

Laryngopharyngeal Reflux- A New Paradigm of Airway Disease

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Abstract-Laryngopharyngeal reflux, an extra-esophageal variation of gastroesophageal reflux disease (GER, GERD, and LRP) is believed to be an important etiologic factor in the development of many inflammatory and neoplastic disorders of the upper aerodigestive tract. It has been associated with laryngeal symptoms of dysphonia, globus sensation, excessive throat-clearing and chronic cough in children as well as in adults. This article reviews the effects, current diagnostic techniques and treatment of reflux. For proper evaluation of reflux patients two scoring system developed by Belafsky et al in 2002, Reflux Finding Score (RFS) gauges the laryngoscopic changes caused by reflux laryngitis. Reflux Symptom Index (RSI) is a preset questionnaire answered by the patient himself to find out the severity of LPR. Effective medical treatment has been claimed to reverse the reflux findings score which can be reliably monitored by 24 hour dual probe pH study. Emergence of newer PPIs has got promising results in the treatment of LPR without need for any surgical intervention.

Keywords: Laryngopharyngeal Reflux, RFS, RSI, 24 hour pH monitoring, PPIs

Introduction:

Laryngopharyngeal Reflux (LPR) is a recently described clinical entity due to retrograde flow of gastric contents into pharynx. The American Academy of Otolaryngology – Head and Neck Surgery adopted the name “Laryngopharyngeal Reflux” in 2002 and issued a position describing the condition¹. Of late interest has grown in this distinct entity manifold with a large number of hitherto vague clinical presentations ascribed to this phenomenon. The importance can be gauged by the suggestion that up to 50% of all patients suffering from hoarseness and voice disorders may have significant LPR.² This article is meant to be an introduction to the concepts of LPR and written in order to sensitize the young physicians, otolaryngologists to this issue.

Pathophysiology:

The posterior glottic area of larynx bears the burden of upper aerodigestive tract and all streams of mucociliary transport finally join in the interarytenoid area thus making it akin to a ‘Gutter’ for all the secretions. A lot of irritants including

allergens, smoke, alcohol and acidic gastric contents and enzymes bathe this area round the clock. All these irritants, secretions and trapped particles from nose, lungs, and oral cavity converge here to finally get swallowed to the stomach. However when the ‘gutter’ backflows, the gastric contents containing acid and activated pepsin comes in contact with the sensitive laryngopharyngeal mucosa. LPR is thought to be more closely linked to pepsin exposure than HCl causing direct damage³. This results in impaired mucociliary clearance, leading to mucus stasis which further exacerbates the mucosal irritation and contributes to patient symptoms such as postnasal drip, throat clearing and a globus sensation⁴. LPR is common in infants as lower esophageal sphincter is less developed, have shorter esophagus and lie down most of the time.

An international collaborative research group studying the impact of LPR on laryngeal epithelium at cellular level, have reported reduced levels of bicarbonate ion producing enzyme carbonic anhydrase subtype III (CA-III) in laryngeal epithelium taken from LPR patients, compared to high levels in normal laryngeal epithelium. Decreased amounts of bicarbonate anions present to neutralize the acidic nature of gastric contents results in less chemical buffer to protect laryngeal mucosa⁵.

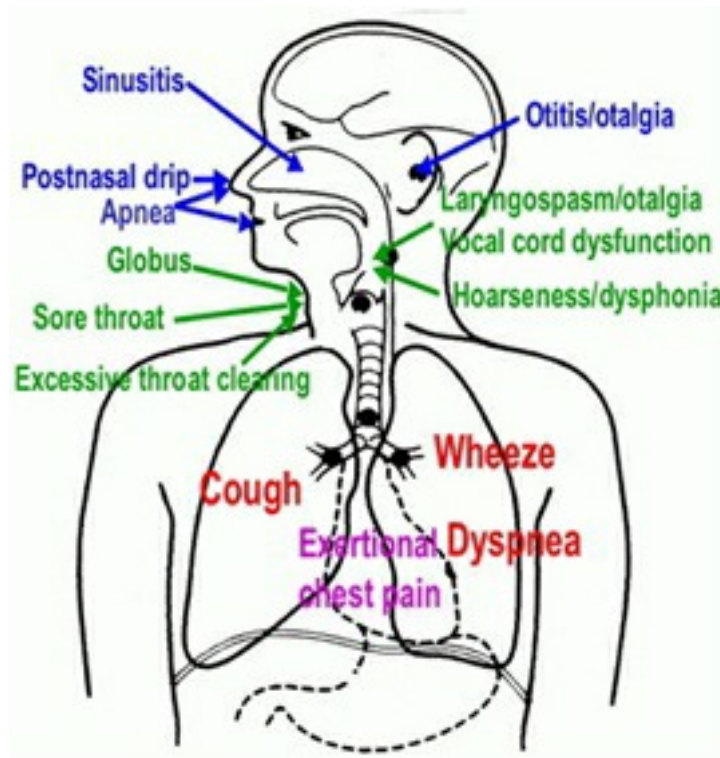
Clinical Picture:

Patients suffering from Laryngopharyngeal reflux are often frustrated a lot after multiple visits to the doctor has yielded no diagnosis and several course of antibiotics and antihistamines has been tried repeatedly. The symptoms themselves are vague and range from a relatively simple hoarseness of voice to an indistinct feeling of globus and chronic throat clearing (Figure 1). This calls for a need of high awareness amongst the medical professionals as such symptoms are usually discarded by many physicians as being ‘supra tentorial!’ Complaints may be one or more of the followings:

- Hoarseness of voice
- Voice fatigue, cranky voice
- Thick or too much mucous

- Heartburn and/or burning throat
- Persistent cough
- Sore throat (rawness) or dysphagia
- Sensation of lump in the throat that does not go away on repeated swallowing
- Chronic throat clearing/ hawking

Figure 1: Various presentations of LPR



- A more uncommon but severe symptom is difficult breathing which is caused by reflux contents coming in contact with the vocal cords causing laryngospasm.

Many adult with LPR do not have symptoms of heartburn. Why? In order to refluxed contents to cause heartburn, it has to stay in the esophagus long enough to cause irritation. Also the esophagus is not as sensitive to irritation as the throat is. Therefore, if the acid passes quickly through the esophagus, but pools in the throat, LPR symptoms will occur without heartburn⁶.

Symptoms in children: Children may also suffer from Laryngopharyngeal reflux which is often 'silent'. They are most commonly seen in infants and prompt evaluation is critical⁷. They may present with:

- Barking or croupy cough
- Reactive airway disease (asthma)
- Noisy breathing (stridor) and pause in breathing (apnoea)
- Trouble feeding/ food aspiration
- Failure to thrive

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)⁸, contact ulcers⁹, hoarseness. Eustachian tube dysfunction from LPR causing recurrent AOM, persistent OME¹⁰, and sinusitis are currently under

research¹¹. In adults, silent reflux can cause scarring which may increase the risk of developing carcinoma in this area^{12, 13}.

Diagnosis of LPR:

After detailed history taking, routine ear, nose, throat, head and neck examination is performed. Particular attention is given to the post nasal and throat area.

a) Laryngoscopy- Indirect laryngoscopy (IL) and Flexible Fibreoptic Laryngoscopy (FOL). A conventional mirror examination is often insufficient to guess the extent and severity of LPR. The most common findings in IL are posterior commissure hypertrophy, erythema and diffuse edema of the false cord obliterating the ventricular opening. Thick mucous can also be seen. Many normal persons not suffering from LPR may also have similar findings, in one study, up to 86%¹⁴.

During laryngoscopy special mention are of two scales developed by the Center for Voice Disorders of Wake Forest University. They attempted to quantify the clinical findings in patients suspected to suffer from LPR. The first Index is Reflux Finding Score (RFS) serves as a scoring tool that grades eight specific physical examination findings that may be attributed to LPR (Table 1). Some of the components are scored as whether or not they are present while others are graded in

regards to its severity. The RFS can range from 0 to 26, and a score greater than 7 suggested a 95% statistical possibility

of a positive dual-probe pH study. This scale is also applicable for asymptomatic patients¹⁵.

Subglottic edema	0 = absent 2 = present
Ventricular obliteration	2 = partial 4 = complete
Erythema/hyperemia	2 = arytenoids only 4 = diffuse
Vocal fold edema	1 = mild 2 = moderate 3 = severe 4 = polypoid
Diffuse laryngeal edema	1 = mild 2 = moderate 3 = severe 4 = obstructing
Posterior commissure hypertrophy	1 = mild 2 = moderate 3 = severe 4 = obstructing
Granuloma/granulation tissue	0 = absent 2 = present
Thick endolaryngeal mucus	0 = absent 2 = present

Table 1: RFS Components

These findings may vary from different otolaryngologists, which make it difficult to diagnose LPR on basis of clinical picture alone¹⁶.

To supplement the diagnostic value of the RFS, Belafsky et al in 2002, developed the Reflux Symptom Index (RSI). The RSI was created with the intention to serve as a validated self-

administered 9-question survey (Table 2) administered to patients who graded specific symptoms on a scale from 0 to 5. Similar to the RFS, a RSI score greater than 13 were found to suggest a positive dual-probe pH study. In addition, the authors had noted that RSI scores tended to decrease before actual physical examination improvements were noted with effective medical management¹⁷.

Within past month, how did the following problems affect you?	0 = No problem					
	5 = Severe problem					
Hoarseness or a problem with your voice	0	1	2	3	4	5
Clearing your throat	0	1	2	3	4	5
Excess throat mucus or feeling of postnasal drip	0	1	2	3	4	5
Difficulty swallowing food, liquids, or tablets	0	1	2	3	4	5
Coughing after eating or lying down	0	1	2	3	4	5
Breathing difficulties or choking episodes	0	1	2	3	4	5
Troublesome or annoying cough	0	1	2	3	4	5
Sensations of something sticking in your throat or a lump in your throat	0	1	2	3	4	5
Heartburn, chest pain, indigestion, or stomach acid coming up	0	1	2	3	4	5
	Total					

Table 2: RSI Components

b) Endoscopy of upper GIT: This is done when patient complains of difficulty in swallowing. It is done to see if there is any scar or growth in the esophagus and biopsy taken in the same maneuver if any abnormality is suspected. This test will also reveal any inflammatory change due to GERD.

c) 24-hour pH testing: This is not a routine procedure to diagnose LPR. If the symptoms of LPR is severe and they do not respond to medical measures, a 24 hour ambulatory dual probe ph metry is considered as gold standard to confirm LPR. In this, a single channel is positioned in the patient much like

a nasogastric tube. This electrode has two pH sensors along its length and the lower one is placed in the lower esophagus approximately 5 cm above the lower esophageal sphincter and the upper one in the laryngopharynx (hypopharynx). The electrode is attached to a portable data logger pocket computer which keeps a record of pH measurement, body posture and meal times. After 24 hours of normal and routine activity by the patient the data is analyzed. Even a single episode of Ph <4 in the laryngopharynx is considered significant (Figure 2). Other important parameters

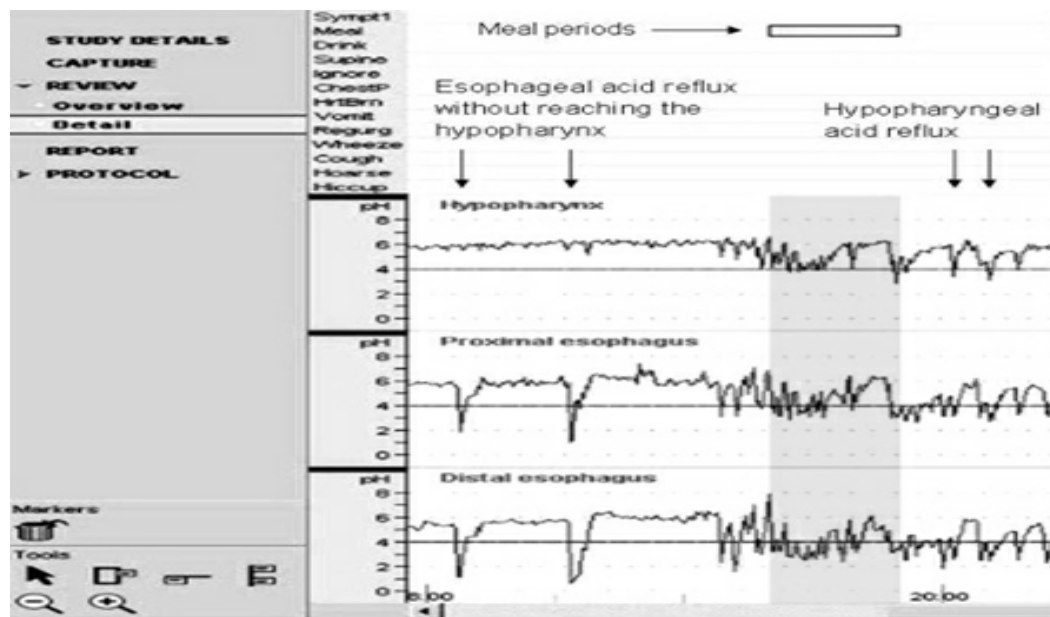


Figure 2: 24 hour ambulatory pH metry tracing showing episodes of pH drop in esophageal probe with and without pH drop in hypopharyngeal probe.

include the number of reflux episodes and the acid exposure time. A recent meta analysis tested the role of upper probe measurements across 16 studies and concludes it to be a reliable and consistent method worldwide¹⁸.

Treatment of LPR:

There are basically four treatments for LPR¹⁹:

a) Lifestyle modification:

- Lose weight
- Quit smoking
- Avoid eating and drinking within two to three hours prior to bedtime
- Avoid tight fitting clothing and belts around waist
- Elevate the head 4 to 6 inches while lying

b) Diet modifications²⁰

There are certain foods that rarely cause heartburn, and foods that should be avoided:

- Caffeine
- Carbonated drinks
- Chocolate
- Peppermint
- Tomato
- Citrus fruits
- Fatty and fried foods
- Alcohol

c) Medications:

To reduce stomach acid - Proton pump inhibitors (PPIs such as omeprazole, pantoprazole, esomeprazole), H₂ blockers (ranitidine, famotidine) for a period of three months and

extending up to six months in refractory cases. PPI's are currently considered the cornerstone to pharmacological treatment of LPR. Its optimal effect exerted when taken 30-60 minutes prior to meals. While establishing the RFS and RSI, Belafsky et al²¹ had observed that significant improvements of physical examination signs were noticeable after four months of twice-daily PPI therapy. Despite a placebo-effect noted early in the course of treatment, Reichel et al²² revealed improvement to laryngeal symptoms and appearance with twice-daily esomeprazole. In a similar manner, Noordzij et al²³ and Steward et al²⁴ concluded that PPI therapy led to noticeable symptomatic relief even if physical examination signs were not as apparent. Furthermore, Wo et al in 2006 reiterated the superiority of a twice-daily regimen over once-daily dose²⁵.

Antacids neutralize acid. This is more to help with symptoms of heartburn. Prokinetic agents (domperidone) increase the forward movement of the GI tract and increase the pressure of the lower esophageal sphincter.

d) Surgery to prevent reflux:

Fundoplication is a surgery which involves wrapping the upper part of the stomach around the lower esophagus to create a stronger valve between the esophagus and stomach. It is usually done laparoscopically, can be done as traditional open surgery with larger incision. The type of surgery most commonly done is [Nissen Fundoplication](#)²⁶.

Silent reflux treatment for infants and children may include:

- Smaller and more frequent feedings
- Keeping an infant in a vertical position for at least 30 minutes after feeding
- Medications such as H₂ blockers (as directed by the pediatrician)

- Surgery for any abnormalities that can't be treated in other ways²⁷

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