Laryngopharyngeal Reflux (LPR)

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GERD vs. LPRD

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Gastroesophageal reflux (GER) is defined as the upward movement of the gastric contents into the esophagus.

Pathologic gastroesophageal reflux or GERD is differentiated from physiologic reflux that occurs in normal subjects by presence of symptoms or complications.

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**LPR**

**Definition**

LPR is the result of retrograde flow of gastric contents to the laryngopharynx, where it comes in contact with tissues of the upper aerodigestive tract.
Incidence & Prevalence of LPR

10% of patients presenting to an otolaryngologist’s office.

Variable prevalence around the world, with an average rate of 10-20%.

Stanghellini V. 1999
Prado J, Moraes-Filho P. 2004

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Pathophysiology of LPR
LPR barriers

- LES
- Esophageal motor function with acid clearance.
- Esophageal mucosal resistance.
- UES.

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Pathophysiology of LPRD

- Direct contact of aspirated gastric refluxate with the upper airway.
- Vagovagal reflex.
Pathophysiology of LPR

Oesophagus

- Reflux
  - Oesophageal vagal afferents

Central Nervous System (CNS)

- Microaspiration
  - Airway vagal afferents
  - CNS

Tracheobronchial tree

- Airway vagal efferents

Airway

- Mediator release
  - Inflammation
  - Oedema
  - Mucus
  - Smooth muscle

Heightened bronchial reactivity
Presentations
Classifications of GERD

GERD is a condition which develops when the reflux of stomach contents causes troublesome symptoms and/or complications.

Esophageal Syndromes

- Symptomatic Syndromes
  - Typical reflux syndrome
  - Reflux chest pain syndrome

- Syndromes with Esophageal Injury
  - Reflux esophagitis
  - Reflux stricture
  - Barrett's esophagus
  - Adenocarcinoma

Extra-esophageal Syndromes

- Established Association
  - Reflux cough
  - Reflux laryngitis
  - Reflux asthma
  - Reflux dental erosions

- Proposed Association
  - Sinusitis
  - Pulmonary fibrosis
  - Pharyngitis
  - Recurrent otitis media


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LPR manifestations

Reflux-induced cough
Reflux-induced laryngitis
Reflux-induced asthma
Reflux-induced choking
Reflux-induced cough

- Occurs during day
- During phonation
- Associated with eating
- Upright position
- When rising from bed

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Reflux-induced laryngitis

- Dysphonia
- Globus sensation
- Frequent throat clearing
- Difficulty swallowing
- Throat pain
- Excessive mucous
- Voice fatigue

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LPR manifestations (cont.)

LPR Signs

- Contact ulcer
- Posterior laryngitis
- Granuloma
- Laryngeal stenosis
- Sub-glottic edema (pseudo-sulcus)
What are the signs of LPR?
Laryngoscopy in normal subjects

105 healthy volunteers

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-arytenoid bar</td>
<td>71%</td>
</tr>
<tr>
<td>Arytenoid medial wall erythema</td>
<td>30%</td>
</tr>
<tr>
<td>Post. Pharyngeal wall cobblestoning</td>
<td>21%</td>
</tr>
</tbody>
</table>

Hicks and Vaize J voice 2002

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# Laryngoscopic findings vs. LPR

<table>
<thead>
<tr>
<th>CONTACT ULCER</th>
<th>SUBGLOTTIC EDEMA</th>
<th>STENOSIS</th>
<th>EDEMA</th>
<th>ERYTHEMA</th>
</tr>
</thead>
</table>

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Current practice

Symptomatic patients

ENT

Laryngoscopy

LPR

GI

pH monitoring
Endoscopy

Responders

Empiric therapy

Non-responders

Increase dose
Change PPI
Add H2RA
Surgery

??

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What is the enigma?

Failure to recognize true LPR.

Over-diagnosis of LPR.

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Assessment of LPR
Diagnosis of LPR

RSI and RFS.

Ambulatory 24-hour double probe pH monitoring.

Multi-channel intra-luminal impedance with pH sensor.

Laryngoscopy and TNE.

Therapeutic trials of PPI.

Immunoassay.

Pharyngeal pH metry.

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### Reflux Symptom Index (RSI)

**Within the last month, how did the following problems affect you?**

*Circle the appropriate response.*

<table>
<thead>
<tr>
<th>Problem</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dysphonia or a problem with your voice.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Clearing your throat.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Excess throat mucus or postnasal drip.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Difficulty swallowing food, liquids, or pills.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Coughing after you ate or after lying down.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Breathing difficulties or choking episodes.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Troublesome or annoying cough.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Sensation of something sticking in your throat or lump in your throat.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Heartburn, chest pain, indigestion, or stomach acid coming up.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**TOTAL**

0 = no problem
5 = severe problem

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<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subglottic edema</td>
<td>0 = absent</td>
</tr>
<tr>
<td></td>
<td>2 = present</td>
</tr>
<tr>
<td>Ventricular obliteration</td>
<td>2 = partial</td>
</tr>
<tr>
<td></td>
<td>4 = complete</td>
</tr>
<tr>
<td>Erythema/hypereamia</td>
<td>2 = arytenoids only</td>
</tr>
<tr>
<td></td>
<td>4 = diffuse</td>
</tr>
<tr>
<td>Vocal fold edema</td>
<td>1 = mild</td>
</tr>
<tr>
<td></td>
<td>2 = moderate</td>
</tr>
<tr>
<td></td>
<td>3 = severe</td>
</tr>
<tr>
<td></td>
<td>4 = polypoid</td>
</tr>
<tr>
<td>Diffuse laryngeal edema</td>
<td>1 = mild</td>
</tr>
<tr>
<td></td>
<td>2 = moderate</td>
</tr>
<tr>
<td></td>
<td>3 = severe</td>
</tr>
<tr>
<td></td>
<td>4 = obstructing</td>
</tr>
<tr>
<td>Inter-arytenoid hypertrophy</td>
<td>1 = mild</td>
</tr>
<tr>
<td></td>
<td>2 = moderate</td>
</tr>
<tr>
<td></td>
<td>3 = severe</td>
</tr>
<tr>
<td></td>
<td>4 = obstructing</td>
</tr>
<tr>
<td>Granuloma/granulation tissue</td>
<td>0 = absent</td>
</tr>
<tr>
<td></td>
<td>2 = present</td>
</tr>
<tr>
<td>Thick endolaryngeal mucus</td>
<td>0 = absent</td>
</tr>
<tr>
<td></td>
<td>2 = present</td>
</tr>
</tbody>
</table>

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Reliability

RSI score = 15
RFS score = 3

RSI score = 25
RFS score = 14


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24-hour double probe pH monitoring

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Wireless pH capsule
Pharyngeal pH metry

Restech®

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Multi-channel intramural impedance
pH metry

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Impedance Technology Fundamentals

Bolus Entry  Bolus Exit

Impedance

Time

Impedance Rings

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NO! It's a Coke swallow.
Impedance Tracks Bolus Movement vs. Tamer Mesallam MD, PhD.
Impedance Detected Swallow
Impedance Detected Reflux Episode

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### Different pHmetry techniques

<table>
<thead>
<tr>
<th></th>
<th>Conventional pH monitoring</th>
<th>Wireless pH monitoring</th>
<th>Impedance pHmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Tolerability</td>
<td>Standard</td>
<td>Better</td>
<td>Standard</td>
</tr>
<tr>
<td>Non-acid reflux</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Detect Retrograde from ante grade</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Prolonged monitoring</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Automated Interpretation</td>
<td>yes</td>
<td>Yes</td>
<td>Available/manual editing</td>
</tr>
</tbody>
</table>

John E. Pandolfino, Marcelo F. Vela, 2009

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Management of LPR
Treatment levels of LPR

LEVEL I - Antireflux Measures

LEVEL II - Medications

LEVEL III - Antireflux Surgery
A. Dietary modification

1. No eating or drinking within 3 hours of bedtime.
2. Avoid overeating or reclining right after meals.
3. No fried food; low fat diet.
4. Avoid coffee, tea, chocolate, mints, and soda pop.
5. Avoid all caffeine-containing foods and drinks.
6. Avoid alcohol, especially in the evening.
7. Avoid any other food that causes problems.
B. Life-style modification
   1. Elevate the head of the bed 4-6 inches.
   2. Avoid wearing tight-fitting clothing or belts.
   3. If you use tobacco, quit!.

C. Liquid antacids q.i.d.
   One tablespoon 1 hour after each meal and at bedtime.
LEVEL II - Medication

A. As level I.

B. Initial Treatment
   1. Proton pump inhibitors (PPIs): 20 mg bid for 3 months
   2. H2-blocker, 150 mg. b.i.d.
   2. Prokinetic agents may be also used

C. Escalation for treatment failures
   1. PPIs: 40 mg bid for 3-6 months
   2. H2-blocker 150 mg q.i.d. up to 300 mg. q.i.d.

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LEVEL III- Antireflux Surgery

A. As level I, plus one medication on level II

B. Fundoplication.

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Possible LPR Symptoms

Laryngoscopy RFS > 7 RSI > 13

PPI therapy

3 month follow up

Symptom resolved

Symptom improved

Increase dose of PPI

Symptoms unchanged or worse

Definitive assessment:
MII (detect reflux)
Pharyngeal pH metry
TNE (document pathology)

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Thank You