

Role of Intractable Laryngopharyngeal Reflux in the Pathogenesis of Otitis Media Effusion: A Clinical Perspective

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Epidemiology

- LPR associated with recurrent symptoms and related poor quality of life
- Recent studies reported that 10% of patients who visit the ENT clinic have symptoms caused by LPR.
- US annual costs treated LPR /GERD 9,3-50 billion (sandler et al 2002)
- Initial year direct cost USD 5,438 per patient evaluate for LPR (francis et al 2013)
- The prevalence of LPR disease is 18.4% regardless of gender, with a prevalence of 19.1% in men and 17.7% in women. Several prior studies estimated the prevalence of LPR to be 34.4% in the United Kingdom, 18.8% in Greece, and 5.0% in Fuzhou region of China, while another US study reported an LPR prevalence of 9.7%^{5,6}. However, due to limited data and diagnostic methods, the prevalence in Indonesia is still unknown

Definition of Laryngopharyngeal Reflux

The American Academy of Otolaryngology Head and Neck Surgery (2002) :

Laryngopharyngeal Reflux (LPR) is the backflow of stomach contents into the **laryngopharynx**

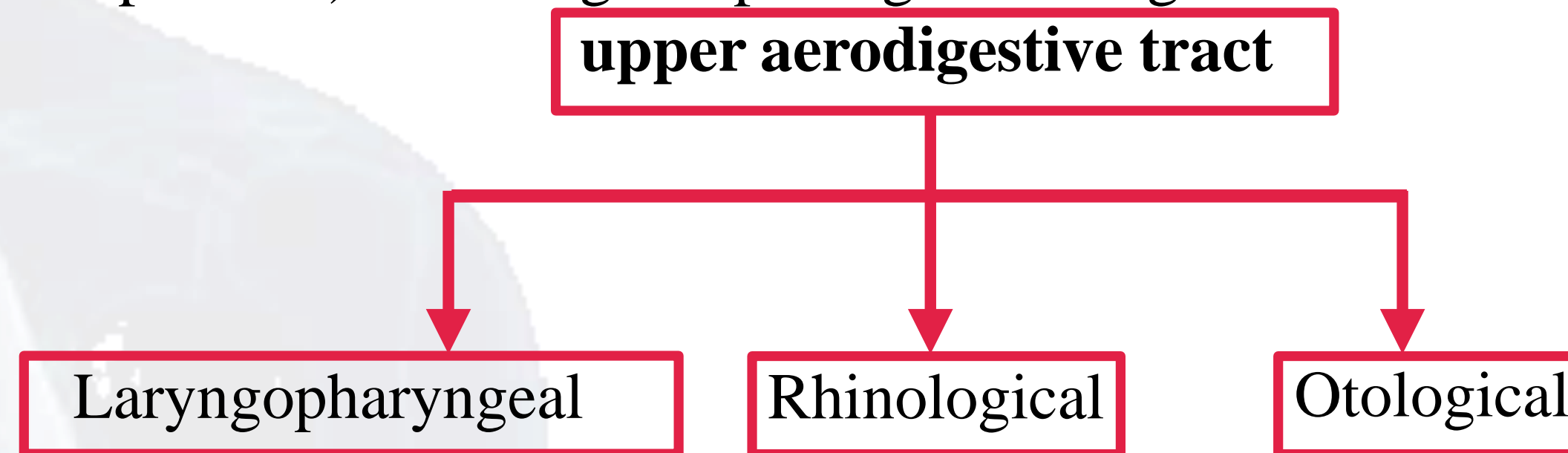
New definition: LPR is an inflammatory condition of the upper aerodigestive tract tissues related to the direct and indirect effect of gastric or duodenal content reflux (pepsin, bile salts, gastroduodenal proteins) inducing morphological changes and/or neurological changes in the **upper aerodigestive tract**

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Alternative names : silent reflux, pharyngolaryngeal reflux, extraesophageal reflux, atypical GERD, reflux laryngitis, full column reflux, pharyngeal reflux, and proximal reflux.

LPR and GERD

GERD	LPR
Accompanied by esophagitis and/or heartburn -less respiratory complaints	Esophagitis or heartburn is rarely present - chronic cough and frequent throat clearing
Reflux is nocturnal or in supine position	Reflux during daytime or in upright position
Abnormal oesophageal motility and prolonged oesophageal acid exposure	Intermittent episodes or reflux
Dysfunction of the lower esophageal sphincter (LES)	Dysfunction of the upper esophageal sphincter (UES)
Throat related symptoms are sometimes present	Leads to throat related symptoms and damage of the laryngopharyngeal epithelium

LPR and GERD share some common pathophysiological mechanisms but may present with different clinical pictures.

The presence of GERD should be a factor when considering the likelihood of LPR

Typical esophageal symptoms of GERD such as heartburn and digestive symptoms may be present in some LPR patients.

LPR and GERD

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Accompanied by esophagitis and/or heartburn -less respiratory complaints	Esophagitis or heartburn is rarely present - chronic cough and frequent throat clearing
Reflux is nocturnal or in supine position	Reflux during daytime or in upright position
<p>Autonomic nerve function</p> <p>Atypical oesophageal acid exposure</p>	Intermittent episodes or reflux
<p>Mechanical aspect</p> <p>Dysfunction of the lower esophageal sphincter (LES)</p>	<p>Dysfunction of the upper esophageal sphincter (UES)</p>
Throat related symptoms are sometimes present	Leads to throat related symptoms and damage of the laryngopharyngeal epithelium
<p>Dietary Habits</p>	

Carroll TL, Nahikian K, Asban A, Wiener D. Nissen fundoplication for laryngopharyngeal reflux after patient selection using dual pH, full column impedance testing: a pilot study. Ann Otol Rhinol Laryngol. 2016; 125(9):722-728.

Types of LPR

Acute

Sporadic development of LPR
Well treated with adequate treatment

Chronic

Chronic course of LPR symptoms
Lack/poor therapeutic response
frequent recurrences of symptoms over time (>2 episodes yearly)
requiring repeated therapeutic trials

The effect of refluxate on Aerodigestive mucosa

**1. Inflammation
material**

**2. Ion & water
transport
damage**

3. Mucosal barrier damage

**4. *Growth
factor
expression
damage***

The effect of refluxate on Aerodigestive mucosa

1. Inflammation material

Damage of protein matrix
(Leichen et al.)

- Decorin
- Elastin *fibers*
- Collagen
- Hyaluronic acid

(Johnston et al.)

2. Ion & water transport damage

3. Mucosal barrier damage

4. *Growth factor expression damage*

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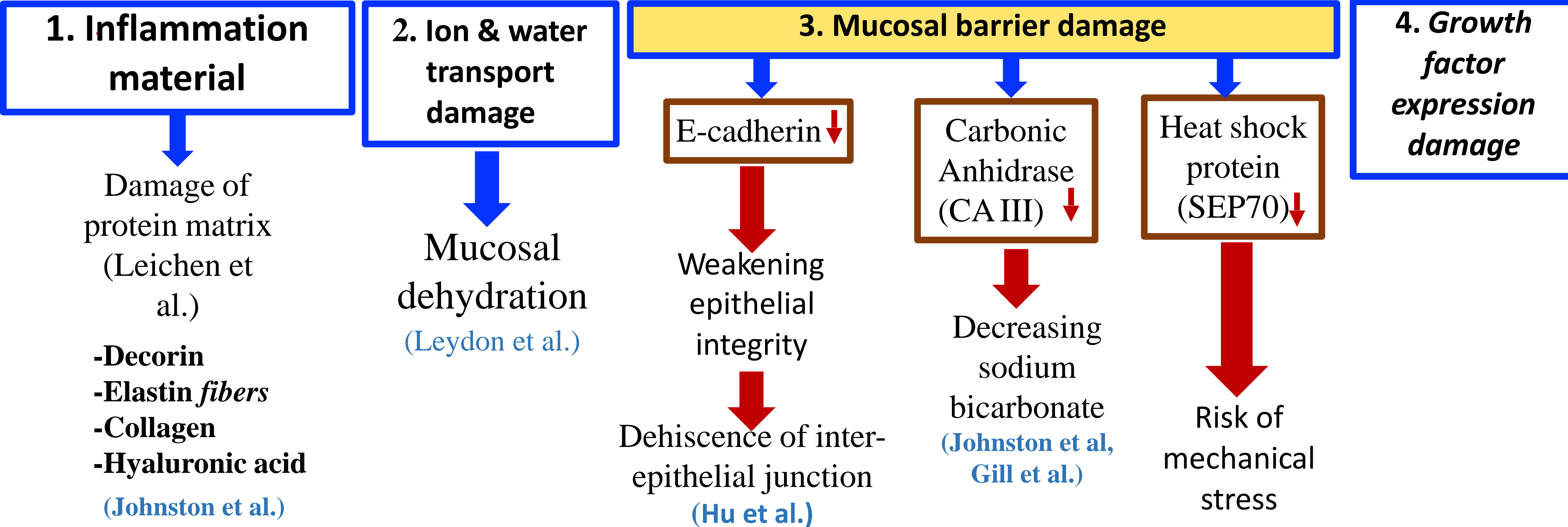
2. Ion & water transport damage

Mucosal dehydration
(Leydon et al.)

3. Mucosal barrier damage

4. *Growth factor expression damage*

The effect of refluxate on Aerodigestive mucosa



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3. Mucosal barrier damage

E-cadherin ↓

Weakening epithelial integrity

Dehiscence of inter-epithelial junction
(Hu et al.)

Carbonic Anhydrase (CA III) ↓

Decreasing sodium bicarbonate
(Johnston et al, Gill et al.)

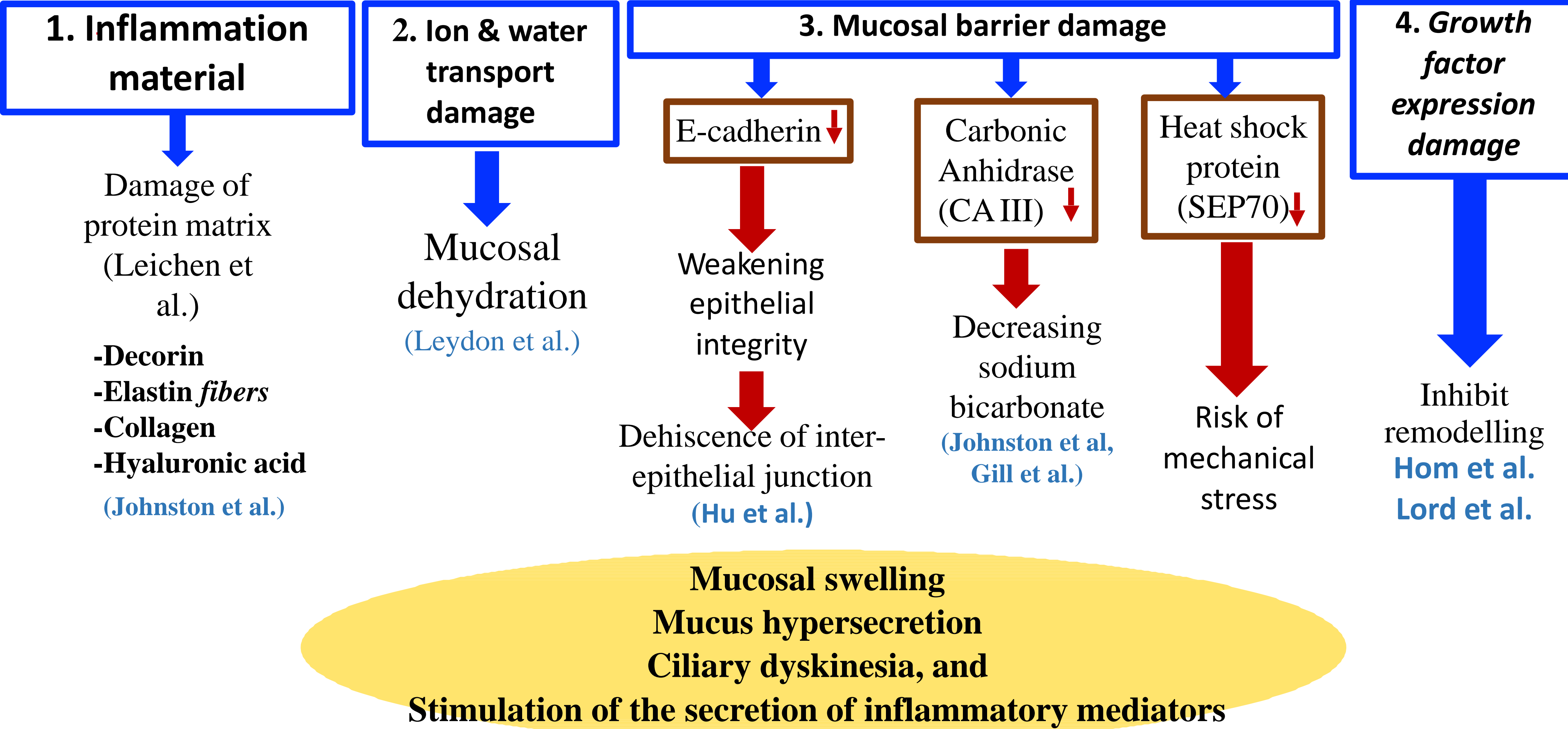
Heat shock protein (SEP70) ↓

Risk of mechanical stress

4. Growth factor expression damage

Inhibit remodelling
Hom et al.
Lord et al.

The effect of refluxate on Aerodigestive mucosa



Diagnosis of LPR

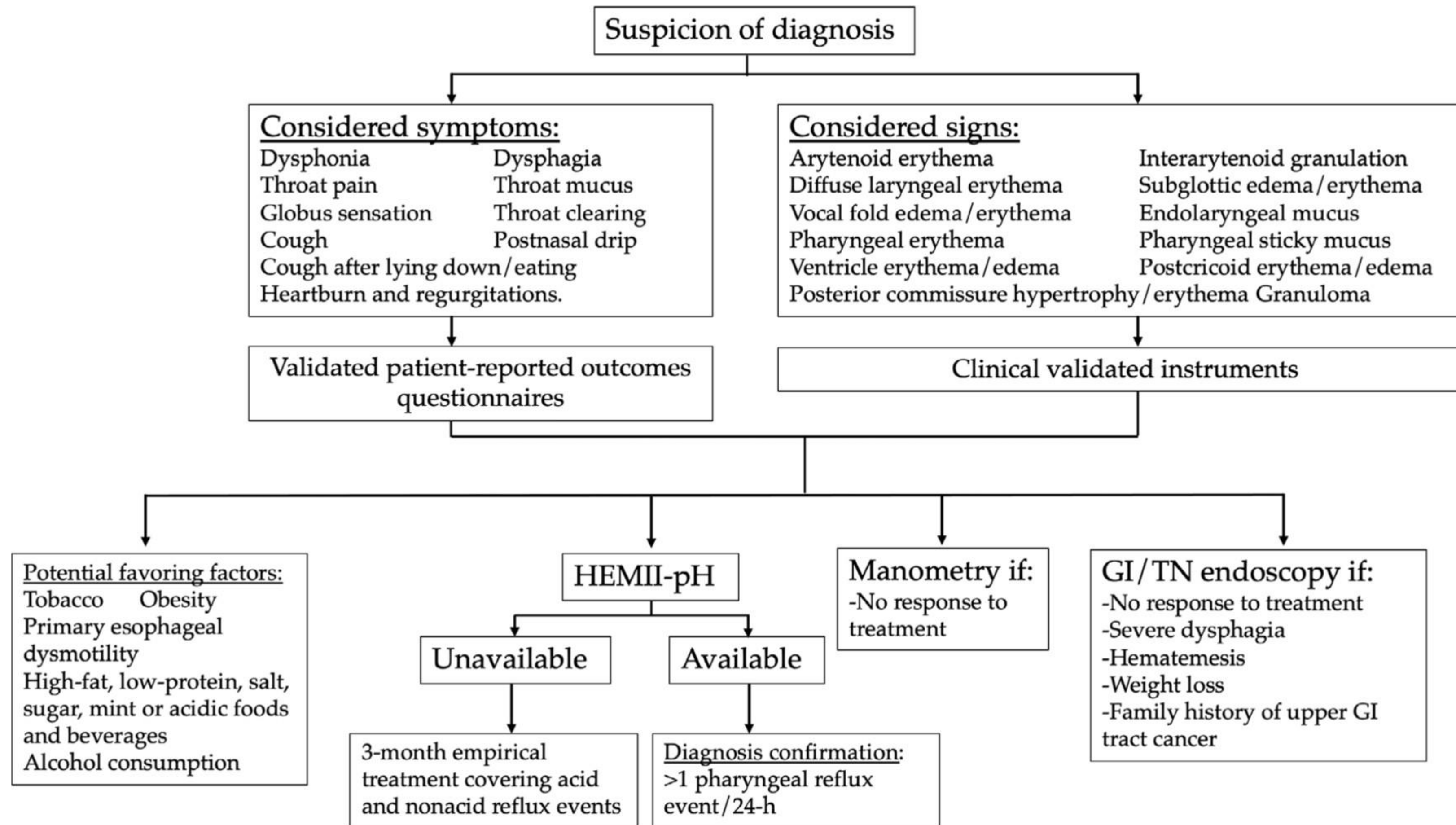
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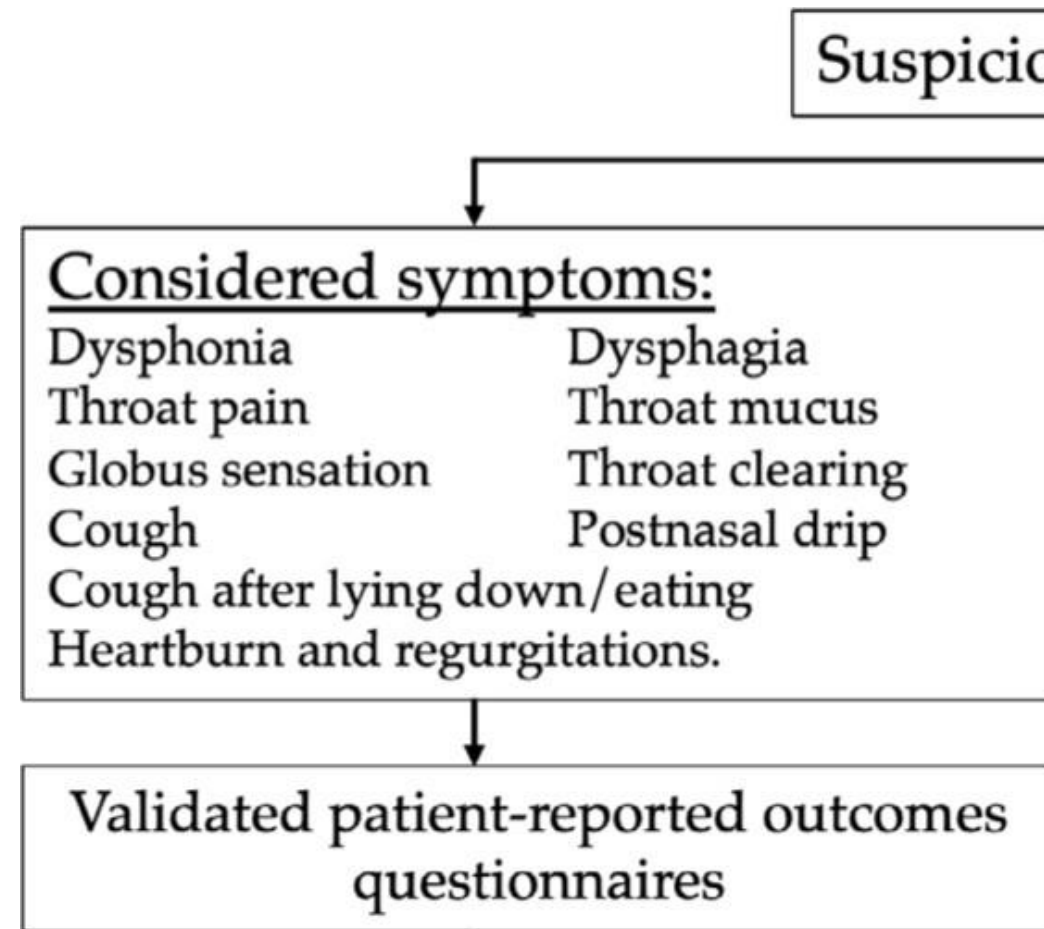
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Requires future study:

- Odynophagia
- Ear pain
- Burning tongue
- Halitosis
- Dyspnea
- Chest pain
- Nausea
- Acid brash
- Belching
- Dyspepsia

PROM severity, frequency, and/or quality-of-life impact of symptoms are used to improve baseline and posttreatment evaluations

broader list of symptoms potentially associated with LPR, for example, odynophagia, ear pain, dyspnea, or halitosis.



RSI

Reflux Symptom Index (RSI)	0 = No Problem 5 = Severe Problem				
1. Hoarseness or a problem with your voice					
2. Clearing your throat					
3. Excess throat mucous or postnasal drip					
4. Difficulty swallowing food, liquids, or pills					
5. Coughing after you eat or after lying down					
6. Breathing difficulties or choking episodes					
7. Troublesome or annoying cough					
8. Sensation of something sticking in your throat or a lump in your throat					
9. Heartburn, chest pain, indigestion, or stomach acid coming up					

RSS-12

Reflux Symptom Score-12					
Within the last month, I suffered from one/several followed symptoms					
Severity: 0 = problem is not severe, 5 = problem very troublesome when it occurs					
Frequency: 0 = I don't have this complaint over the past month, 1;2;3;4 = I had 1-2;2-3;3-4;4-5 weekly over the past month; 5 = complaint occurs daily					
	Disorder Frequency	Disorder Severity	Total score	Quality of Life Impact	Total score
Ear Nose and Throat Disorders					
1. Hoarseness or a voice problem	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
2. Throat pain or pain during swallowing time	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
3. Difficulty swallowing (pills, liquids or solid foods)	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
4. Throat clearing (not cough)	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
5. Sensation of something being stuck in the throat	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
6. Excess mucous in the throat and/or postnasal drip sensation	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
7. Bad breath	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
8. Heartburn, stomach acid coming up, regurgitations, burping or nausea	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
9. Abdominal pain or diarrhea	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
10. Indigestion, abdominal distension and/or flatus	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
11. Coughing (not just throat clearing)	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
12. Breathing difficulties, breathlessness or wheezing	0-1-2-3-4-5	0-1-2-3-4-5	.....	0-1-2-3-4-5	.....
	RSS total score:		Quality of Life score:		

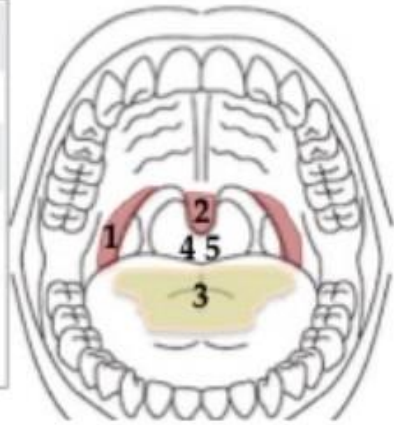
Severity item (5-point) is multiplied by frequency (5-point) to obtain symptom score (0-25). The sum is calculated to obtain RSS-12 final score (0-300). A RSS-12>11 is suggestive of Laryngopharyngeal Reflux (LPR) and exhibits high sensitivity (94.5%) and specificity (86.2%) [50].

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Suspicion of diagnosis

- 1 Erythema of anterior pillar
0 = absent 4 = present
 - 2 Uvula edema ± erythema
0 = absent 3 = present
 - 3 Coated tongue
0 = absent 2 = present
- Oral Cavity RSA:/9



- 4 Oro- hypopharyngeal erythema
0 = absent 4 = present
 - 5 Oro- hypopharyngeal granulation
0 = absent 3 = present
 - 6 Tongue tonsil hypertrophy
0= absent 3= mild/moderate 4= severe
Apparent *Apparent* *Unapparent*
villicula *villicula when* *villicula*
tongue sticked
 - 7 Pharyngeal sticky mucus
0 = absent 4 = present
 - 8 Contact between epiglottis & base of tongue
0 = absent 4 = present
- Pharyngeal RSA:/19

Considered signs:

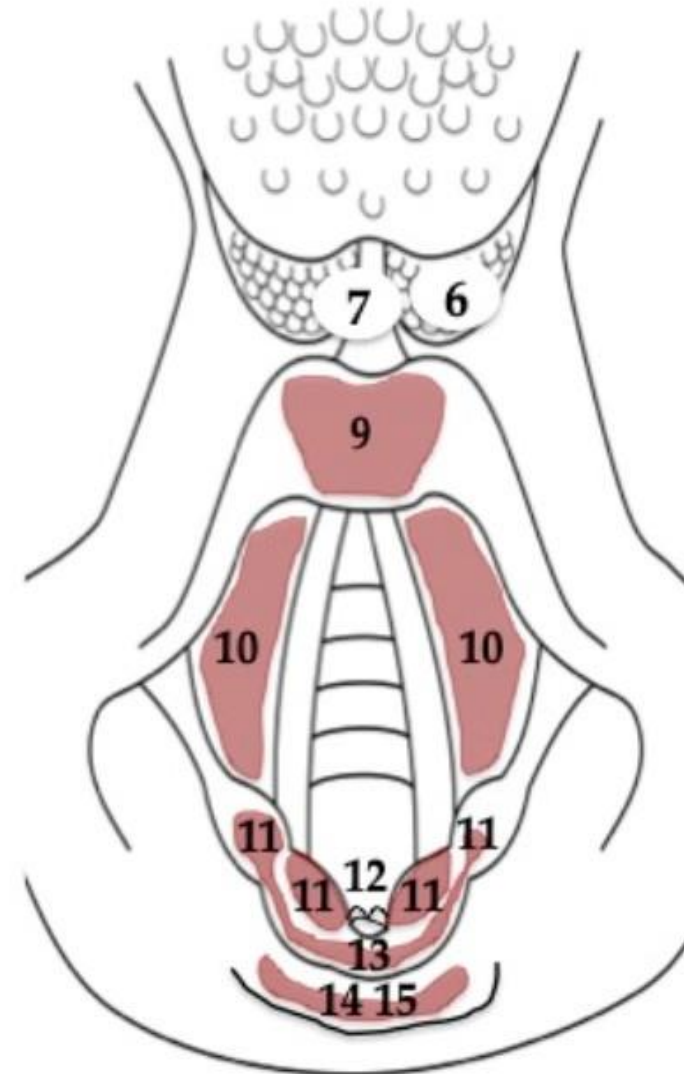
- Arytenoid erythema
- Diffuse laryngeal erythema
- Vocal fold edema/erythema
- Pharyngeal erythema
- Ventricle erythema/edema
- Posterior commissure hypertrophy/erythema
- Interarytenoid granulation
- Subglottic edema/erythema
- Endolaryngeal mucus
- Pharyngeal sticky mucus
- Postcricoid erythema/edema
- Granuloma

Clinical validated instruments

Reflux Finding Score (RFS).

Subglottic edema	0 – absent / 2 – present			
Ventricular obliteration	Partial – 2 points		Complete – 4 points	
Erythema/hyperemia	Arytenoids only – 2		Diffuse – 4	
Vocal fold edema	Mild – 1	Moderate – 2	Severe – 3	Polypoid – 4
Diffuse laryngeal edema	Mild – 1	Moderate – 2	Severe – 3	Obstructive – 4
Posterior commissure hypertrophy	Mild – 1	Moderate – 2	Severe – 3	Obstructive – 4
Granuloma /granulation tissue	Absent – 0 / Present – 2			
Thick endolaryngeal mucus	Absent – 0 / Present – 2			

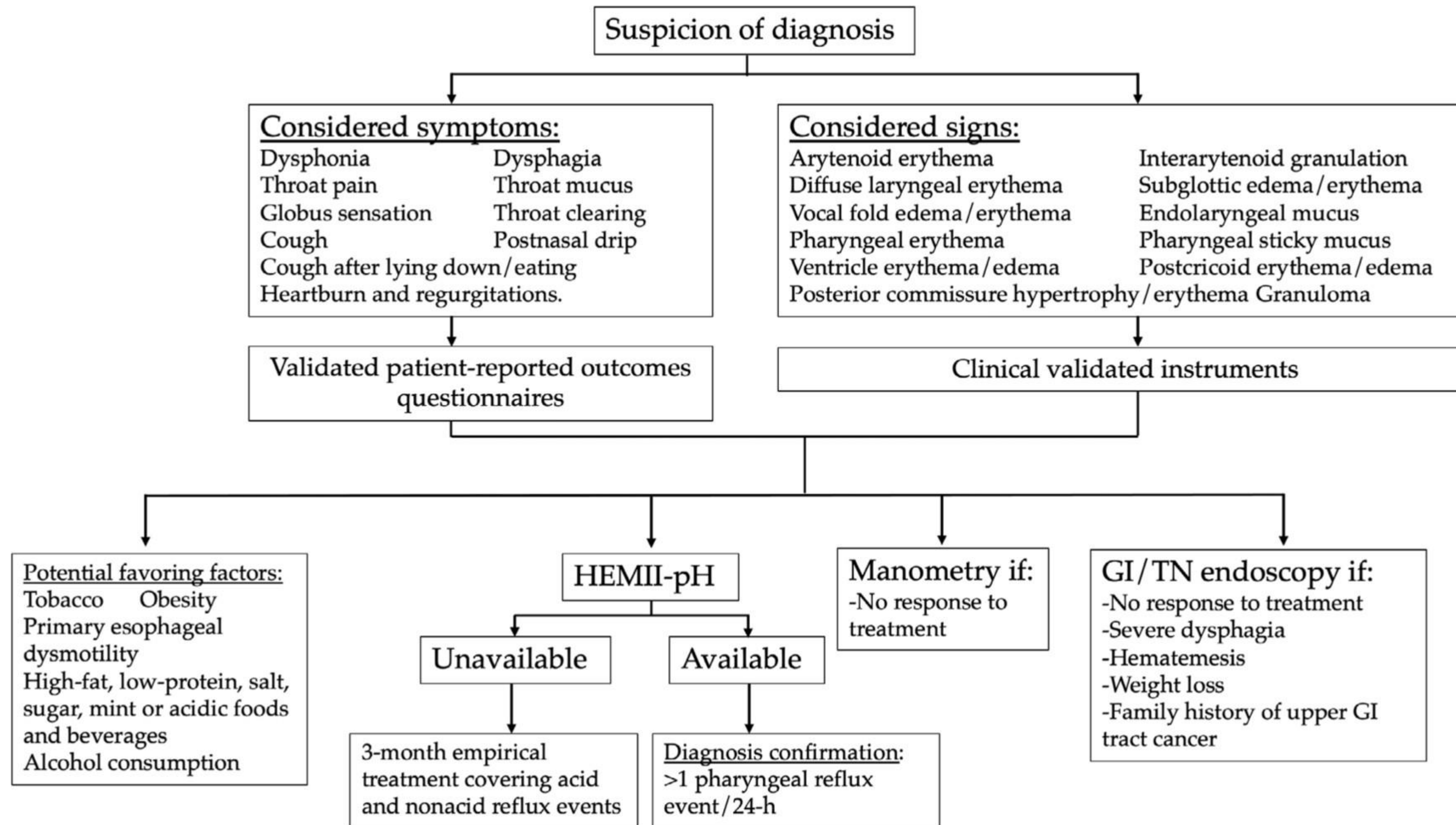
- 9 Erythema/edema of the epiglottis
0 = absent 3 = present
 - 10 Erythema/edema of the ventricular band
0 = absent 2 = present
 - 11 Laryngeal erythema
0 = absent 4 = located to arytenoids 5 = diffuse
 - 12 Inter-arytenoid inflammatory granulations
0 = absent 2 = present
 - 13 Posterior commissure hypertrophy
0 = absent 5 = present
 - 14 Retrocricoid erythema
0 = absent 3 = present
 - 15 Retrocricoid edema
0 = no contact with hypopharyngeal wall (open glottis) 4 = contact with hypopharyngeal wall (open glottis)
 - 16 Endolaryngeal sticky mucus
0 = absent 3 = present
 - 17 Vocal fold granuloma
0 = absent 2 = present
 - Laryngeal keratosis
0 = absent 2 = present
 - Vocal fold ulceration
0 = absent 2 = present
- Laryngeal RSA:/33



RSA total score:/61

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Validity and Reliability of the Indonesian Version of Reflux Symptoms Score (RSS) and Reflux Sign Assessment (RSA)

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ABSTRACT

Introduction: Laryngopharyngeal reflux (LPR) symptoms are unspecific and make it difficult for clinicians to make a diagnosis. Several types of questionnaires have been developed to diagnose LPR such as the reflux symptoms score (RSS) and reflux sign assessment (RSA) questionnaires. However, the use of these questionnaires in Indonesia is still experiencing obstacles because there is no Indonesian version that has been tested for validity and reliability. This study aims to evaluate the validity and reliability of the Indonesian versions of RSS and RSA.

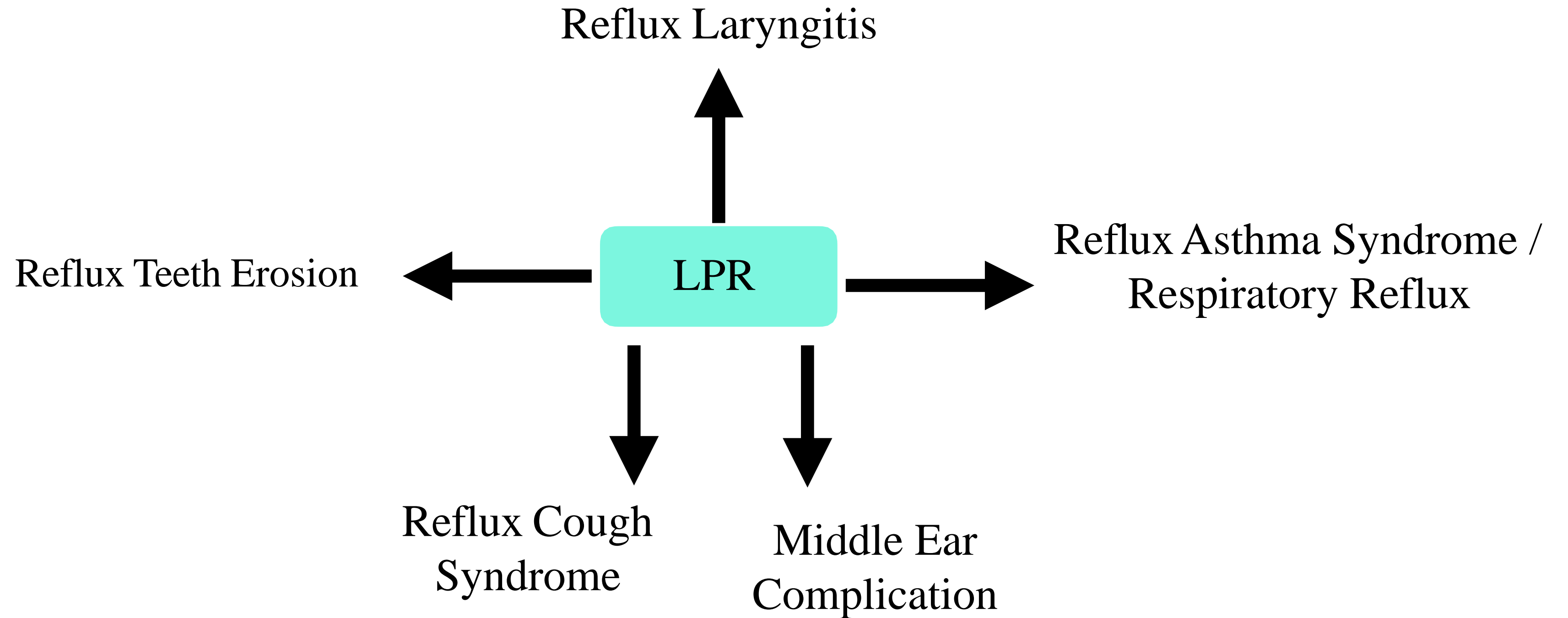
Methods: This study was an observational analytic study with a cross-sectional design involving 40 patients with LPR during January-March 2023. Questionnaire validity was assessed using external and internal validity methods, while reliability was assessed using internal consistency and test-retest reliability.

Results: The Indonesian versions of the RSS and RSA had good internal consistency with Cronbach's α values of 0.734-0.831 and 0.743-0.809 respectively. Test-retest reliability for RSS and RSA was also good with r of 0.930 and 0.842 respectively with $p < 0.001$ for both questionnaires. The Indonesian versions of RSS and RSA also proved to have good validity with high correlations between RSS with reflux symptoms index (RSI) and RSA with reflux finding score (RFS) with $p < 0.001$ for both questionnaires).

Conclusion: The Indonesian versions of the RSS and RSA questionnaires were found to be valid and reliable for the assessment of symptoms and diagnosis of LPR.

Keywords: LPR; Reliability; RSA; RSS; Validity

Complication of LPR



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Otitis media related hearing loss in Indonesian school children

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FULL TEXT LINKS



ACTIONS



SHARE



- Prospective epidemiological survey in a sample of 7005 public school children (6-15 years) from 6 urban and rural sub-districts, in Indonesia.
- OM was detected in 172 children (2.5%), acute otitis media - AOM (17%), otitis media with effusion - OME (15%), and chronic suppurative otitis media - CSOM (67%)
- OME accounted for much of the mild HL, while CSOM accounted for most of the moderate HL

Otitis Media Effusion

- Otitis media with effusion (OME) is the presence of non-purulent effusion within the middle ear and is a common disease during childhood.
- It is characterized by fluid collection in the middle ear without active infection
- If the disease continues for more than three months, it is defined as chronic OME
- One of the most common causes of hearing loss in developing countries[2].
- OME is a chronic inflammatory disease with a multifactorial etiology. The pathogenesis of OME can be caused by:
 - adenoid diseases
 - allergic rhinitis
 - immunological diseases
 - craniofacial dysmorphology
 - laryngopharyngeal reflux (LPR)
- Other risk factor : gender, race, environment, climatic conditions, humidity, a crowded home, socioeconomic status, breastfeeding duration, kindergarten nursery, passive smoking.

