






Do Laryngologists and General Otolaryngologists Manage Laryngopharyngeal Reflux Differently?

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Objective: To investigate current practices of laryngologists and non-laryngologists in management of Laryngopharyngeal Reflux (LPR).

Methods: An online survey was sent to members of otolaryngology societies about LPR, and subgroup analysis was performed between laryngologists and non-laryngologists. This survey was conducted by the LPR Study Group of Young Otolaryngologists of the International Federation of Otolaryngological Societies.

Results: A total of 535 otolaryngologists completed the survey. Among them, 127 were laryngologists and 408 were non-laryngologists. Collectively, symptoms most commonly attributed to LPR are cough after lying down/meal, throat clearing, and acid brash; most common findings are thought to be arytenoid erythema and posterior commissure hypertrophy. Respectively, 12.5% and 5% of non-laryngologists and laryngologists believe that $\geq 50\%$ of LPR patients suffer from heartburn ($P = .010$). Non-laryngologists are more aware about some extra-laryngeal findings associated with LPR (eg, pharyngeal erythema) than laryngologists. Neither laryngologists nor non-laryngologists associated development of benign lesions of the vocal folds with reflux. The management of LPR substantially differs between groups, with laryngologists indicating increased awareness of (impedance)-pH monitoring as well as the prevalence and treatment of nonacid/mixed LPR. Conversely, non-laryngologists are much more likely to include gastroenterology referral in their management of presumed LPR. Respectively, 44.8% and 27.6% of non-laryngologists and laryngologists believe themselves not sufficiently knowledgeable about LPR.

Conclusions: Significant differences exist between laryngologists and non-laryngologists in diagnosis and treatment of LPR. Overall only one-third of responders believe themselves to be sufficiently educated about LPR.

Key Words: Laryngopharyngeal, reflux, laryngologist, management, treatment, survey.

Level of Evidence: 4

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INTRODUCTION

Laryngopharyngeal reflux (LPR) is an inflammatory condition of the upper aerodigestive tract tissues related to direct and indirect effect of gastric or duodenal content reflux, which induces morphological changes in the upper aerodigestive tract.¹ The prevalence of LPR is difficult to know with precision, but many authors suggest that LPR-associated symptoms are found in 10% to 30% of patients presenting to otolaryngology–head and neck surgery

departments^{2,3} and up to 50% of patients in laryngology practices.⁴ In that respect, laryngologists more often treat LPR than general otolaryngologists and could theoretically be more aware about the reflux management than general otolaryngologists. Over the past two decades, a few surveys have assessed the management of LPR by otolaryngologists, especially in United States.^{5–7} These surveys emphasized the opinion by respondents that LPR was “new” and a distinct clinical entity from gastroesophageal reflux disease

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(GERD), with differences in pathophysiology, diagnostic approach, and therapeutic management.

Since then, an increasing number of studies support association of LPR with the development of many prevalent ear, nose, and throat (ENT) diseases such as chronic rhinosinusitis,⁸ acute and chronic media otitis,^{9–11} or cancer.^{12,13} The involvement of LPR in ENT diseases is particularly high in laryngeal diseases, such as laryngotracheal stenosis,¹⁴ spasmodic dysphonia,¹⁵ leukoplakia,^{16,17} granuloma,¹⁸ and benign lesion of the vocal folds.¹⁹ However, the current knowledge and practices of laryngologists have never been extensively assessed or perhaps compared with non-laryngologists. Such assessment may particularly clarify issues regarding definition, diagnosis, and treatment of LPR and the related high heterogeneity in the management of the disease reported in some American cohorts of otolaryngologists.⁶ In light of this knowledge gap, the aim of this study is to investigate the current trends in management of LPR among laryngologists and non-laryngologists.

MATERIALS AND METHODS

The LPR Study Group of Young Otolaryngologists of the International Federation of Oto-rhino-laryngological Societies (YO-IFOS) has developed an international survey based on a state-of-the-art review¹ for assessing the current knowledge and practice of otolaryngologists in the management of LPR around the world. The LPR Study Group of YO-IFOS includes otolaryngologists from North America (Canada, USA), South American (Colombia, Brazil), Europe (Belgium, France, Italy, Spain, Greece, Sweden, Luxembourg, Poland, and UK), Oceania (New Zealand), Africa (Morocco), and Asia (Turkey, Lebanon, and South Korea).^{20–22}

The survey was created with Survey Monkey (San Mateo, California, USA), so that each participant could complete the survey only once. The survey itself was developed in iterative fashion, with drafts revised by both three certified otolaryngologists, including one laryngologist (phoniatician). In the final version of the survey, there were 21 questions divided into five sections: definition and epidemiology (3), clinical presentation (4), diagnostic approach (3), treatment (10), and skills (1) (Appendix 1). About reflux sign assessment, the responders were invited to answer to the question if they use at least flexible scopes for assessing findings.

The survey was emailed on two occasions to otolaryngologists under 45 years old (criteria of YO-IFOS representation) who had attended the 2017 IFOS meeting (Paris, France) and

also to members of some otolaryngology societies (eg, the Greek ENT society, French ENT society, European Laryngological Society, New Zealand ENT society, Korean ENT society and Confederation of European Otorhinolaryngology–Head and Neck Surgery). Responses were collated anonymously. Incomplete responses were excluded from analysis. Because there is not any patient data, this study was exempt from the need for Institutional Review Board approval.

Statistical Package for the Social Sciences for Windows (SPSS version 22,0; IBM Corp, Armonk, NY, USA) was used to perform the statistical analyses. A level of $P < .05$ was used to determine statistical significance. The differences in response between laryngologists and non-laryngologists were evaluated using the χ^2 test.

RESULTS

Approximately 6000 otolaryngologists received the survey and 535 completed the survey. While distribution methodology makes it impossible to know with certainty how many otolaryngologists received an invitation to complete the survey, we estimate that several thousand otolaryngologists were offered the opportunity to participate. Among them, 535 responses were received. One hundred twenty-seven were laryngologists and 408 were non-laryngologists. The characteristics of groups are available in Table I. Both groups were comparable regarding the geographic localization of physicians (continents) and the types of practice (academic vs. private vs. academic and private).

Laryngopharyngeal Reflux Definition and Prevalence

The majority of laryngologists and non-laryngologists (71.1%) consider LPR and GERD as different diseases sharing some common pathophysiological mechanisms. In the remaining responders, the proportion of non-laryngologists (16.7%) who consider GERD and LPR as the same disease is higher than the proportion of laryngologists (9.6%; $P = .010$). The prevalence of LPR in their patients is estimated to be 23.3% by both groups together, and there was no difference between laryngologists and non-laryngologists in this estimate.

TABLE I.
Characteristics of Otolaryngologists.

Practice characteristics	Laryngologists	Non-laryngologists	Total
Years of practice (yr)	15.2 ± 9.0 (r1–40)	11.5 ± 9.1 (r1–42)	12.4 ± 9.1
Academic practice	65	177	242
Private practice	21	94	115
Academic & private practice	38	131	169
Lacking information	2	7	9
World location			
America	22 (17.3%)	56 (13.8%)	78
Europe	44 (34.6%)	218 (53.4%)	262
Oceania	11 (8.7%)	16 (3.9%)	27
Asia	42 (33.1%)	104 (25.5%)	146
Africa	8 (6.3%)	14 (3.4%)	22

r = range.

Involvement of LPR in the Development of ENT Diseases

Laryngologists and non-laryngologists consider LPR to be associated with the development of the following diseases: chronic cough, chronic rhinosinusitis, and chronic

throat pain. In contrast, they do not think that there is a relationship between LPR and vocal fold polyp or hemorrhage, nodules, Reinke's edema, laryngotracheal stenosis, otitis media, Eustachian tube dysfunction, and nasal obstruction (Fig. 1). Comparison of laryngologists and

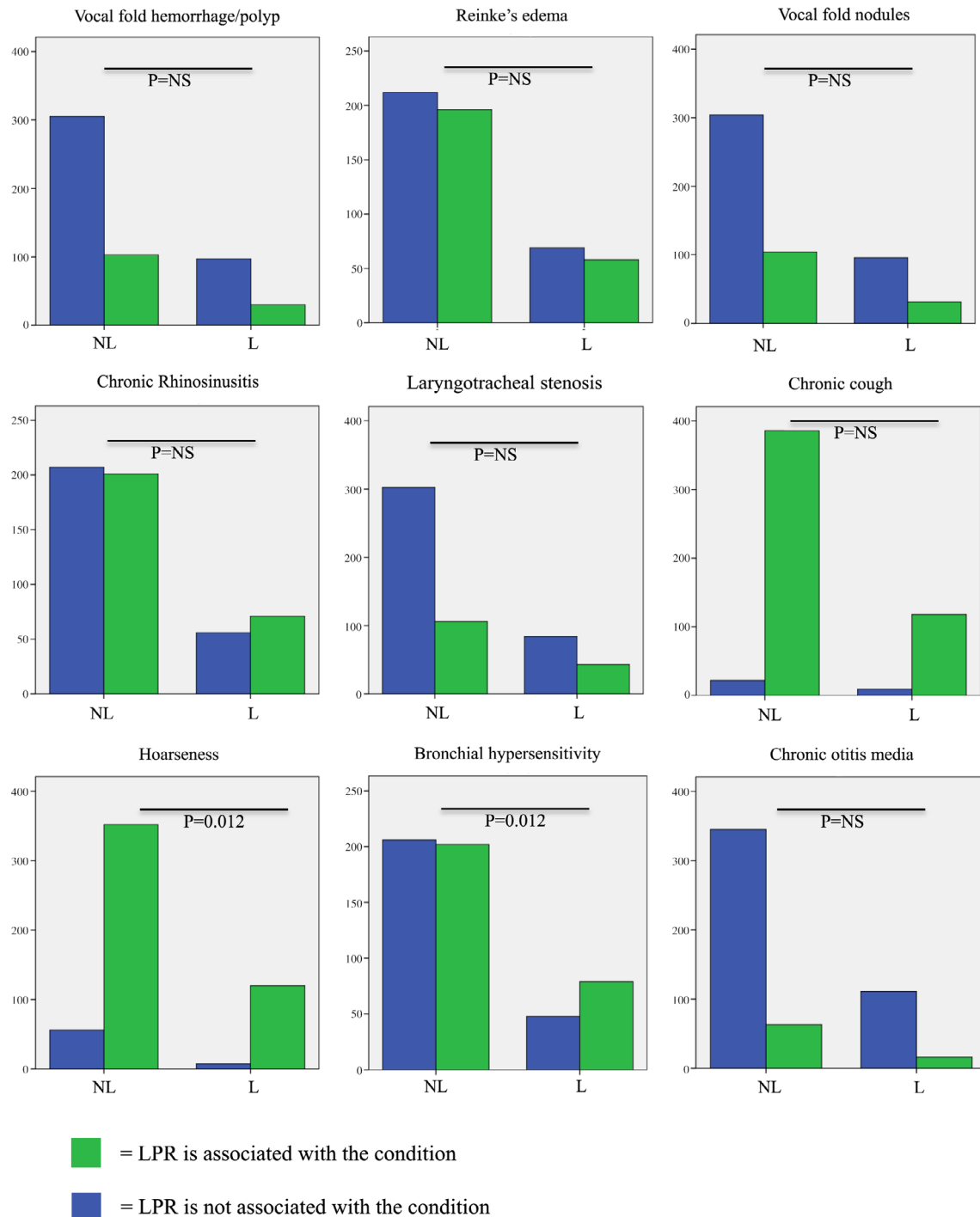


Fig. 1. The involvement of reflux in the development of upper aerodigestive tract diseases regarding the specialty. The y-axis corresponds to the percent of physicians who agree or not with the association. The statistics were made through chi-square test. L = laryngologists, LPR = laryngopharyngeal reflux, NL = non-laryngologists, NS = non-significant. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

non-laryngologists reveals some differences in association between LPR and other diagnoses. For instance, the majority of non-laryngologists consider LPR to be unrelated to the development of bronchial hyper-responsiveness, while laryngologists felt that LPR does contribute to distal airway reactivity ($P = .012$). Additionally, a higher proportion of laryngologists believe that LPR may be associated with hoarseness than non-laryngologists ($P = .012$).

LPR Symptoms and Findings

Irrespective of group, symptoms thought to be highly related to LPR are cough after lying down/after meal, throat clearing, acid brash, and troublesome cough (Table II). Non-laryngologists give higher importance to LPR as a source of throat pain than laryngologists ($P = .004$). Additionally, 12.5% of non-laryngologists believe that $\geq 50\%$ of LPR patients suffer from heartburn, whereas only 5% of laryngologists believe this ($P = .010$). Both groups consider arytenoid erythema and posterior commissure hypertrophy as the most important exam findings associated with LPR (Table III). Non-laryngologists consider arytenoid erythema and pharyngeal erythema as more specific LPR signs than laryngologists ($P = .012$ and $P = .004$, respectively).

Diagnostic Approaches

The majority of both laryngologists and non-laryngologists (91.0%) base LPR diagnosis on response to an empiric trial of medication, looking for improvement in both signs and symptoms. When additional examinations are utilized, non-laryngologists more frequently use transnasal esophagoscopy than laryngologists (33.7% vs. 24.4%; $P = .002$), though each had similar indications for esophagoscopy. The most common indications

indicated by respondents are symptoms refractory to treatment (60.9%), long-term use of PPIs (44.5%), heartburn as a presenting symptom (26.5%), and elderly patient (14.2%). Only 8.6% of otolaryngologists indicated that they sought esophagoscopy for all patients, while 8.6% do not perform or refer for esophagoscopy at all.

Laryngologists more often performed or referred patients for esophageal manometry (28.3% vs. 17.9%; $P = .016$). At baseline or in case of therapeutic resistance, non-laryngologists more often refer the patient to gastroenterology than do laryngologists (45.2% vs. 27.6%; $P = .001$).

Of laryngologists and non-laryngologists, 78.4% never use dual-probe esophageal and hypopharyngeal pH metry. Precisely, 12.4% of laryngologists use dual-probe esophageal pH metry versus 4.7% of non-laryngologists ($P = .006$). Laryngologists utilize impedance-pH testing (MII-pH) for LPR diagnosis more than non-laryngologists (31.3% vs. 14.1%; $P = .001$).

Irrespective of subspecialty group, the most important barriers in using MII-pH or pH monitoring are: inconvenience (62.0%), cost (54.2%), thought that it is unimportant (42.2%), and lack of understanding of interpretation (41.0%). Some differences exist between the groups, with non-laryngologists considering convenience (41.2% vs. 30.8%; $P = .012$), interpretation (40.0% vs. 30.4%; $P = .015$), and unclear indications (40.7% vs. 20.6%; $P = .013$) as more important barriers than laryngologists. Taken together, 8.3% of respondents have used oropharyngeal pH-testing, while 3.4% have used salivary pepsin assays.

Treatment of LPR Patients

The different treatments used by laryngologists and non-laryngologists are described in Figure 2. Irrespective of specialty, the majority of otolaryngologists use once

TABLE II.
Symptoms Associated with Laryngopharyngeal Reflux According to Survey.

Symptoms	Non-laryngologists (%)					Laryngologists (%)					<i>P</i>
	1	2	3	4	5	1	2	3	4	5	
Heartburn	32.6	16.7	27.3	15.6	7.7	37.3	22.0	24.6	9.3	6.8	.298
Stomach acid coming up	50.3	18.5	19.5	8.8	3.0	49.2	25.0	17.7	6.5	1.6	.484
Troublesome cough	32.8	34.1	28.6	4.3	0.3	28.9	38.0	27.3	5.0	0.8	.770
Cough after lying down/meal	48.9	28.8	18.5	2.5	1.3	39.7	40.5	14.9	4.1	0.8	.116
Globus	44.7	23.1	22.8	6.1	3.3	40.5	33.9	17.4	5.8	2.5	.193
Hoarseness	22.4	36.6	31.8	7.7	1.5	16.1	31.5	37.1	12.1	3.2	.144
Throat pain	20.3	30.0	34.2	13.4	2.2	9.7	27.4	50.0	8.9	4.0	.004
Odynophagia	8.0	16.2	38.6	23.6	13.7	7.4	19.7	40.2	17.2	15.6	.599
Dysphagia	6.3	15.3	33.1	27.3	18.0	2.4	17.1	35.8	29.3	15.4	.485
Chest pain	4.2	10.0	31.2	35.9	18.7	1.7	5.8	39.2	39.2	14.2	.161
Throat sticky mucus	27.1	32.6	28.6	6.7	5.0	21.8	34.7	27.4	12.9	3.2	.178
Throat clearing	44.6	31.7	16.2	5.2	2.2	36.1	34.4	24.6	1.6	3.3	.072
Tongue burning	5.7	17.9	36.3	26.4	13.7	8.9	15.4	29.3	32.5	13.8	.346
Halitosis	10.7	21.4	40.5	19.2	8.2	10.6	18.7	39.0	21.1	10.6	.883
Breathing difficulties	2.5	6.2	28.9	38.1	24.4	1.6	5.7	34.1	38.2	20.3	.757

The selection of the symptoms including in the survey was based on the Reflux Symptom Score.³¹ The numbers in the table consist of the percent of physicians who rate the symptom association: physicians had to choose from 1 (high-associated LPR symptom) to 5 (not associated with LPR). LPR = laryngopharyngeal reflux.

TABLE III.
Signs Associated with Laryngopharyngeal Reflux According to Survey.

Findings	Non-laryngologists (%)					Laryngologists (%)					P
	1	2	3	4	5	1	2	3	4	5	
Arytenoid erythema	60.8	26.3	10.8	2.0	0.3	55.5	19.3	21.0	2.5	1.7	.012
Pharyngeal erythema	29.3	36.3	24.6	9.5	0.3	22.5	29.2	33.3	11.7	3.3	.004
Anterior tonsillar pillar erythema	7.0	12.3	34.6	26.8	19.3	4.2	8.5	34.7	32.2	20.3	.517
Tonsil pillars edema	3.5	7.0	31.7	31.4	26.4	4.2	5.1	24.4	24.2	20.3	.309
Vocal fold erythema	16.1	34.7	35.5	10.2	3.5	14.0	30.6	33.9	15.7	5.8	.339
Subglottic erythema	7.5	25.4	29.6	26.6	10.8	6.7	22.7	32.8	24.4	13.4	.847
Subglottic edema	10.0	22.1	25.8	27.1	15.0	11.9	20.3	23.7	25.4	18.6	.842
Posterior commissure hypertrophy	56.9	26.7	11.3	4.5	0.5	50.8	25.8	13.3	9.2	0.8	.325
Interarytenoid granulations	43.9	28.2	15.5	9.2	3.2	39.7	28.9	20.7	8.3	2.5	.702
Retrocricoid edema	31.2	28.2	22.4	11.6	6.5	25.4	35.6	24.6	7.6	6.8	.378
Pharyngeal wall edema	12.8	26.5	34.8	19.5	6.5	9.2	25.0	40.0	20.8	5.0	.699
Vocal fold edema	11.1	27.9	35.9	18.6	6.5	14.0	19.8	43.8	17.4	5.0	.288
Laryngeal ventricle edema	10.3	21.0	38.8	19.0	11.0	8.5	15.3	42.4	22.9	11.0	.590
Vocal fold lesions (leukoplakia, nodules, etc.)	7.3	21.8	35.5	26.5	9.0	6.7	18.5	45.4	19.3	10.1	.299
Endolaryngeal sticky mucus	21.7	22.7	35.2	15.5	5.0	17.4	32.2	29.8	16.5	4.1	.262
Uvula erythema or edema	5.3	12.5	39.1	26.3	16.8	4.3	10.3	33.3	29.9	22.2	.513
Coated tongue	9.0	17.5	35.8	24.0	13.8	9.2	11.7	25.8	34.2	19.2	.039
Tongue tonsil hypertrophy	10.2	19.7	28.4	22.7	19.0	7.8	15.5	30.2	25.9	20.7	.731

The selection of the signs including in the survey was based on the Reflux Sign Assessment.²³ The numbers in the table consist of the percent of physicians who rate the finding association: physicians had to choose from 1 (high-associated LPR finding) to 5 (not associated with LPR). LPR = laryngopharyngeal reflux.

daily PPI or twice daily PPI as single-agent therapy. Alginate and magaldrate are prescribed by 42.2% and 4.8% of otolaryngologists, respectively. Laryngologists more frequently use H2-blockers than non-laryngologists (30.6% vs. 20.5%; $P = .022$). The majority of otolaryngologists prescribe treatment for 1 to 2 months, which does not vary from one group to another (Fig. 2). The treatment of patients with mild LPR does not change regarding the specialty and consists of dietary recommendations alone (50.5%); diet and PPI together (35.7%); PPI without dietary counseling (10.7%); other treatments (2.1%); or nothing (1.0%). Irrespective to the group, 57.3% of otolaryngologists assess posttreatment symptoms and exam findings to judge the therapeutic efficacy, whereas 42.2% consider symptoms alone. Of laryngologists, 58.3% systematically or sometimes use patient-reported outcome questionnaires for following LPR patients as compared to 38.4% of non-laryngologists ($P = .001$).

Respectively, 16.2% (66/408) of non-laryngologists and 34.6% (44/127) of laryngologists are aware of the existence of different types of LPR (nonacid, mixed, acid; $P = .001$). For laryngologists, the treatment nonacid LPR was reported as alginate alone (34%), combination of PPI and alginate (22.6%), fundoplication (16%), PPI alone (10.4%), strict diet (10.4%), and magaldrate (0.9%). Of laryngologists, 5.7% report not knowing treatment for nonacid reflux. Non-laryngologists treat nonacid reflux with combination of PPI and alginate (24/8%), strict diet (22.8%), PPI alone (16.2%), alginate alone (12%), and magaldrate (4.5%). Of non-laryngologists, 9.7% state uncertainly about an approach to nonacid reflux. Irrespective of type of reflux (acid, nonacid, or mixed), 9.9% and 2.5% of non-laryngologists

and laryngologists do not advise dietary and behavioral changes for treatment ($P = .028$).

Causes and Management of Recalcitrant LPR

According to both laryngologists and non-laryngologists, poor diet (42.7%), non-compliance with treatment (18.7%), severity of reflux (12.3%), and nonacid LPR are the most important causes of resistance to treatment. Of otolaryngologists, 16.4% responded that they did not know possible causes of treatment failure. The management of patients with recalcitrant LPR varies significantly between laryngologists and non-laryngologists ($P = .001$). Of laryngologists, 40.3% undertake additional examinations (ie, esophagoscopy, MII-pH), 27.7% refer to gastroenterology, and 20.2% prescribe long-term PPI. A higher proportion of non-laryngologists refer to gastroenterology (52.4%), and a corresponding lower proportion (25.0%) undertake additional examinations themselves; 10.7% of non-laryngologists give long-term PPI. 6% of both laryngologists and non-laryngologists refer for possible fundoplication in case of lack of response to PPI. The therapeutic approaches of recalcitrant LPR of both laryngologists and non-laryngologists are described in Figure 3.

Self-Rating of LPR Knowledge

Respectively, 32.5% and 61.8% of non-laryngologists and laryngologists considered themselves to be adequately knowledgeable and skilled about LPR, while 44.8% and 27.6% believed the opposite ($P = .001$).

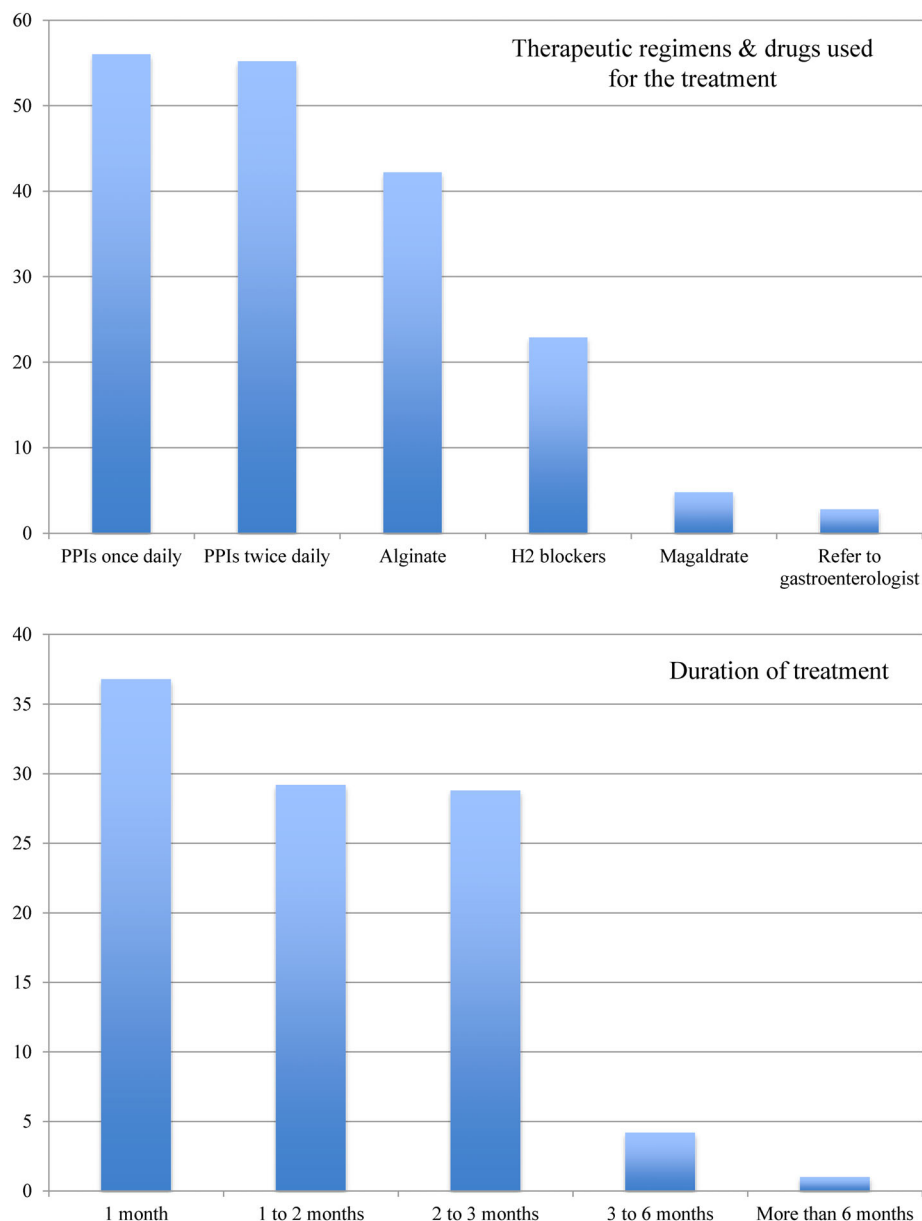


Fig. 2. Treatment of reflux regarding the specialty. The y-axis corresponds to the percent of physicians who use the approach. The statistics were made through chi-square test. PPIs = proton pump inhibitors. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

DISCUSSION

The management of LPR remains a controversial topic, characterized by different practices around the world.¹ Literature suggests that LPR is associated with presenting symptoms in 10% to 30% of otolaryngology patient populations, and the current survey fits within these prevalence figures as respondents collectively estimate that 23.3% of their patients present with an LPR-associated complaint. The majority of laryngologists and non-laryngologists believe that GERD symptoms, such as heartburn, are important for the diagnosis of LPR.¹ The current study finds that non-laryngologists are more aware about the association between LPR and some non-laryngological findings including coated tongue or pharyngeal erythema. This observation is not surprising, as laryngologists might focus

more on laryngeal findings to the exclusion of oropharyngeal signs. In practice, pharyngeal erythema has been one of the most prevalent findings associated with LPR and should be considered for both the diagnosis and the evaluation of therapeutic effectiveness.²³

As mentioned above, LPR may be associated with many upper aerodigestive tract mucosal conditions. Among upper aerodigestive tract diseases, basic science and clinical studies indicate that LPR is associated with development of nodules, Reinke's edema and polyps,^{19,24,25} an association which seems not to be well-known by the majority of laryngologists and non-laryngologists. The current survey reveals similar lack of awareness of the potential role of LPR in development of laryngotracheal stenosis and chronic media otitis, despite an increasing literature

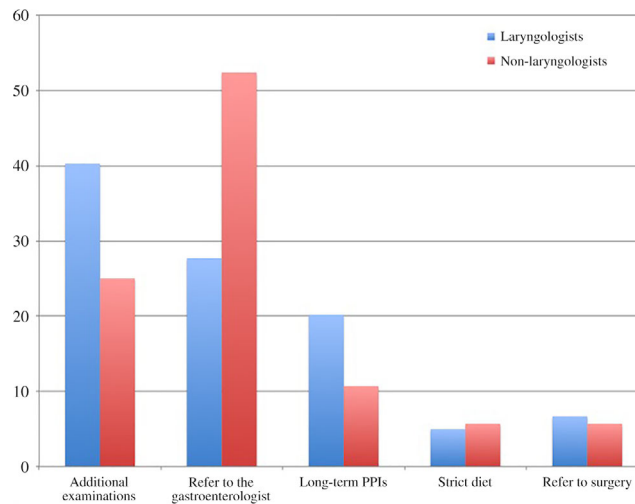


Fig. 3. Therapeutic management of recalcitrant reflux regarding the specialty. The y-axis corresponds to the percent of physicians who use the approach. The statistics were made through chi-square test. PPIs = proton pump inhibitors. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

which supports this relationship.^{10,11,26,27} Surprisingly, non-laryngologists seem to be unaware about the role of LPR in bronchial diseases such as asthma; however, many studies have demonstrated that LPR is involved in the development of bronchial hypersensitivity conditions, such as asthma,^{28,29} or chronic obstructive pulmonary disease.³⁰

In the current survey, the largest differences between laryngologists and non-laryngologists concern diagnostic approach towards LPR, particularly with regard to examinations such as esophagoscopy and MII-pH. In initial evaluation, non-laryngologists more frequently perform or refer for esophagoscopy, although less than 40% of LPR patients have GI findings such as hiatal hernia or esophagitis.^{31,32} The majority of otolaryngologists believe that GI endoscopy is indicated for patients requiring long-term PPI therapy or those with refractory LPR. Only 14.2% of otolaryngologists recommend performing GI endoscopy in elderly LPR patients, while these patients are known to have a lower perception of esophageal irritation and a related higher risk of “silent” erosive esophageal lesions.^{33–35} Overall, reported indications for GI endoscopy are still heterogeneous, reflecting the lack of consensus among otolaryngologists.

Additionally, the current survey shows that the majority of laryngologists and non-laryngologists do not use pH monitoring or MII-pH, though laryngologists report increased awareness of esophageal manometry, pH monitoring and MII-pH than non-laryngologists. Conversely, non-laryngologists more frequently refer patients to gastroenterology. The main reasons cited for not using MII-pH are convenience, cost, the feeling that results are not meaningful to management of LPR, and difficulty with interpretation; non-laryngologists in particular rate difficulty with interpretation as a larger barrier than do laryngologists, though these perceived barriers may have slowed adoption of MII-pH into otolaryngologic management of LPR. In our practice, the probe placement is inconvenient but less than 5% of patients do not tolerate the 24-hour MII-pH testing. Although there is no

international consensus for the diagnostic criteria, results are usually easy to interpret considering the occurrence of symptoms, findings, and ≥ 1 proximal reflux episode for LPR diagnosis.^{31,36} About the meaningfulness of the approach, some recent data suggested that the use of MII-pH at baseline is the best way for the diagnosis confirmation and would have a therapeutic role.¹⁹ Indeed, regarding MII-pH results, patients with nonacid LPR may receive alginate or magaldrate in place of PPIs, which are less effective in non-acid or mixed LPR.³¹ The choice of an adequate treatment at baseline is important because that would be associated with a decreased risk for using an ineffective treatment and should be more cost effective than an empirical therapeutic trial. This point is matter of importance regarding the high number of both laryngologists and non-laryngologists who systematically use empirical therapeutic trial (based on PPI as a single agent).

The present survey confirms that PPI are the most used drugs by both laryngologists and non-laryngologists for LPR treatment. However, PPI are less effective on mixed reflux, and ineffective on nonacid LPR, which together affect more than 50% of LPR patients.^{31,37} For this reason, recent studies and recommendations support the use of alginate for nonacid and mixed LPR, which form a raft floating over gastric contents and a protective biofilm on mucosa of the esophagus and upper aerodigestive tract.^{31,38,39} Laryngologists are more aware about the existence of nonacid and mixed LPR, and, therefore, they more frequently use alginate for the treatment of nonacid LPR in comparison with non-laryngologists. Note that 10% to 16% of otolaryngologists responded to the survey with answers that suggest a preference for fundoplication referral rather than consideration of alginate and magaldrate, even as alginate and magaldrate have demonstrated efficacy in treatment of non-acid reflux.⁴⁰

Other therapeutic differences relate to use of validated patient-reported symptom questionnaires and dietary counseling. Laryngologists more frequently use outcome questionnaires for the assessment of treatment,

which is associated with a better management of LPR.⁴¹ The diet is an important part of the LPR treatment and the majority of otolaryngologists know that. In practice, 50.5% of both laryngologists and non-laryngologists recognize to just advise diet and behavioral changes for patients with mild LPR. This trend makes particular sense regarding the studies reporting a significant improvement of LPR symptoms or findings in patients treated by low-fat, high-protein, and alkaline diet^{42–44} but, nowadays, there is no clear definition of “mild” LPR, and no clinical criteria for considering a diet versus a medical treatment for LPR patients. These two points require further clinical studies for developing cost-effective therapeutic approach for the management of LPR.

The most important heterogeneity between laryngologists and non-laryngologists is found in the management of resistant patients (defined as patients who did not respond to conventional PPI therapy). First, more than 50% of non-laryngologists refer the patient to gastroenterology while 40.3% of laryngologists prefer additional examination, ie, MII-pH, esophageal manometry, or GI endoscopy. Second, laryngologists systematically prescribe more long-term PPI therapy than non-laryngologists. Both groups attribute the resistance to treatment to poor diet, non-compliance with medication, and severity of reflux. A few data are available in the literature about the resistance to treatment. Pisegna et al. reported that the lack of therapeutic compliance is probably one of the most important cause,⁴⁵ but many other factors would be involved including autonomic nerve dysfunction,^{46,47} or genetic make-up (drug metabolism, sphincter functioning, etc.).⁴⁸ This variability between laryngologists and non-laryngologists is in line with the lack of consensus or validated therapeutic algorithm for the management of patients with recalcitrant LPR. In that way, our study group has recently proposed a clinical algorithm for the management of these patients,⁴⁹ but future studies are needed to confirm its reliability.

The main weakness of this study is the probable heterogeneity of the otolaryngologist sample, which can be effected by local technology availability. The pepsin saliva detection is the most blatant example because it is not available in all countries. In the same vein, the availability of MII-pH may vary between hospitals regarding the awareness of the local gastroenterologists/otolaryngologists of the usefulness of this approach.

The second weakness is the inability to precisely assess the response rate. Because the survey was sent to both attendees of the 2017 IFOS meeting and members of some otolaryngology societies, the precise number of otolaryngologists who received the survey is difficult to evaluate as both YO-IFOS and these organizations are limited in their assessments of how many email addresses are functional or non-functional.

CONCLUSION

This study highlights many differences between laryngologists and non-laryngologists and many common trends in the management of LPR. Despite growing evidence

in the literature, both laryngologists and non-laryngologists do not seem to be aware of the involvement of LPR in the development of benign lesions of the vocal folds. The main differences between the groups concern management of LPR, with laryngologists indicating more awareness of mixed and non-acid reflux along with corresponding increased use of MII-pH than non-laryngologists. In contrast, non-laryngologists more often refer to gastroenterology. Because LPR-associated symptoms are prevalent and diagnosed by non-laryngologists in many countries, the education of otolaryngologists about the above-mentioned points is still an important challenge for the next decades, which would primarily require the establishment of international consensus about the diagnostic criteria and the therapeutic paradigm. This point is strengthened by the high rate of both laryngologists and non-laryngologists who considered themselves to be inadequately knowledgeable and skilled about LPR.

AUTHOR CONTRIBUTIONS

JRL, JA, SS, LMA: design, acquisition of data, data analysis and interpretation, drafting, final approval, and accountability for the work; final approval of the version to be published; agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

FB, MRB, PK, FM, YE: design, acquisition of data, data analysis and interpretation, revising the manuscript for important intellectual content; final approval of the version to be published, final approval, and accountability for the work; final approval of the version to be published; agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

TA, KH, LCB, SH: design, acquisition of data, data analysis and interpretation; final approval of the version to be published, final approval, and accountability for the work; final approval of the version to be published; agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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