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# “Hoarse Voice, Chronic Cough and Sore Throat”

## Diagnosis: ‘Silent’ Reflux

### What is LPR?

Laryngopharyngeal Reflux Disease (LPR) is an extra-oesophageal disorder of gastroesophageal reflux (GERD). Recognized since 1960s, LPR represent extra-oesophageal complications due to reflux of gastric acid and contents up to the larynx/pharynx. Other terms used to describe this condition include ‘atypical reflux’ and ‘silent reflux’.

Prevalence of LPR is rapidly increasing and are diagnosed and treated primarily by ENT surgeons. Altman *et al* reported a 500% increase in visits to the otolaryngologist due to LPR between 1990 and 2001. Moreover, it is estimated that LPR is present in more than 50% of patients with dysphonia.

Although these symptoms were previously thought to constitute part of the spectrum of GERD, laryngopharyngeal reflux is today thought to be a distinct entity and should be managed differently. In a large study including 899 patients, throat clearing was observed in 87% of patients with LPR versus only 3% of patients with GERD. On the other hand, only 20% of the patients with LPR reported heartburn or a burning sensation compared with 83% in the group with GERD. The body of evidence on causation, diagnosis, and treatment of these increasingly diagnosed disorders is still very much evolving.

### What are the symptoms of LPR?

There are many symptoms of LPR, all of which relate to sensations in the throat:

- Dysphonia
- Sensation of a lump in the throat (Globus)
- Throat clearing
- Sensation of excess mucous stuck in the throat and/or post-nasal drip
- Chronic cough, choking and laryngospasms
- Difficulty swallowing
- Sore throat
- Feeling of something caught in the throat (sometimes a tickling sensation)
- Halitosis
- Dry throat and altered (metallic) taste

Globus sensation, chronic throat clearing, and gravelly voice are the three most common presenting symptoms of LPR. Chronic throat pain, the sensation of choking as well as chronic cough, may also be frequently experienced. Although heartburn is a primary symptom among people with GERD it is not commonly associated with LPR, and studies suggest that perhaps only 6% of patients with LPR have heartburn or clinically significant gastroesophageal reflux disease (GERD).

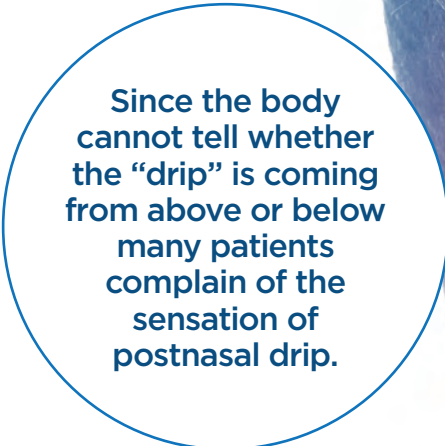
## What causes LPR?

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In contrast to the more robust lower oesophagus, the larynx and pharynx have no defense mechanisms to gastric reflux contents resulting more pronounced response to these substances. It is known that refluxing as little as two times per week can have significant effects on the larynx. The delicate ciliated epithelium of the respiratory tract is sensitive to damage. Dysfunction in the cilia leads to mucus stasis. The stasis of mucus produces sensations that provoke chronic throat clearing. Since the body cannot tell whether the “drip” is coming from above or below many patients complain of the sensation of postnasal drip.

Direct irritation of the upper airway by gastric reflux can cause laryngospasm, producing symptoms of chronic coughing and choking. The combination of direct injury by reflux and symptoms such as chronic laryngospasm and throat clearing then lead to vocal cord edema, contact ulcers, and granulomas that cause symptoms such as hoarseness, globus pharyngeus, and sore throat.

The benefit of empiric anti-reflux treatment as reported by multiple observational studies that have led clinicians to associate chronic extraesophageal reflux of gastric acid to the chronic laryngeal symptoms and findings. However, the precise cause of LPR is poorly understood, and the cause-effect relationship has been difficult to establish. Although a significant subset of these patients may have abnormal esophageal acid exposure, in many patients, typical esophageal reflux symptoms or esophagitis are absent. Further, there is a high response rates to placebo-only (non-PPI) treatment, suggesting a much more complex and multifactorial pathophysiology of LPR than simple acid reflux.



**Since the body cannot tell whether the “drip” is coming from above or below many patients complain of the sensation of postnasal drip.**

## How is LPR diagnosed?

There is no specific diagnostic test or universally accepted diagnostic criteria for LPR. One challenge in diagnosis is that the multiple symptoms of LPR lack sufficient specificity to confirm LPR and thus it is important to rule out other, potentially more serious, causes. Belafsky *et al* developed the Reflux Symptom Index (RSI), a nine-item questionnaire, for the assessment of symptoms in patients with reflux disease (see table 1). The authors have shown high reproducibility and validity for the diagnosis of reflux if an RSI score >13 is defined as abnormal.

Table 1 – Reflux Symptom Index

Within the last MONTH, how did the following problems affect you?	
0 = no problem, 5 = severe problem	
1. Hoarseness or a problem with your voice	0 1 2 3 4 5
2. Clearing your throat	0 1 2 3 4 5
3. Excess throat mucous or postnasal drip	0 1 2 3 4 5
4. Difficulty swallowing food, liquids or pills	0 1 2 3 4 5
5. Coughing after you ate or after lying down	0 1 2 3 4 5
6. Breathing difficulties or choking episodes	0 1 2 3 4 5
7. Troublesome or annoying cough	0 1 2 3 4 5
8. Sensation of something sticking in your throat or a lump in your throat	0 1 2 3 4 5
9. Heartburn, chest pain, indigestion or stomach acid coming up	0 1 2 3 4 5
<b>Total</b>	

Source: Centre for Voice Disorders of Wake Forest University. Reprinted with permission.

### Reflux Symptom Index (RSI):

Self-administered 9-Qs survey. Each graded in severity 0-5. Score >13 shown to be correlated to positivity on pH study.

The laryngoscopic findings used for the diagnosis of reflux are nonspecific signs of laryngeal irritation and inflammation. Laryngoscopy is important because an association exists between cancer and LPR. The main findings used for the diagnosis of LPR include edema and erythema, particularly in the posterior region but these findings are very nonspecific. Further, studies have shown significant inter-rater variability that make the precise diagnosis of LPR highly subjective. In an attempt to overcome the diagnostic variability, Belafsky *et al* also developed the Reflux Finding Score (RFS) based on the findings of fiberoptic laryngoscopy. This scale evaluates eight items that comprise the most common laryngoscopic findings in patients with LPR (see table 2). It should be emphasized, therefore, that a thorough medical history and laryngoscopy are important for the proper workup of cases of LPR, precisely because there is no gold standard for diagnosis.

Table 2 – Reflux Finding Score

Subglottic Edema	2 = present 0 = absent	
Ventricular Obliteration	2 = partial 4 = complete	
Erythema/Hypermia	2 = arytenoids only 4 = diffuse	
Vocal Fold Edema	1 = mild 3 = severe 2 = moderate 4 = polypoid	
Diffuse Laryngeal Edema	1 = mild 3 = severe 2 = moderate 4 = obstructing	
Posterier Commissure Hypertrophy	1 = mild 3 = severe 2 = moderate 4 = obstructing	
Granuloma/Granulation	2 = present 0 = absent	
Thick Endolaryngeal Mucus	2 = present 0 = absent	
<b>Total</b>		

Source: Centre for Voice Disorders of Wake Forest University. Reprinted with permission.

### Reflux Finding Score (RFS):

A scoring system for documenting the physical findings and severity. The RFS is based on 8 laryngoscopic findings. 95% certain that a person with a score higher than 7 has LPR.

## Most of the time, no further investigations are needed to make the clinical diagnosis.

Further tests may be contemplated to detect and document oesophageal reflux to support the diagnosis; three commonly used tests are barium swallow, gastroscopy, and pH Testing. However, pH monitoring has been shown to be unreliable for the diagnosis of LPR.

Finally, in view of the controversial diagnostic criteria for LPR, empirical treatment with PPIs, and response to the acid-suppression, has been used as an alternative diagnostic modality in which a favorable response is defined as diagnostic confirmation.



## How is LPR treated and how can it be prevented?

LPR is treated with a combination of medications as well as behaviour and dietary changes.

### MEDICATIONS

#### 1. Proton-Pump Inhibitors (PPIs).

Frequently, LPR is well controlled with Proton Pump Inhibitors, (PPIs). The empirical treatment consists of PPI administered for three months, twice daily, 30 to 60 minutes before a meal. This period is important because it provides the highest concentration of the drug during the period of stimulation of the proton pump by food consumption. PPIs not only to prevent exposure of the upper aerodigestive tract, but also to reduce the damage resulting from the enzymatic activity of pepsin, which requires an acid medium for activation.

In contrast to GERD, the therapeutic response of patients with LPR to PPIs is variable, in part because LPR requires more aggressive and prolonged therapy than GERD. Although most patients show improvement of symptoms within 3 months, the resolution of symptoms and laryngeal findings generally takes 6 months.

In one major study, a response to the regimen consisting of two daily doses of PPI was observed in 50% of the patients after 2 months of treatment and 70% after 4 months of treatment. However, the response rate was much lower in patients receiving a single daily dose. Most studies suggest an overall response rate of almost 70% to PPIs.

#### 2. H2-blockers.

An alternative anti-reflux medication sometimes used is an H2-blocker antacid (Ranitidine or cimetidine). These can be taken with or without food, allowing them to be taken before going to bed. These medications may be more useful in patients with predominantly nocturnal symptoms.

#### 3. Alginates.

PPIs and H2-blockers reduce the volume of acid reflux, but nonacid reflux may still occur. Orally ingested liquid alginate (Gaviscon) reacts with the acid in the stomach to produce a “raft” that acts as physical barrier to reflux. This is the only nonsurgical treatment that physically prevents acid and nonacid reflux disease. Alginates act rapidly, are long-lasting and inexpensive, and have no known side effects.



## DIET AND BEHAVIOUR MODIFICATIONS

In addition to medical therapy, modification of behaviour and diet is essential in the treatment of laryngopharyngeal reflux. In fact, recent studies suggest that anti-reflux medications will have little effect if the diet is not carefully controlled.

### *Dietary changes:*

Many foods and drinks can make symptoms worse, and it is important that these be reduced. In particular, caffeinated or carbonated beverages, dairy products, acidic foods such as tomatoes, all citrus fruits and their juices, etc. should be reduced. These dietary modifications have been shown to be a significant independent determinant of the response to medical treatment.

### *Behavioural changes:*

Changes in behaviour and habits include weight loss, quitting smoking, avoiding alcohol (particularly wine), and not eating immediately before bedtime are all factors that aim to reduce reflux disease. It is known that nicotine and alcohol relax the sphincters of the esophagus, allowing acid to reflux more easily.

## REFERENCES

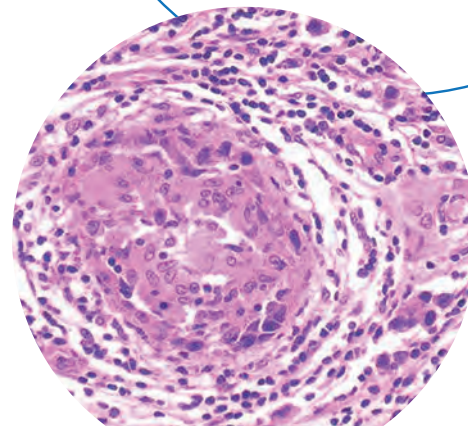
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## SURGERY

In very severe cases, and where reflux is clearly a major problem, surgery may be recommended as treatment. Laparoscopic or Nissen's fundoplication is a well-established surgical treatment for GERD and produces reliable and reproducible results for reducing reflux oesophagitis. However, its role in the management of LPR is uncertain. A recent study revised an extensive series of patients undergoing fundoplication and found poor results were obtained for patients with exclusively laryngopharyngeal symptoms, but a positive pH monitoring test for reflux, indicating the possibility that the cause of symptoms is not solely related to reflux in many of these patients.

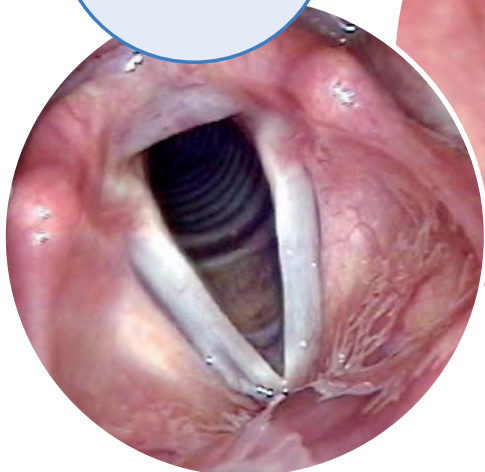
### What can happen if LPR is not treated?

Untreated LPR can lead to other laryngeal pathologies (vocal cord ulcers and granulomas, subglottic stenosis) and worsening of coexistent asthma and COPD. Untreated LPR also may play a role in exacerbating chronic sinusitis and contribute to the development of laryngeal cancer



Cancer & Granulomas

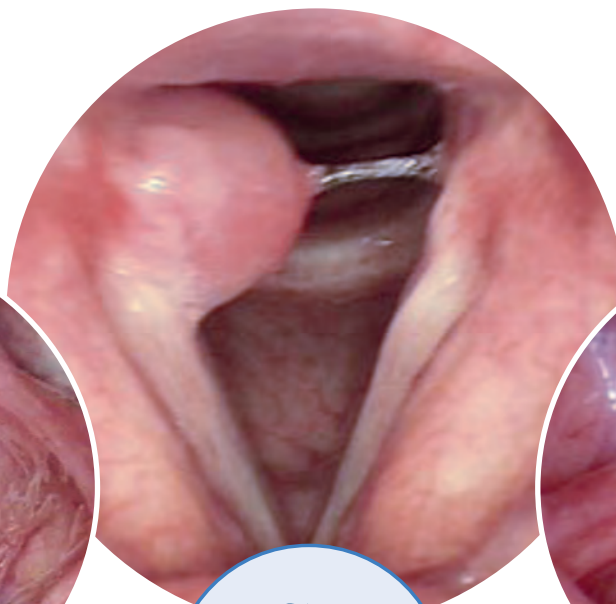
Normal  
Larynx



LPR -  
Vocal Process  
Granuloma



LPR -  
Inflamed  
Larynx



**Dietary and behavioural measures to reduce reflux and direct irritation of the larynx and pharynx:**

- Follow a bland diet (low acid levels, low in fat, not spicy)
- Eat frequent, small meals
- Lose weight
- Avoid alcohol (white wine), tobacco, and caffeine
- Do not eat food less than 2 hours before bedtime
- Raise the head of the bed before sleeping

**Untreated LPR has been implicated in the etiology of various disorders:**

- Granulomas, contact ulcers, and vocal nodules.
- Laryngeal malacia
- Laryngeal & subglottic stenosis
- Laryngeal carcinoma
- LPR may also result in sinusitis
- Exacerbation of asthma and COPD