Prevalence of reflux in 113 consecutive patients with laryngeal and voice disorders

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OBJECTIVES: **The goal was to estimate the prevalence of laryngopharyngeal reflux (LPR) in patients with laryngeal and voice disorders.**

STUDY DESIGN AND SETTING: **This was a prospective study of 113 unselected, new patients with laryngeal and voice disorders. Patients completed an extensive medical history form including a reflux symptom profile. A comprehensive otolaryngologic examination was performed with photographic transnasal fiberoptic laryngoscopy. Patients with both symptoms and findings of LPR (78/133, 69%) underwent ambulatory 24-hour double-probe pH monitoring.**

RESULTS: **Seventy-three percent (57/78) of patients undergoing pH testing had abnormal studies. Thus 50% (57/113) of the entire the study population had pH-documented reflux. Of the diagnostic subgroups studied, the highest incidence of reflux was found in patients with vocal cord neoplastic lesions (88%) and patients with muscle tension dysphonias (70%). LPR was infrequently found in patients with neuromuscular disorders.**

CONCLUSION: **LPR occurs in at least 50% of all patients at our center with laryngeal and voice disorders at presentation.** (Otolaryngol Head Neck Surg 2000;123:385-8.)

Laryngopharyngeal reflux (LPR) went unrecognized as a clinical entity until 1968 when the first reports linking LPR with the development of vocal process granulomas (contact ulcer) appeared in the otolaryngology literature.[1,2] Since that time, LPR has been reported to be associated with a host of laryngeal conditions, including muscle tension (functional) dysphonia,[3,4] subglottic stenosis,[5-8] laryngospasm,[9,10] pachydermia,[7,11] leukoplakia,[7] and vocal cord carcinoma.[7,12-15]

The most common symptoms associated with LPR are hoarseness, dysphagia, globus pharyngeus, chronic throat clearing and cough, and excessive throat mucus.[15-20] Common laryngeal findings of LPR are localized or diffuse laryngeal edema, opalescence and/or hypertrophy of the posterior commissure, erythema, granulation, and, sometimes, granuloma formation. Classic posterior laryngitis (red arytenoids and piled-up interarytenoid mucosa) is not seen in most patients with LPR. Instead, laryngeal edema, not erythema, is by far the most common laryngeal finding.

The first reports of the use of ambulatory 24-hour pH monitoring in otolaryngologic patients with hoarseness and other throat symptoms appeared in the 1980s.[16-20] Wiener et al[17] reported the use of simultaneous monitoring of the pH in the distal esophagus and in the pharynx by placement of a second pH probe in the hypopharynx behind the laryngeal inlet. This diagnostic technique was used to document the presence of extraesophageal reflux (ie, true LPR). This test is the current gold standard for diagnosis of LPR.

Although LPR is now a widely recognized clinical entity, the incidence of this disease process remains unknown. The purpose of this study was to investigate the prevalence of reflux disease in a consecutive series of patients with laryngeal and voice disorders with ambulatory 24-hour double-probe pH testing.

METHODS AND MATERIAL

During a 5-month period, a prospective study of 113 consecutive, unselected, new adult patients with laryngeal and voice disorders was carried out at the Center for Voice Disorders of Wake Forest University. Every patient with a laryngeal or voice problem seen during the study period completed a reflux symptom profile and underwent a complete otolaryngologic examination, which included videostroboscopy with photographic documentation of the laryngeal findings. Patients who presented with both symptoms and findings of LPR were referred for ambulatory 24-hour double-probe pH monitoring.

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Table 1. Study population by primary diagnosis, sex, and proportion of group that underwent reflux testing

Diagnosis	n	Male	Female	pH tested
Vocal misuse/abuse syndromes*	30	11	19	30
Vocal cord paralysis/paresis	22	10	12	7
Spasmodic dysphonia	14	6	8	2
Presbylaryngis	6	5	1	5
Vocal cord carcinoma	6	5	1	6
Polypoid degeneration	5	1	4	5
Laryngeal papillomas	5	3	2	5
Cervical dysphagia	4	2	2	3
Chronic cough	4	1	3	3
Intracordal cyst	4	1	3	4
Subglottic stenosis	3	1	2	3
Hypothyroidism	2	0	2	2
Vocal process granuloma	1	1	0	1
Conversion aphonia	1	0	1	0
Amyotrophic lateral sclerosis	1	1	0	0
Globus pharyngeus	1	0	1	1
Zenker's diverticulum	1	0	1	1
Throat pain	1	0	1	0
Laryngeal fracture	1	1	0	0
Resonance problem	1	0	1	0
TOTAL	113	49	64	78/113 (69%)

*This group includes patients with functional (muscle tension) dysphonia, vocal nodules, and abuse-related vocal cord hemorrhages.

Table 2. Results of reflux testing by subgroup/diagnosis

Subgroup and diagnosis	n	Abnormal (+) reflux testing n	Abnormal (+) reflux testing %
Vocal abuse/misuse/overuse syndromes			
Muscle tension dysphonia	23	18	78
Vocal nodules	5	2	40
Acute vocal cord hemorrhage	2	1	50
SUBTOTAL	30	21	70
Neoplastic conditions			
Vocal cord carcinoma	6	4	67
Polypoid degeneration	5	5	100
Papillomatosis	5	4	80
Intracordal cysts	4	4	100
Subglottic stenosis	3	3	100
Vocal process granuloma	1	1	100
SUBTOTAL	24	21	88
Neuromuscular conditions			
Paralysis and paresis	7	4	57
Spasmodic dysphonia	2	1	50
Presbylaryngis/atrophy	5	3	60
SUBTOTAL	14	8	57
Miscellaneous conditions			
Cervical dysphagia	3	3	100
Chronic cough	3	2	67
Globus pharyngeus	1	1	100
Hypothyroidism	2	0	0
Zenker's diverticulum	1	1	100
SUBTOTAL	10	7	70
TOTAL	78	57	73

Reflux Testing

Before undergoing 24-hour double-probe pH monitoring, all patients underwent esophageal manometry to determine the location of the upper and lower esophageal sphincters.[7] Using those determinants, we placed the distal pH probe in the distal esophagus 4 cm above the lower esophageal sphincter. The proximal pH probe was placed in the hypopharynx behind the laryngeal inlet, 1 cm above the upper esophageal sphincter.[7,21] Dual pH sensors embedded in a single catheter with a variety of intraprobe lengths were available so that the probes could be positioned precisely.

Interpretation of Results

Results of the esophageal pH testing were evaluated with established criteria.[7,22,23] The most widely used clinical parameter is the percentage of time that the pH is less than 4.0 when the patient is either upright or supine. This value is also calculated for the total time of the test. In our laboratory, normal values for the percentage of time the pH is less than 4 in the esophageal probe have been established to be 8.1% upright and 2.9% supine.[23] Normal values for pharyngeal probe pH monitoring have been established in our laboratory based on the evaluation of 20 normal subjects.[7,17,18] A single pharyngeal event (pH < 4.0) immediately preceded by a precipitous drop in the esophageal probe of equal pH magnitude is considered to be an abnormal finding. Other criteria, such as the number of reflux events per 24 hours, were not used in this study.

RESULTS

Of the 113 patients in the study, 69% (78/113) presented with both symptoms and findings of LPR and were referred for reflux testing. The symptoms of the reflux-tested patients were as follows: hoarseness, 88% (69/78); chronic throat clearing, 88% (69/78); chronic cough, 55% (43/78); globus pharyngeus, 40% (31/78); dysphagia, 37% (29/78); and heartburn, 33% (26/78). Of those patients who did have heartburn, only half (13/26) had daily heartburn, with the rest having it less frequently. The mean age of the 49 male subjects was 55.4 years, and the mean age of the 64 female subjects was 53.7 years. Table 1 summarizes the distribution of study subjects undergoing reflux testing by primary diagnosis and sex.

About 73% (57/78) of the subjects had abnormal reflux testing. As measured by the esophageal probe,

60% had abnormal upright reflux, 36% had abnormal supine reflux, and 20% had both. As measured in the pharyngeal probe, 58% of the patients had abnormal upright reflux, 9% had abnormal supine reflux, and 6% had both.

To search for associations between LPR and other laryngeal disorders, we divided the patients into 4 broad subclasses: those with vocal abuse/misuse syndromes, those with neoplastic disorders, those with neuromuscular disorders, and a miscellaneous group. The results of the reflux studies by each subgroup and diagnosis are shown in Table 2. Several specific lesion types in the neoplastic subgroup had 100% rates of abnormal reflux testing: polypoid degeneration (5/5), intracordal cysts (4/4), and laryngeal stenosis (3/3). Patients with papillomatosis had abnormal reflux tests 80% (4/5) of the time, patients with muscle tension dysphonia 78% (18/23) of the time, and patients with vocal cord carcinoma 67% (4/6) of the time.

The prevalence of LPR in the total population of 113 patients with laryngeal disorders was 50% (57/113). Reflux was documented in each of the subgroups as follows: vocal abuse/misuse syndromes, 70% (21/30); neoplastic conditions, 88% (21/24); neuromuscular conditions, 19% (8/43); and miscellaneous conditions, 44% (7/16). LPR was relatively infrequently suspected in patients with neuromuscular disorders, such as spasmodic dysphonia, vocal cord paralysis, and presbylaryngis; only 33% (14/43) of that subgroup was tested for reflux.

DISCUSSION

The results of this study demonstrate that LPR is a relatively common disorder in that it was present in half of our patient population. As prevalence of this disease has not been studied previously, we cannot compare this result to results in the published literature. It should be noted that the results of this study may be somewhat biased in that they represent the prevalence of LPR in patients who were referred to a tertiary voice center. This study population may be skewed by the fact that our center is recognized by referring physicians as a center that is particularly experienced in the diagnosis and management of LPR. Consequently, our data/results probably overestimate the prevalence of LPR in the laryngology practices of community-based clinicians. As an obvious corollary, the data of this study do not allow inferences to be drawn about the prevalence of LPR in the general population. Nevertheless, the results do suggest that LPR is ubiquitous in patients with voice problems and that clinicians seeing such patients look specifically for the signs and symptoms of LPR.

The results also demonstrate that LPR often coexists with other laryngeal pathology. In this study LPR was found to be common in patients with certain neoplastic conditions of the larynx and less common in patients with neuromuscular disorders. The association of LPR with other laryngeal disorders has been noted in several published reports. Kuhn et al[24] found a higher incidence of pH probe–proven LPR in patients with vocal fold nodules compared with control subjects. Morrison et al[25] found an association between reflux and muscle tension dysphonia. In the most comprehensive study on LPR, Koufman[7] noted a significant association between LPR and a variety of laryngeal pathologies. Our study corroborates the findings of these and other studies that demonstrate the coexistence of LPR with such disorders. The associative data of these papers are epidemiological in nature and do not prove a causal relationship between LPR and laryngeal diseases. In other words, we recognize that the association between LPR and a neoplastic lesion does not prove that LPR caused the lesion.

On the other hand, in animal studies, LPR has been shown to cause certain laryngeal lesions. Little et al[6] demonstrated that alternate-day application of stomach contents to the mucosally abraded intracricoid region of dogs could lead to subglottic stenosis within weeks. Using a similar model Koufman[7] showed that as few as 6 applications of acid and pepsin to the larynx over a period of 2 weeks could produce frank ulceration of the cricoid. Unfortunately, the canine vocal fold is structurally different from that of the human being, dogs are not afflicted with the same variety of laryngeal pathologies as human beings, and thus at present, the causal link between laryngeal pathology and LPR remains speculative.

CONCLUSIONS

LPR is a relatively common problem that appears to be common in patients with laryngeal pathology. Although the significance of the data remains controversial, it is likely that LPR may be involved at least in part in the promotion and/or progression of many laryngeal lesions and diseases.

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