



Diverged Otorhinolaryngological Manifestations of Reflux Disease in Indian Condition: A Base Line Data Generation

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ABSTRACT

Aims: To generate base line data of different otorhinolaryngological manifestations of laryngopharyngeal reflux (LPR) disease in Uttar Pradesh, India.

Materials and methods: Fifty cases were selected from OPD setup and diagnosed to be having LPR disease based on predefined inclusion and exclusion criteria. They were then explained the necessary details and purpose of the study and were subjected to further standard protocol. The patients with ear complaints were advised pure tone and impedance audiometry. The findings were charted and data extrapolated.

Results: Among various complaints, the most common complaint was lump in the throat; others were frequent throat clearing, cough, choking, hoarseness, and excessive throat mucus. The nasal complaints were nasal discharge and blockage, and ear complaints were otalgia and hard of hearing.

Laryngoscopy showed hyperemia of larynx and vocal fold edema, ventricular obliteration, laryngeal edema, posterior commissure hypertrophy, thick endolaryngeal mucus, pseudosulcus vocalis and vocal cord granulations. Nasal findings were rhinitis, congestion, and turbinate hypertrophy. Ear complaints had tube dysfunction. On upper gastrointestinal (UGI) endoscopy most of the patients had normal study; some showed esophagitis or hiatus hernia. Mean body mass index of the study population was in normal range.

Conclusion: Globus, a common presenting complaint in ENT outdoors is usually related to reflux. Reflux was found associated with Eustachian tube dysfunction and rhinitis. Results demonstrated that obesity and esophagitis are not associated with LPR.

Clinical significance: This study investigated a range of parameters responsible for LPR disease. The understanding of the entity of LPR and its manifestations is far from being completely understood. Present-day thrust is in the direction of increasing importance of LPR being recognized in ENT practice. The results and their analyses created an important base line document for the population of the state of Uttar Pradesh (population about 200 million) and adjoining states who commonly call on the Sir Sunderlal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.

Keywords: Globus, Laryngopharyngeal reflux, Reflux disease.

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INTRODUCTION

Reflux is the retrograde flow of gastric contents from the stomach into the esophagus. Reflux may, in some instances, pass the upper esophageal sphincter and into the hypopharynx/larynx as well as the lower aerodigestive tract.

Of the two reflux diseases, the gastroesophageal reflux disease (GERD) is readily recognized by the typical symptoms of heartburn and regurgitation. However, for the other, i.e., laryngopharyngeal reflux (LPR) or extraesophageal reflux (EER), the symptomatology is more diverse and less pathognomonic. Due to this reason, the lack of consensus in how to diagnose LPR and the disparate methodologies used by investigators, the true prevalence of LPR is not well documented. Connor et al¹ reported that symptoms commonly attributed to LPR were as high as 49% in a normal community dwelling. Koufman² estimated that in the United States 40% people have symptoms of reflux. In addition, almost half of the subjects with reflux had silent/undiagnosed reflux.

Though James Koufman³ was the first to describe LPR as a distinctly separate disease in 2002, Delahunty and Cherry⁴ was the first to report it in 1947. In the last two decades, however, LPR disease has drawn special attention as an important subject to explore, and over different research it has been conclusively proved to be different from GERD in signs, symptoms, diagnostic criterion, and treatment protocols.^{2,4,5}

One challenge in diagnosing LPR is that the symptoms of the LPR disease lack sufficient specificity to confirm LPR and thus to rule out other causative agents. Till date a number of studies (e.g., see Shaker et al⁶) concluded that pH monitoring in conjunction with manometry is the best tool of diagnosing LPR. Key symptoms reported are foreign body sensation of throat or globus, chronic cough, excessive salivation, repeated throat clearing, dysphonia or hoarseness of voice, chronic cough, and dysphagia.^{7,8} On laryngeal examination, the reported

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signs believed to be caused by LPR are posterior laryngitis with erythema, edema and thickening of the posterior wall of the glottis,⁹ vocal fold granuloma,¹⁰ contact ulcer, subglottic stenosis,¹¹ and chronic laryngitis.¹²

But the correlations between laryngeal findings, symptoms, and pH monitoring have been found to be weak.¹³ It has also been reported that findings normally associated with LPR may also be found among healthy controls as often as in 86%.¹⁴ Another problem is the intra- and inter-rater variability, as reported by Branski et al.¹³

In an attempt to standardize the larynx examination, Belafsky et al⁹ proposed a validated systematic instrument for assessing the laryngeal findings, the reflux finding score (RFS), which to date is the most recognized and used instrument for evaluating laryngeal findings.

Studies have been undertaken which suggest that RFS is complementary to esophageal pH monitoring in diagnosing LPR.¹²

Reflux symptom index (RSI) is another nine-point self-administered scoring system based on the symptoms experienced by the patient over the last month. This scoring system was proposed by Belafsky et al.¹⁵ Used together these two instruments have been proved to be easily administrable and effective in diagnosing and evaluating LPR.¹⁶

Some studies have also been initiated to evaluate the linkage between rhinological and otological symptoms with LPR. Chronic rhinosinusitis¹⁷ and tubaric dysfunctions¹⁸ are the diseases mostly considered.

Literature searches indicated that systematic investigations on LPR, though utmost relevant, are rare in India. Enriched by the above observations the present study was planned to look for the varied otorhinolaryngological manifestations of reflux disease in Indian condition and results presented herein. Furthermore, lot of hitherto symptoms of unknown etiology are gaining attention increasingly for treating patients with atypical reflux symptoms, such as hoarseness (unexplained cause), globus, throat clearing, cough, etc., with antireflux therapy.

MATERIALS AND METHODS

The study was conducted from September 2011 to June 2013 in the Department of Otorhinolaryngology and Department of Gastroenterology, Sir Sunderlal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi.

Selection of Cases

Fifty-seven (57) cases were selected for the study as per criterion given below. Seven (7) cases did not complete the study due to noncompliance. The age of patients ranged from 18 to 65 years, of both sexes belonging to various religions with different socioeconomic background.

Inclusion Criterion

- Patients presenting in outpatient door with reflux symptom index was >13.
- All the patients had given written consent for enrollment in the study.

Exclusion Criterion

- Patients with reflux symptom index was >13 but reflux finding score was <8.
- Patients with preexisting otorhinolaryngological disorder.
- Patients already on treatment with proton pump inhibitors.
- Pediatric age group patients.

The cases were registered and allotted a number. The age, sex, religion, socioeconomic status, occupation, and address of patients were recorded.

The patients were graded according to reflux symptom index and those recording a score of >13 were included into the study (Table 1).

The selected patients were then explained the necessary details and purpose of the study. The patients who agreed to enroll in the study were then subjected to thorough history-taking and clinical otorhinolaryngological examinations (indirect laryngoscopy, otoscopy, and

Table 1: Reflux symptom index

<i>During the last month how did the following problems affect you:</i>						
1. Hoarseness or a problem with your voice	0	1	2	3	4	5
2. Clearing of throat	0	1	2	3	4	5
3. Excess throat mucus or postnasal drip	0	1	2	3	4	5
4. Difficulty in swallowing food, liquids, or pills	0	1	2	3	4	5
5. Coughing after you ate or after lying down	0	1	2	3	4	5
6. Breathing difficulties or choking episodes	0	1	2	3	4	5
7. Troublesome or annoying cough	0	1	2	3	4	5
8. Sensations of something sticking in your throat or a lump in your throat	0	1	2	3	4	5
9. Heartburn, chest pain, indigestion, or stomach acid coming up	0	1	2	3	4	5

0=no problem, 5=severe problem/very troublesome

Table 2: Reflux finding score

Findings	Score
Infraglottic edema (pseudosulcus vocalis)	0 = absent, 2 = present
Ventricular obliteration	0 = none, 2 = partial, 4 = complete
Erythema/hyperemia	0 = none, 2 = arytenoids, 4 = diffuse
Vocal fold edema	0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = polypoidal
Diffuse laryngeal edema	0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = obstructive
Posterior commissure hypertrophy	0 = none, 1 = mild, 2 = moderate, 3 = severe, 4 = obstructive
Granuloma or granulation	0 = absent, 2 = present
Thick endolaryngeal mucus	0 = absent, 2 = present

anterior/posterior rhinoscopy) to document different manifestations. The patients with ear complaints were advised pure tone and impedance audiometry. The patients were then subjected to anthropometric measurements for calculation of BMI.

We posted the patients for a fiberoptic laryngoscopy the following day. The laryngoscopic findings were graded according to the reflux finding score (Table 2).

The patients having a score of more than 7 then underwent upper gastrointestinal (UGI) endoscopy in the Department of Gastroenterology. The observations were tabulated and data extrapolated.

Instruments used in the following study were Mazer's flexible fibreoptic laryngoscope; Pure tone audiometer: ALPS advanced digital audiometer – AD210; impedance audiometer: Interacoustics: AZ26; UGI endoscope and an AIDA recording system and software.

RESULTS

Mean age of our study group is 34.84 and standard deviation was 10.47. The male–female gender ratio was 1:1.27.

According to BG Prasad classification¹⁹ of socioeconomic strata, 66% of the participants enrolled belonged to the higher rung of the society.

The most common presenting complaint (Table 3) was lump in throat or foreign body sensation in throat (36%), followed by hoarseness of voice (14%) and excessive throat mucus (14%). Only 6% patients presented heartburn as the main complaint which is the main complains in GERD.²

Table 3: Frequency distribution of presenting complaints

Presenting complaint	Frequency	%
Lump in throat	18	36
Hoarseness of voice	7	14
Excessive throat mucus	7	14
Dysphagia	6	12
Clearing your throat	5	10
Choking episodes	4	8
Heartburns	3	6

The most common symptom was complaint of lump in throat (88%), followed by clearing of throat by 86%. Other complaints, such as cough (68%), excessive throat mucus (60%), and dysphagia (18%) were also observed. Thus it is clearly manifested that complaints of lump in throat is the most common occurring symptom in patients of LPR (Table 4).

Flexible laryngoscopy findings were documented based on the parameters of reflux finding score index (Table 5). In the present study, the commonest finding being erythema present in as many as 96% cases. Ventricular obliteration either partial or complete was also noted quite frequently (74%), vocal fold edema was found to be present in 74% of the study population. Thick endolaryngeal mucus (Fig. 1) and posterior commissure hypertrophy (Fig. 2) were found in 58% and 68% cases respectively. The least common laryngoscopic finding was granuloma vocal cord found in only 18% cases all of which presented with hoarseness of voice.

Table 4: Frequency distribution of symptomatology

Complaints	Frequency	%
Hoarseness of voice	20	40
Clearing of throat	43	86
Excessive throat mucus or postnasal drip	30	60
Dysphagia	9	18
Coughing after eating or lying down	16	32
Breathing difficulties or choking episodes	13	26
Annoying cough	34	68
Lump in throat	44	88
Heartburn	14	28

Table 5: Frequency distribution of laryngoscopic findings

Sign	Frequency	%
Pseudosulcus vocalis	21	42
Ventricular obliteration	37	74
Erythema/hyperemia	48	96
Vocal fold edema	37	74
Diffuse laryngeal edema	26	52
Posterior commissure hypertrophy	34	68
Granuloma or granulation	9	18
Thick endolaryngeal mucus	29	58

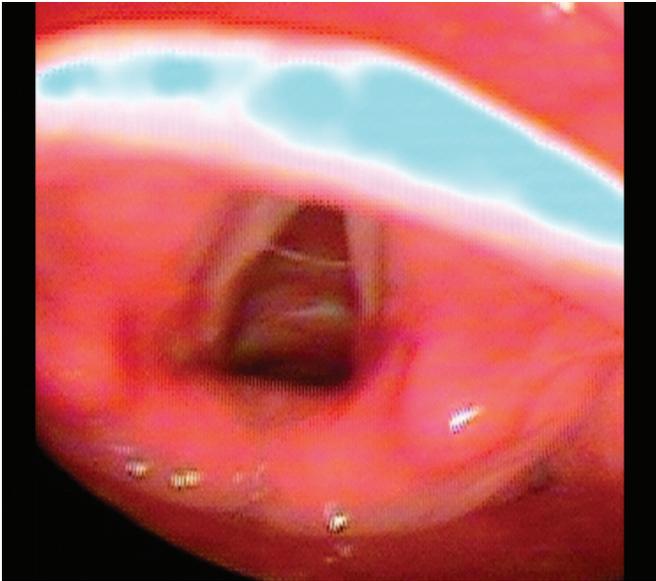


Fig. 1: Thick endolaryngeal mucus



Fig. 2: Posterior commissure hypertrophy

Eighteen percent of the patients complained of nasal problems out of which 8% had complaints of nasal obstruction, and the rest 10% had complaints of frequent running nose. Forty-one patients (82%) had no nasal complaints, and 20% of the total participants had one or more positive findings in anterior rhinoscopic examination. On the contrary, 2% showed only congestion of nasal mucosa, and 2% had nasal discharge and isolated inferior turbinate hypertrophy was found in 6% participants. Ten percent of the patients had more than one nasal finding, and 10% of the population had positive findings while the rest 40% were normal on nasal examination. Asymptomatic deviated nasal septum (DNS) was not considered as it is not relevant for this study (Table 6).

The most common ear complaint was found to be otalgia in 10% subjects. Earitch was found in 2%, ear discharge in 2%, and hard of hearing complaint was recorded in 8% of the patients; 39 patients (78%) had no otological complaints.

On testing (Table 7) the study population for audiological tests, 16% had partially or grossly impaired Eustachian tube functions. Whereas, 9% of the patients had conductive hearing loss and 2% had sensorineural hearing loss. The conductive hearing loss was mostly of mild grade according to WHO classification.

Table 6: Frequency distribution of nasal findings

Finding	Frequency	%
Congestion only	1	2
Nasal discharge only	1	2
ITH only	3	6
Congestion and discharge	4	8
Congestion, discharge, and ITH	1	2
Total	10	20

Table 8 shows the frequency distribution of different UGI endoscopic findings of the study population at one glance. Esophagitis is seen in 10% of the cases. Most participants had a normal UGI study (48%). Interestingly, hiatal hernia was seen in 14% of the patients.

On the contrary, 64% of the participants were normal according to basal body mass index (BMI) range, 24% had overweight, and 10% were frankly obese (Table 9). The mean BMI is 24.04 kg/m² with a standard deviation of 3.28.

Table 7: Frequency distribution of otological findings

Ear findings	Frequency	%
Retracted membrane	8	16
Eustachian tube dysfunction	8	16
Conductive hearing loss	9	18
Sensorineural hearing loss	2	4

Table 8: Frequency distribution of upper gastro intestinal endoscopy findings

Finding	Frequency	%
Normal	24	48
Esophagitis	5	10
Gastropathy	2	4
Patulous cardia	2	4
Gastritis/duodenitis	9	18
Hiatal hernia	7	14
Duodenal ulcer	1	2

Table 9: Frequency distribution of BMI in study population

Body mass index	Frequency	%
Underweight	1	2
Normal	32	64
Overweight	12	24
Obese	5	10

DISCUSSION

Seventy-six percent of the subjects are within 21 to 40 years of age. Concurring to our study on the age group Patigaroo et al²⁰ in their study, which was conducted in India, found maximum cases in the age group of 31 to 40 years. In other studies by Ozturk et al,²¹ the mean age recorded was 41.60 years, and Toros et al²² reported it to be 48 years. The variation in age group may arise from the difference in geographical locations of the subjects under study.

Our study showed a 56% enrollment of females compared to 44% males – the male–female gender ratio being 1:1.27. It concurred with previous studies conducted by Belafsky et al,⁹ Toros et al,²² and Patigaroo et al,²⁰ showing enrollment of more females. Murat Saruç et al²³ showed the male gender to be a risk factor for cases of LPR. Gender predilection in LPR, however if any, still needed to be proven conclusively.

The participants in the study had different presenting complaints. The most common presenting complaint was lump in throat or foreign body sensation in throat (36%). In concurrence to our finding, Mesallam et al,²⁴ Karkos and Yates,²⁵ and Patigaroo et al²⁰ found globus to be the most common presenting symptom. By contrast Koufman et al,² Vaezi,²⁶ and Eubanks et al²⁷ found hoarseness to be the predominant LPR complaint. Noordzij et al²⁸ described throat burn to be the most common complaint.

Extrapolating the laryngeal symptoms we found different complaints like lump in throat (88%), clearing of throat (86%), cough (68%), excessive throat mucus (60%), and dysphagia (18%). Patigaroo et al²⁰ found most common symptom in their study to be globus sensation in 74% of patients followed by frequent clearing of throat in 64% of patients and troublesome or annoying cough in 56% of study population. Toros et al²² found excessive salivation to be the most commonly occurring complain. Koufman³ found the complaint of hoarseness in 71%, chronic cough in 51%, 47% with globus pharyngeus, 42% of the patients complaining of chronic throat clearing, and 35% complaining of dysphagia. Vaezi²⁶ discussed the finding of dysphonia in 71% cases which was most common. In another study, Ozturk et al²¹ found heartburn to be the most frequent symptom in 53.5% of the patients. Toros et al²² found throat clearing in 77.8% of the patients. Thus considering the results of this and other studies, it appears that perhaps there is no chief or predominant laryngeal symptom associated with the patients suffering from LPR. However, our study indicated the symptom like “lump in throat” was the main complaint.

We found hoarseness of voice in 40% of our patients. James Koufman² described reflux as the underlying etiology in 40 to 60% of patients with various voice

disorders. However, there are studies which claim that LPR-associated hoarseness is overdiagnosed.²⁹

We have documented the varied signs and symptoms pertaining to nasal problems with which the subjects presented.

In the present study, most common ear complaint was found to be otalgia in 10%, ear itch was found in 2%, ear discharge in 2%, and hard of hearing was complained by 8% of the patients. On testing the study population for audiological tests, 16% had partially or grossly impaired Eustachian tube functions. On the contrary, 9% of the patients had conductive hearing loss and 2% had sensorineural hearing loss.

Only recently has reflux been into consideration as a possible risk factor for tubaric dysfunction. Heavner et al¹⁸ showed the relationship between simulated gastroesophageal reflux and Eustachian tube dysfunction in rat middle ears and found positive correlation. White et al³⁰ concluded in another animal model study that nasopharyngeal exposure to simulated gastric juice causes Eustachian tube dysfunction in rats. To the best of our knowledge, no other study documents symptoms in humans related to ear in LPR patients.

On laryngoscopic examination, we most commonly found laryngeal erythema in as high as 96% cases. As pointed out earlier, ventricular obliteration either partial or complete was also noted quite frequently (74%), and vocal fold edema was found to be present in 74% of the study population. The least common laryngoscopic finding was granuloma vocal cord, found in only 18% cases all of which presented with hoarseness of voice. Likewise, Patigaroo et al²⁰ found erythema/hyperemia in 88% of patients to be the most common laryngoscopic sign in the study followed by ventricular obliteration in 76% of patients and posterior commissure hypertrophy in 60% of study population. Other studies, such as by Mesallam et al,²⁴ Karkos and Yates,²⁵ and Toros et al²² have also found erythema as the most common sign. By contrast to the present study, some authors have most commonly noted other laryngoscopic signs. For example, posterior commissure hypertrophy in a landmark study by Belafsky.⁹ On the contrary, partial ventricular obliteration was noted by Tezer and Kockar.³¹ But Hicks et al¹⁴ reported that findings normally associated with LPR may also be found among healthy controls, as often as even in 86%.

The frequency distribution of different UGI endoscopic findings of the present study population showed esophagitis in 10% of the cases. Most participants had a normal UGI study (48%). Similar to our study endoscopic findings of reflux esophagitis was observed in 5 of 45 patients (11%) by Toros et al.²² Eubanks et al²⁷ found 44% esophagitis and 12% hiatus hernia. Tauber et al³² detected

GERD by esophagogastroduodenoscopy (EGD) in 43% of patients (13 of 28). According to Tokashiki et al,³³ reflux esophagitis was present endoscopically in as many as 52% of the patients with the globus sensation and laryngeal symptoms. Koufman² found esophagitis in only 18% of 182 ENT patients by using barium esophagography. Similarly, Ossakow et al³⁴ reported 10% prevalence of endoscopic esophagitis in 63 ENT patients with chronic unexplained throat symptoms.

Hiatal hernia was seen in 14% of our patients. Sontag³⁵ hypothesized that hiatus hernia is a cause for GERD. Piesman et al³⁶ conducted a study which revealed 37% esophagitis and 1% hernia in a study population comprising of 32 patients with typical reflux symptoms. Saruç et al²³ showed hiatal hernia was more frequent (53%) in LPR group of patients compared to (24%) non-LPR group. Hiatal hernia is a well-known risk factor for GERD, but the results are conflicting for LPR. Studies³⁷ revealed a predisposition for LPR in patients with hiatal hernias, but the cause-effect relationship is still unclear.

The distribution of BMI of the participants was analyzed. Sixty-four percent of the participants were normal according to BMI range – 24% were overweight and 10% were frankly obese. Obesity has been denoted as a risk factor for GERD in various previous studies. But its association with LPR is yet not sufficiently proven. In a study by Halum et al³⁸ it was concluded that pharyngeal reflux was not associated with increasing BMI or obesity in LPR patients. By contrast, abnormal esophageal reflux (GERD) was found to be associated with increasing BMI and obesity. Ayazi et al³⁹ showed that in a large series of 2,000 patients with symptomatic reflux disease, 13% of changes in esophageal acid exposure was attributable to changes in body mass index.

CONCLUSION

This study investigated various parameters responsible for LPR disease. The results and its analyses created an important base line document for the population of the state of Uttar Pradesh (about 200 million) and adjoining states who commonly visit the Sir Sunderlal Hospital, Institute of Medical Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India. The symptoms and signs of LPR observed here may be complex. The understanding of the entity of LPR and its manifestations is far from being completely understood. Effect of various lifestyle modifications are generally attributed to the cause. Present-day thrust is in the direction of increasing importance of LPR being recognized in ENT practice. Lots of symptoms of unknown etiology are being diagnosed properly as patients with atypical reflux symptoms, such as hoarseness (unexplained cause), globus, throat

clearing, cough, etc., with antireflux therapy. With ever-increasing research in this field like the one we present herein, hopefully a clearer picture will emerge. We believe that ENT surgeons be fully aware of this condition as LPR presents itself in many ways and is in itself a factor for many otolaryngological problems.

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