication.

How is LPR diagnosed?

Currently, there is no good standardized test to identify LPR. If parents notice any symptoms of LPR in their child, they may wish to discuss with their pediatrician a referral to see an otolaryngologist for evaluation. An otolaryngologist may perform a flexible fiberoptic nasopharyngoscopy/laryngoscopy, which involves sliding a small scope through the infant or child's nostril, to look directly at the voice box and related structures or a 24 hour pH monitoring of the esophagus. He or she may also decide to perform further evaluation of the child under general anesthesia. This would include looking directly at the voice box and related structures (direct laryngoscopy), a full endoscopic look at the trachea and bronchi (bronchoscopy), and an endoscopic look at the esophagus (esophagoscopy) with a possible biopsy of the esophagus to determine if esophagitis is present. LPR in infants and children remains a diagnosis of clinical judgment based on history given by the parents, the physical exam, and endoscopic evaluations.

Reflux Precautions for Infants

- Elevate the head of the bed to a 30 degree angle and position the child in a prone position (on tummy). This helps to minimize the night refluxing and aspiration. This can be achieved in a variety of ways. You can put the head of the mattress on the top rung of the crib and the bottom of the mattress on the bottom rung. You can also put a pillow under the crib mattress. You can also put something stable under the legs of the crib, bed or bassinet. A Tucker Sling (see below) is a useful device to assist in appropriate positioning.
- Avoid laying the child flat as much as possible.
- Avoid infant car seats, infant swings, and other infant seats, which put excessive pressure on the abdomen and worsen reflux.
- Avoid tight or constricting clothing
- Continue breast feeding: Reflux is milder in babies that breast feed.
- Thickening of feeding has been recommended for years as therapy for reflux in infants. This can be achieved by adding infant cereal to breast-milk or formula. The usual amount is between 1 and 3 teaspoons cereal per ounce of formula or breast milk. Rice cereal can be used but will often cause constipation so oatmeal is recommended.

Also--if you are using powdered formula, try switching to a thicker variety--concentrate or the thickest of them all, ready-to-feed. Also, remember that breastmilk is of a thinner consistency than either concentrate or ready-to-feed formulas, so a little more cereal may be needed. If your child improves with thickened feedings, then you could consider changing to Enfamil AR (added rice) which is thicker than most formulas.

- Feed Smaller Amounts: Reflux is always worse with overfeeding. It is better to feed your infant small amounts more frequently than giving a large amount and overfilling the stomach.
- Frequent Burping: You should try to burp your child frequently during each feeding.
- Keep the child upright for 30-45 minutes after feeding.
- Eliminate exposure to secondhand smoke.

Reflux Precautions for Children

- Avoid supine (back laying) or semi seated position
- Elevate head of bed
- Fast before sleeping
- Avoid large meals (smaller but more frequent feedings instead)
- Diet - if overweight or obese (obesity has been linked to reflux)
- Avoid tight fitting clothes
- Avoid tobacco smoke
- Avoid medications that decrease the LES (Lower Esophageal Sphincter) pressure or increase gastric acidity
- Avoid adrenergic medication
- Avoid anticholinergics
- Avoid calcium-channel blockers
- Avoid prostaglandins
- Avoid xanthenes (caffeine, theophylline)
- Avoid foods that decrease the LES pressure or increase gastric acidity. such as alcohol, coffee or anything with caffeine, carbonated drinks, fatty foods, citrus fruits (and citrus fruit juices), tomatoes, peppermint, chocolate, and mint
- Chewing sugarless gum

Tucker Sling

Tucker Designs 1-888-236-9275 (www.tuckersling.com)

A one-piece positioning system used to support babies in an elevated position. The Tucker Sling attaches to a mattress like a fitted sheet. The baby is held firmly in place with adjustable Velcro straps, which allow for easy access. It also maintains the infant in an elevated position.

Commonly Used Medications

Most of the medications prescribed to treat GERD either break down or lessen intestinal gas, decrease or neutralize stomach acid, or improve intestinal coordination. Your physician will prescribe the most appropriate medication for your child.

- *Zantac* reduces the amount of acid the stomach produces.
- *Reglan* speeds up the rate of digestion (motility). This means that the stomach empties faster which in turn means less acid to reflux.
- *Prevacid* blocks acid production in the stomach.
- *Nasonex*, *Flonase*, *Rhinocort*, and *Nasocort* are topical nasal steroid sprays. These sprays safely decrease inflammation and swelling in the nose often caused by the acid reflux into the nose. Infants under 6 months of age may have severe respiratory problems when their nose becomes congested. Unless they are crying, infants are not able to adequately mouthbreathe at rest due to the anatomy at the back of the throat.

Surgical Treatment

It is rare for children with GERD to require surgery. For the few children who do require surgery, the most commonly performed operation is called Nissen fundoplication. With this procedure, the top part of the stomach (the fundus) is wrapped around the bottom of the esophagus to create a collar. After the operation, every time the stomach contracts, the collar around the esophagus contracts preventing reflux.