

Introduction

1. Definition

Laryngopharyngeal reflux (LPR) is the back flow of gastric contents to the laryngopharynx where it comes in contact with tissues of the upper aerodigestive tract¹. **The relationship with Gastro-esophageal reflux disease (GERD)** is complicated as both may appear to be the result of acid reflux but some individuals develop one syndrome or the other, or both. The explicit relationship between these two syndromes is unknown².

2. Epidemiology

8 to 20% of the general population, **4% to 10%** of patients in the ENT consultation, **1%** of patients in primary care practice³⁻⁵. This clinical entity is known to considerably affect:

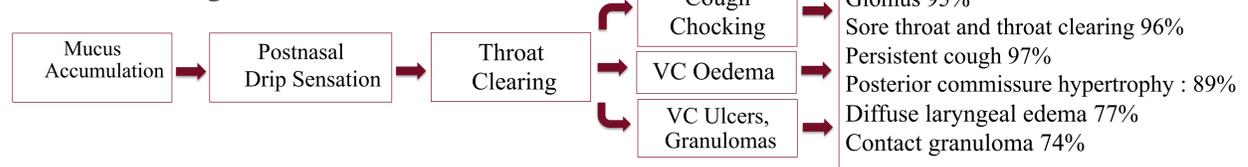
- Patients quality of life as reducing the speaker's communicative effectiveness, LPR would concern 50 to 78% of population with voice complaints⁸⁻¹⁰
- Sleep and daily activities^{6,7}

Aim : To study the current literature about i) the **changes of speech behavioral**, ii) the **impact of a medical treatment** with or without speech therapy or surgery.

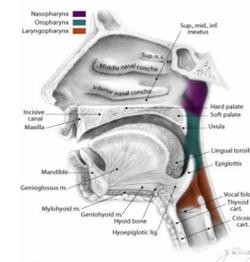
1. Models

- The **direct effect** of the gastric content reflux on the laryngeal mucosa involves several irritants present in the reflux such as acid, pepsin, trypsin, bile salts, bacteria, food proteins, and others gastro-duodenal proteins. Effect of **gas refluxes** since hydrochloric acid can easily form an acid concentrated cloud entering the airways^{8,9}. LPR episodes occur **upright** and **daytime** that completes gas theory^{10,11}.
- The **indirect effect** of the gastric content reflux : chemoreceptor stimulation resulting from refluxed material from the stomach in the distal portion of esophagus, with vagal reflexes followed by coughing and throat clearing.

2. Clinical findings^{12,13}



Pathophysiology and clinical findings



Subglottic Edema	2 = present 0 = absent
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	2 = present 0 = absent
Thick Endolaryngeal Mucus	2 = present 0 = absent
Total:	

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 mucus 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. Sensations 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
Total	

Vocal manifestations

- Hoarseness concerns nearly **30% in American adult population**, **50% in elderly patients** and **3,9% to 23% in children**¹².
- The **major etiologic factor** for hoarseness of more than 3 months duration remains **LPR**¹³.
- Many patients also reported abnormal perceptual voice characteristics such as **musculoskeletal tension**, **hard glottal attack**, **glottal fry**, **vocal forcing**, **forcing sensations**, **clamping**, **vocal fatigue**, **prolonged voice warm-up time**, and **restricted tone placement**^{14,15}.

Differences with GERD

- Participants with **severe GERD** had significantly **higher LPR scores** compared to those with mild, moderate, or inactive disease¹⁶.
- GERD patients often have **dysmotility** and **prolonged acid clearance** unlike LPR patients¹⁷.
- **Episodes of GERD** occur at **night** and **lying**. LPR reflux episodes occur **upright** and **daytime** (gases).
- **23%** of patients with confirmed LPR have normal levels of acid exposure in the **distal oesophagus**¹⁸.
- **Heartburn** and **dyspepsia**, classical symptoms in GERD, are **absent in more than 50% LPR patients** compared with patients suffering from a classic GERD where **89%** have **heartburn**¹⁹.
- In **12-18%** cases, patients suffering from LPR have **oesophagitis** and **Barrett's metaplasia** in **3-7%**²⁰.

Diagnosis

- 24-hour double-probe ambulatory pH metry**
 - Detect the presence of LPR simultaneously in the **distal portion of the esophagus** and the **hypopharynx**²¹.
 - The **normal values** for the test could not be definitely established given the difficulty of carrying out this test in a large number of normal volunteers. **52% healthy subjects** have **LPR episodes** with a cut-off set to 2 episodes per day²².
- RSI > 13 and RFS > 7**
 - Exclude all **confounding diseases** (i.e. active allergy, laryngeal infection, a large alcohol consumption and/or smoking, and other causes of laryngitis).
 - **Good alternatives** to pH metry or Restech.

Treatment

- Diet behavioral changes**
 - The most important part of treatment (mild and moderate LPR).
 - Lose overweight, reduce daily caloric intake, practice physical activity, sleep with the head of bed elevated, and change alimentary habits.
- Medical treatment**
 - PPIs for 3 to 6 months ; RCT controversy.
 - Confirmation of the diagnosis.
- Surgery**
 - Restore competence of the lower esophageal sphincter.
 - Option for i) resistant LPR, ii) symptomatic non-acid reflux, iii) not achieve adequate acid suppression even on high doses of PPIs, iv) individuals who prefer avoidance of long-term use of medication.
- Speech therapy**
 - Improve subjective and objective assessments after 3 months.
 - Restore reversible mucosal damages^{23,24}.

Results

- General symptoms and signs**
 - Improvement under different medical and surgical treatments.
- Subjective assessments**
 - General improvement of hoarseness.
 - GRBAS & VHI : better improvement when PPIs are coupled with Speech therapy.
- Objective assessments**
 - Jitter and Shimmer : mixed results.
 - HNR: significant improvement but effect of PPIs ?
 - *Pitch*: significant improvement but effect of PPIs ?



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Future Research

- Pathophysiology**
 - More studies are needed to clarify the involvement of every pathophysiological mechanisms in the etiology of LPR.
 - A better understanding of molecular mechanisms may allow the development of targeted therapy.
- Diagnosis**
 - The normal values for the pH metry must be definitely established in a large number of normal volunteers sample.
 - Comprehensive collection of the evolution of speech parameters altered (under treatment) must be made.
- Treatment**
 - Methodologically correct RCT should assess the effect of PPIs and providing speech therapy.