

LARYNGOPHARYNGEAL REFLUX SYMPTOMS INDEX: RELATION WITH THE MAIN SYMPTOMS OF GASTROESOPHAGEAL REFLUX, VOICE USAGE LEVEL AND VOICE SCREENING

Índice de sintomas do refluxo faringo-laríngeo: relação com os principais sintomas de refluxo gastroesofágico, nível de uso de voz e triagem vocal

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ABSTRACT

Purpose: to determine the relation between Laryngopharyngeal Reflux Symptoms Index (LPRSI) and the main symptoms of gastroesophageal reflux disease (GERD) – heartburn and retrosternal pain – voice usage level and voice screening. **Method:** there were 179 volunteers, older than 18 years old, 107 females and 72 males divided into two groups according to the LPRSI total score: positive group (total score equals or greater than 13) and the negative group (below 13). Participants answered questions about the presence of typical GERD signs (heartburn and/or retrosternal pain), the voice usage level (high or low demand) and submitted to voice screening during the interview. **Results:** for LPRSI, 35 (19.6%) subjects made up the positive group (average score of 20) and 144 (80.4%) subjects made up the negative group (average score of 4.34). The typical GER symptoms were greater in the positive group: heartburn in 54.2% (19) versus 30.5% (44), retrosternal pain in 51.4% (18) versus 20.1% (29), and 74.3% of the subjects in the positive group and only 43.1% of those in the negative group showed one of the symptoms. For voice screening, 37.1% of the positive group and only 13% of the negative one failed it. There was no difference in voice demand related by any volunteer in neither groups. Statistical relation was found between positive LPRSI, GERD symptoms and voice screening failure ($p < 0.0001$). No relation to voice usage was found. **Conclusion:** a positive LPRSI may be related to signs of GERD and to altered voice quality noticed during the screening.

KEYWORDS: Gastroesophageal Reflux; Voice; Heartburn

■ INTRODUCTION

Laryngopharyngeal reflux (LPR) has been pointed as one of the cause factors more relevant to the development of dysphonia and it would be present in approximately 50% of the voice disorders patients¹, although such information is controversial

since many of the related symptoms of LPR are unspecific and also present in others laryngeal disturbances as allergies or respiratory diseases.

According to the *Consenso Brasileiro do Refluxo Gastroesofágico* (Brazilian Consensus of Gastroesophageal Reflux – 2002), the Gastroesophageal Reflux Disease – GERD is defined as a chronic disease coming from retrograde flux of part of gastro-duodenal containing to esophagus and/or extra-esophageal associated or not to tissue lesions. GERD patients may have the following symptoms: heartburn/burning, retrosternal pain and regurgitation; besides signs as: lesion of esophagus mucosa or airways-digestive tract. Many researches usually associate heartburn and retrosternal pain with

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reflux. Heartburn/burning or pyrosis is defined as the burning retrosternal sensation that radiates from manubrio sternum trough neck base, and it may reach throat². Retrosternal pain is the one felt behind the sternum bone associated many times to burning as heartburn consequence, and it even may be confused with heart disturbances.

Koufman et al (2002)³ defined LPR as an atypical way of GERD, since it has symptoms exclusive extra-esophageal, larynx-pharyngeal and/or trachea-bronchial. LPR may be responsible for many larynx disorders as in laryngitis by reflux, subglottis stenosis, larynx carcinoma, contact ulcer, granuloma, vocal nodules, and arytenoids cartilage fixation¹. The most observed frequent symptoms in LPR are: globus pharyngeus, retrosternal burning, chronic phlegm, posterior rhinorrhea, halitosis, roughness, vocal fatigue, voice breakdowns, dysphagia, regurgitation, chronic cough, wheezing, airway obstruction, and paroxysmal laryngospasm, the most frequent signs observed are: diffuse laryngeal edema, hyperemia, hypertrophic of interarytenoid area, contact ulcer, granuloma or granulation, posterior glottis area thickening³.

Belafsky et al (2001, 2002)^{4,5} developed a questionnaire to evaluate LPR patients entitled Laryngopharyngeal Reflux Signs and Symptoms Index, LPRSI. According to the authors a score higher than 13 points is equal to a deviated index. The authors highlight that, even without well defined criteria to diagnose LPR, it must have signs and symptoms in larynx or pharynx even if the patient does not have gastroesophageal reflux signs or have been diagnosed with the gastroesophageal reflux disease in order to suspect of LPR diagnose.

LPR may be hidden which means the disease may occur without the patient awareness or complaint leading to a low search for medical treatment. It is estimated that of the patients searching for an otolaryngologist evaluation half or two thirds of them are associated with roughness or other larynx diseases^{1,6}. In 100 cases investigated aging higher than 40 years old, without voice complaints, larynx or swallowing and without the GERD or LPR diagnostics, 64% had clinical findings of LPR at larynx evaluation⁷. Therefore the hidden LPR may significantly contribute to larynx diseases and may remain without detection until some substantial damage occurs to the tissue⁸.

Literature points out disagreement about the importance of LPR signs and symptoms, although the existence of pathognomonic LPR signs and symptoms. In 1995, Koufman⁹ did a comparison between GERD and LPR symptoms and did not find a common complaint of heartburning or regurgitation. One of the reasons to LPR occur without

heartburning or other GERD symptoms is in order to cause heartburning the reflux needs to stay in the esophagus enough time to cause irritation. Therefore if the acid pass fast through esophagus and reach supra esophagus, pharynx, and larynx areas the heartburning may not occur, but the LPR symptoms may since the supra esophagus area is more sensible to irritation than the esophagus¹⁰.

LPR has been pointed out as the responsible to dysphonia cases since to have a good voice production it is necessary to have a complete mucosa of vocal folds movement. Any factor that interferes in this movement will result in a voice disturbance. Therefore an irritation of vocal fold mucosa caused by gastric acid may not only cause burning and throat swelling sensation but interfere on phonation itself due to edema on vibration border of lamina propria, that will cause a voice disturbance¹¹. There are researches describing and suggesting that reflux may be the responsible to cause posterior larynx carcinoma. Others recognize reflux as the contribution factor in cases of posterior glottis stenosis¹².

Some LPR patients have a voice quality showing dysphonia caused by musculoskeletal tension, abrupt vocal onset, vocal fry usage, restrict modulation, and roughness¹³, but these voice symptoms also occur in other diseases. Therefore it is again a trouble to diagnose without particularly symptoms and exclusive for LPR.

The purpose of this research is to relate the Laryngopharyngeal Reflux Symptoms Index – LPRSI with the main gastroesophageal reflux – GERD main symptoms (heartburning/burning and retrosternal pain), also with the voice usage level, and a voice screening.

■ METHOD

The sample was composed by 179 subjects, 107 women and 72 men, mean age 35.4 years, varying from 18 through 77 years, voluntaries invited to join the research. As inclusion criteria it was inserted in this research men and women with age higher than 18 years from general population, asked to join randomly, independent of having voice, gastric, or general health complaints. The participants agreed to join the research and answered the LPRSI questionnaire about presence of GERD symptoms considering just heartburning/burning and retrosternal pain due to be more common and easier to be identified by the public as related to reflux symptoms and about voice usage; the participants also passed through a voice screening. These procedures were developed by speech and language pathologists, in an interview model, using direct questions.

The LPRSI questionnaire was proposed by Belafsky et al (2002)⁵, translated to Brazilian Portuguese (Figure 1) composed by nine questions in order to investigate the presence of LPR. The answerers should indicate if they have or have not the symptom and, in positive cases, they also should point out the level of the problem, with 0 (zero) meaning absence of problem and 5 (five) an important problem, the maximum score is 45 points. The questions refer to roughness or voice problems; phlegm; excessive secretion on nose or throat; trouble to swallow food,

liquids, or pills; cough after meal or lying down; breathing trouble or choking episodes; excessive cough; sensation of something stopped at the throat and heartburning; indigestion or stomach acid on the mouth. The LPRSI was considered positive when scores were equal or higher than 13, and negative when the score was lower than 13. The answerers were then placed into two groups: positive and negative, according to the sum of points of the answered questionnaire. To Belafsky et al (2001, 2002)^{4,5} the positive index is considered deviated.

Mark in the chart below if you had some of the symptoms in the last month and which way it has affected you. Mark (0) zero if the symptom is not a problem, and (5) five if it is an important problem.

1. Roughness or voice disturbance	NO	YES	0	1	2	3	4	5
2. Phlegm	NO	YES	0	1	2	3	4	5
3. Excessive secretion on nose or throat	NO	YES	0	1	2	3	4	5
4. Troubles to swallow food, liquids, or pills	NO	YES	0	1	2	3	4	5
5. Cough after meal or lying down	NO	YES	0	1	2	3	4	5
6. Breathing troubles or choking episodes	NO	YES	0	1	2	3	4	5
7. Excessive cough	NO	YES	0	1	2	3	4	5
8. Sensation of something stopped at the throat	NO	YES	0	1	2	3	4	5
9. Heartburning, chest pain, indigestion or stomach acid in the mouth	NO	YES	0	1	2	3	4	5
		TOTAL						

Figure 1 – Laryngopharyngeal Reflux Symptoms Index Protocol

Regarding the proper GERD symptoms the participant was asked to report the heartburning/burning, and/or retrosternal pain symptoms presence or absence. Regarding voice demand the participant evaluated the need of voice usage during work considering low demand when the participants answered to have low or mild voice usage during work and high demand when they report to use much or a lot the voice. It was performed a voice screening, perceptual analysis, during the interview evaluating the participant's voice during conversation while answering the questions. It was observed aspects as: intensity and frequency, presence of roughness, harshness, breathiness, or any other aspect compromising a good voice emission like voice breakdowns and stoppages. The evaluator, at the end of interview, categorized the voice in "pass" or "fail", suggesting the patient to look for otolaryngologist or gastroenterologist advice.

The current research was approved by CEV Ethical in Research Committee, under the protocol

number 0614/06 and all the participants signed the informed consent.

To statistical analysis it was used: Chi-squared test to measure the degree of relation between LPRSI and GERD symptoms, voice usage, and voice screening; and the Test for Equality of Proportions between two samples to verify the relation of LPRSI with the main GERD symptoms. The significance level adopted was 0.05 (5%)

■ RESULTS

Mean score, numerical distribution, and LPRSI percentage data are available on Table 1 in which 35 subjects (19.6%) composed the positive group to LPRSI (mean score equal to 20) and 144 (80.4%) composed negative group (mean equal to 4.34 points).

Table 2 presents the LPRSI relation with proper signs of gastroesophageal reflux which 54.3% of positive group had heartburning/burning against

30.5% of negative group, and retrosternal pain in 51.4% of positive group against 20.1% of negative group, data statistical significant ($p < 0.001$).

In table 3 are the relation of LPRSI with GERD symptoms, voice usage, and voice screening. There was statistical significant difference ($p < 0.001$) to GERD symptoms, 74.3% of positive group had the

symptoms against 43.1% of negative group; on voice demand self-reported there was no statistical significant difference, and on voice screening, 37.1% of positive group and 13% of negative group had failed, showing a significant statistical association ($p < 0.001$)

Table 1 – Numerical distribution, percentage, and mean score of each LPRSI question according to positive or negative group to the index

Questions	positive			negative		
	N	%	Mean Score	N	%	Mean Score
1 – Roughness or voice problems	24	68.6	3.8	31	21.5	2.6
2 – Phlegm	30	85.7	3.2	44	30.6	1.9
3 – Excessive secretion in throat or nose	29	82.9	3.4	48	33.3	2.5
4 – Trouble to swallow food, liquids or pills	10	28.6	3	14	9.7	2.7
5 – Cough after meal or while lying down	17	48.6	3.6	15	10.4	1.5
6 – Breathing troubles or choking episodes	18	51.4	3	23	16	2.6
7 – Excessive cough	22	62.9	3.7	7	4.9	2.4
8 – Sensation of something stopped at throat	25	71.4	3.8	29	20.1	2
9 – Heartburning, chest pain, indigestion or stomach acid in the mouth	26	74.3	3.5	54	37.5	2.7
Total	35	100	20	144	100	4.3

N- subjects number

LRSI: Laryngeal reflux symptoms index

Table 2 – Relation of LPRSI with typical symptoms of gastroesophageal reflux disease

	Heartburning/burning		Retrosternal pain	
	N	%	N	%
Positive	19	54.3%	18	51.4%
Negative	44	30.6%	29	20.1%
p-value	0.008*		<0.001*	

N- subjects number

LRSI: Laryngeal reflux symptoms index

Table 3 – Reflux symptoms, voice demand, and voice screening according to LPRSI

General		LPRSI positive		LPRSI negative		Total		P-value
		N	%	N	%	N	%	
GERD Symptoms	Present	26	74.3	62	43.1	88	49.2	0.001*
	Absent	9	25.7	82	56.9	91	50.8	
Voice demand	High	19	54.3	70	48.6	89	49.7	0.547
	Low	16	45.7	74	51.4	90	50.3	
Voice screening	Pass	22	62.9	125	86.8	147	82.1	0.001*
	Fail	13	37.1	19	13.2	32	17.9	
Total		35	35	19.6	144	80.4	179	100

N- subjects number

LPRSI: Laryngeal reflux symptoms index

GERD – Gastroesophageal Reflux Disease

■ DISCUSSION

GERD and LPR are controversial themes and hard to be diagnosed. The LPR have symptomatology extra esophagus, many times diagnosed as non allergic rhinitis, unspecific rhinopharyngitis, allergic pharyngitis, chronic laryngitis, or chronic sinusitis which diverges from the treatment of the truth etiology¹⁵. GERD symptoms show up in 25% of LPR cases¹⁵. In order to develop a tool capable of suggest a LPR diagnosis, Belafsky et al (2002)⁵ created the LPRSI instrument with questions about LPR symptoms. This instrument has been used by some authors with the purpose to follow the gastric treatment evolution done in LPR cases, although some researches are missing evaluating the questionnaire itself.

LPRSI is short with nine questions. Even the questions not having a direct relation with voice disorders, some of them, i.e. question 1 (roughness and voice disorders) are specific while others point out to the possibility of this relationship, as for instance the sensation of something stopped at throat and troubles to swallow, many times reported in functional dysphonia cases due to professional voice usage or musculoskeletal tension. Phlegm, excessive secretion in nose and throat, excessive cough, and cough after meal or after lying down are supra esophageal symptoms that might be due to reflux, have breathing or allergic origin. The question 9 (heartburning, chest pain, indigestion, or stomach acid in the mouth) might be related to cardiac disorders and reflux. So, this questionnaire must not be used as unique tool of LPR diagnose, and it is responsibility of the physician to evaluate the patient, requesting clinical examination and diagnostic conclusion, although the LPRSI may contribute in the initial conduction of this complex analysis. The LPRSI has received some critiques, specially about the question composition, as not including the sore throat symptom found in more than 40% of the patients with LPR¹⁷, the inclusion of heartburning, as a GERD proper symptom that have a good response to proton pump inhibitor¹⁸, and to overrepresentation of the cough symptom that appears in two items, questions 5 and 7¹⁹. However it is a useful questionnaire since it allows to suspect of LPR and to make the needed followings.

Table 1 shows the results of the nine researched symptoms divided in two groups, one positive, composed by subjects with scores equal or higher than 13; and another negative group with scores lower than 13. The mean score in positive group was equal 20 and to negative group equal to 4.34, an expressive difference. To Belafsky (2002)⁵ the mean score to LPR patients was 19.9 and to asymptomatic group was 11.6. In positive group

the phlegm (85.7%) and the excessive secretion on throat or nose (82.9%) were the predominant symptoms; the gastric symptoms show up in third place (74.8%) leading to questioning the Koufman et al 2003 state saying that LPR have symptoms exclusive extra esophagus, pharyngolaryngeal and/or tracheobronchial. Following is the symptom of the sensation of something stopped at throat (71.4%). The item about roughness presence and voice disorders, pretty much discussed at literature as main LPR symptoms, show up in fifth place (68.6%), however with a high occurrence. Breathing symptoms, cough and choking were reported by less than 50% of the sample in positive group. The least reported symptom was trouble to swallow (28.6%). Analysing the results of negative group, it is observed the gastric symptoms were the most reported (37.5%) followed by excessive secretion on throat (33.3%), phlegm (30.6%), roughness and voice disorders (21.5%), and sensation of something stopped at throat (20.1%). Breathing disorders and choking, cough and trouble to swallow were few reported.

In table 2 it is showed the relation of LPRSI with two of the proper GERD symptoms, heartburning / burning and retrosternal pain, these symptoms were higher in the positive group: heartburning/burning in 54.2% (19) against 30.5% (44) and retrosternal pain in 51.4%(18) against 20.1 (29), as 74.3% of subjects of positive group and only 43.1% of negative participants had one or two symptoms, there is a statistical difference between the groups to both symptoms. Again the data is in disagreement with literature that points out 20% to 25% of patients with GERD and LPR concomitantly^{3,20}.

Table 3 relates LPRSI with GERD symptoms, voice usage, and voice screening, showing 74.3% of subjects of positive group and only 43.1% of negative group having some of GERD symptoms. Regarding voice screening, 37.1% of positive group and only 13% of negative group failed, since the dysphonia percentage of occurrence is from 3 to 9% a fail higher than 30% in positive group point out the real voice disturbances of this group. There was no difference between voice demand self-reported between groups. It was found a statistical association between LPRSI positive and gastroesophageal reflux symptoms and failing in voice screening ($p < 0.001$).

■ CONCLUSION

Positive LPRSI may be related to GERD symptoms and to voice quality deviated and perceived at screening. The use of LPRSI questionnaire may contribute to speech and language clinical practice.

RESUMO

Objetivo: relacionar o Índice de Sintomas do Refluxo Faringo-Laríngeo – ISRFL com os principais sintomas do refluxo gastroesofágico – RGE (azia/queimação e dor retroesternal), com o nível de uso da voz e com uma triagem vocal. **Método:** participaram deste estudo 179 voluntários maiores de 18 anos, 107 mulheres e 72 homens, classificados em dois grupos de acordo com o escore total do ISRFL, grupo positivo (escore total igual ou maior a 13 pontos) e negativo (abaixo deste). Os participantes foram questionados sobre a presença dos sinais característicos do refluxo gastroesofágico (azia/queimação e/ou dor retroesternal), sobre a demanda de uso da voz (baixa/alta demanda) e submetidos à triagem vocal durante a entrevista. **Resultados:** quanto ao ISRFL, 35 (19,6%) indivíduos compuseram o grupo positivo (escore médio de 20) e 144 (80,4%) o grupo negativo (média de 4,34 pontos). Os sintomas característicos do RGE foram maiores no grupo positivo: azia/queimação em 54,2% (19) versus 30,5% (44), dor retroesternal em 51,4% (18) versus 20,1% (29), sendo que 74,3% dos indivíduos do grupo positivo e apenas 43,1% do negativo apresentaram algum dos sintomas. Quanto à triagem vocal, 37,1% do grupo positivo e 13% do negativo falharam. Não houve diferença de demanda vocal auto-relatada entre os grupos. Foi encontrada associação estatística entre ISRFL positivo, os sintomas de refluxo gastroesofágico e fracasso na triagem vocal ($p < 0,001$). Não houve associação quanto ao uso da voz. **Conclusão:** o ISRFL positivo pode estar relacionado com os sinais do RGE e com a alteração na qualidade vocal percebida em triagem.

DESCRIPTORIOS: Refluxo Laringofaríngeo; Refluxo Gastroesofágico; Voz; Azia

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