

Clinical Profile of Laryngopharyngeal Reflux Disease and Effect of Treatment with Proton Pump InhibitorsAlekh Kumar¹, Mahesh Kumar²¹Senior Resident, Department of ENT, Indira Gandhi Institute of Medical Sciences, Sheikhpura, Patna, Bihar, India²Assistant Professor, Department of ENT, Indira Gandhi Institute of Medical Sciences, Sheikhpura, Patna, Bihar, India

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Abstract:

Background: Laryngopharyngeal reflux disease (LPRD) is a common problem all over world caused by the back-flow of stomach contents into the laryngopharynx. Symptomatology of laryngopharyngeal reflux includes chronic cough, hoarseness of voice, throat-clearing, globus sensation and difficulty in swallowing. LPRD is seen in about 10% of patients visiting outpatient departments of otolaryngology clinics and in more than 50% of patients presenting with changes in voice. LPRD can have association with sleep disorders, dental problems, food habits and various otolaryngological disorders. Gastric acid reflux with LPRD is considered causative factor for granulomas of the larynx and malignancy.

Materials and Methods: This was a hospital based descriptive cross sectional study, conducted at the department of ENT at IGIMS, Patna. Patients having symptoms of Laryngopharyngeal reflux disease were included in the study. Data collection was done using clinical examination forms and written questionnaire and data was processed and analysed using SPSS.

Results: This study was done on 292 subjects where 158 were males and 134 females. The mean age was 40.54 ± 12.68 years. Prevalence of LPRD was found to be 17.46% and there was slight male preponderance (18.35% in males, 16.41% in females). The common presentations were sensation of lump in throat, hoarseness of voice, sensation of mucus sticking in throat and urge to clear throat. Common findings were thick mucus, erythema of vocal cord, edema of vocal cord. Obesity, diabetes, hypertension, tobacco use, drinking alcohol, eating spicy foods were risk factors for LPRD. Patient's positive for LPRD were treated with oral PPIs, life style and dietary modifications, and showed statistically significant improvement in symptoms and signs post treatment.

Keywords: Reflux, gastric acid, laryngopharynx, globus sensation, vocal cords.

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Introduction

Laryngopharyngeal reflux (LPR), also known as silent reflux, is a condition where stomach acid irritates the larynx and pharynx. It's closely related to gastroesophageal reflux disease (GERD), where gastric content containing pepsin can flow backward, damaging the upper airway tissues [1]. While LPR shares similarities with GERD, its distinct causes and diagnostic challenges make it a unique condition. LPR is primarily caused by the irritation of the larynx and pharynx due to the backflow of stomach acid and pepsin [2]. The causes may include defects in the physiological barriers of the esophagus, such as the lower and upper esophageal sphincters, and issues with the esophageal mucosal barrier. This complexity makes it challenging to pinpoint the exact pathophysiology of LPR without the presence of GERD [3]. Laryngeal abnormalities can result from direct injury or secondary mechanisms related to

LPR. Experimental evidence shows that even as few as three reflux episodes per week can lead to severe laryngeal damage. Direct injury occurs when acid and pepsin come into contact with laryngeal mucosa, leading to mucosal damage. Irritation of the distal esophagus by acid can trigger a reflux mediated by the vagus nerve, causing chronic symptoms like coughing and throat clearing, which, in turn, can damage laryngeal tissues [4]. LPR is more prevalent than one might think, and it often goes underreported or misdiagnosed. Its clinical significance is underscored by its association with potential severe consequences, including laryngeal carcinoma [5]. The exact prevalence of LPR in India is unknown, but it is a substantial concern around the globe. As more otolaryngologists are becoming more vigilant in recognizing the signs of LPR, the frequency of diagnoses has been increasing. Patients with LPR

often present with clinical signs like posterior laryngeal edema and erythema, along with other indicators such as obliteration of the laryngeal ventricles and interarytenoid hypertrophy [7]. The diagnosis and management of LPR remain controversial due to diagnostic challenges faced by ENT specialists. The symptoms of LPR can be nonspecific and often overlap with those of other conditions. Moreover, the lack of definitive diagnostic techniques and inconsistent results from studies contribute to the controversy. Several diagnostic tools are available, but they have their limitations. Commonly employed diagnostic tools are 24 hour pH monitoring, reflux symptom index (RSI) and reflux finding score (RFS) [8,9,10].

Materials and Methods

This was a prospective observational quasi experimental study done on 300 subjects to determine the prevalence and clinical features of laryngopharyngeal reflux disease (LPRD) and effect of treatment with proton pump inhibitors (PPIs). Duration of study was one year from March 2022 to February 2023. Patients between age group of 18 to 65 years attending the outdoor of ENT department of Indira Gandhi Institute of Medical Sciences, Patna, and Bihar were included in the study. Common symptomatology used in the questionnaire was of globus sensation, chronic cough, throat problems, heart burn, urge to clear throat, etc. Data collection was done using structured questionnaire, reflux scoring index (RSI) and reflux finding score (RFS) followed by laryngoscopic examination. Patients who were confirmed with LPRD were given oral PPI

(pantoperazole 40 mg) for 4 weeks and then again laryngoscopy was done along with clinical history and examination. Data analysis was done using SPSS version 20. Results were presented in frequency tables, cross tables, figures with help from statistical tests like Chi square test and P value calculation.

Results

Out of 300 patients studied, 8 were lost to follow up. So final study was done and results interpreted on 292 subjects. Out of 292, 54.11% were males and 45.89% were females. The overall prevalence of LPRD was 17.46% while prevalence in males and females was 18.35% and 16.41% respectively. Majority of the study subjects were in the 36-65 years age group. Out of 292 subjects, 51 were confirmed with LPRD of which 29 (56.86%) were males and 22 (43.14%) were females.

The most common encountered symptoms consisted of globus sensation (92.16%), hoarseness of voice (82.35%), excessive urge of clearing throat (76.47%) while observed signs were thick mucus around the larynx (80.39%), hyperemia of the glottis (76.47%) and ventricular obliteration (62.75%). Least common findings included chronic cough, dysphagia and granuloma formation. The findings were statistically significant with P value less than 0.05.

Among risk factors were consumption of spicy foods often, sleeping within 2 hours of meal and use of tobacco products. Comorbidities associated with LPRD were diabetes, chronic ear disease, dental issues and asthma.

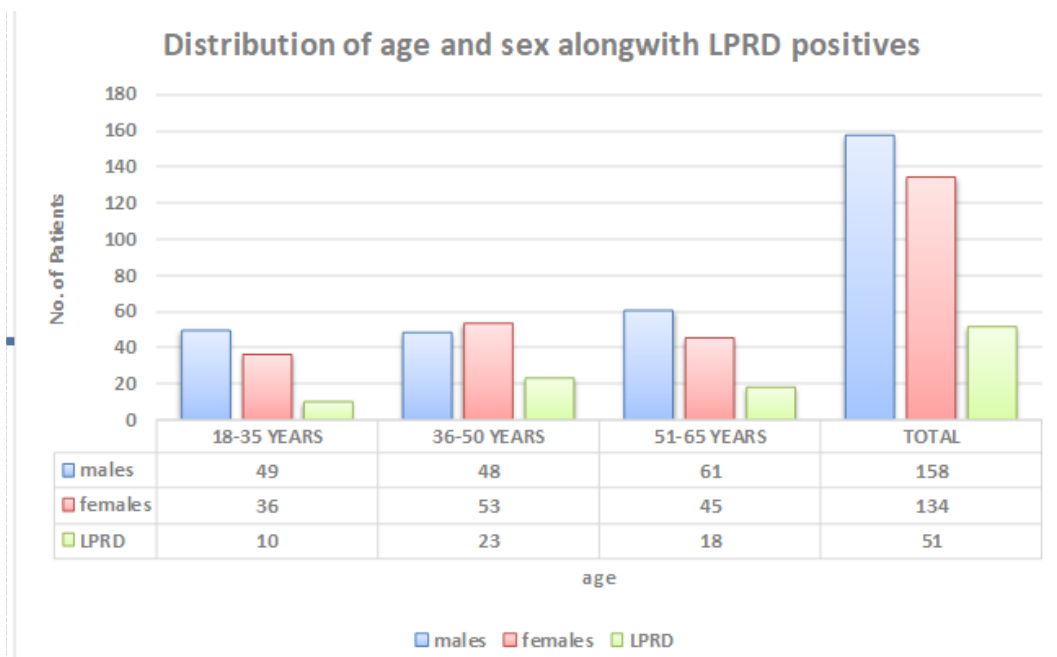


Figure 1: Social and demographic characteristics of study population

Table 1: Conditions associated with LPRD

Comorbidities and risk factors		LPRD positive	P Value
Obesity	Yes	31 (60.78%)	0.043
	No	20 (39.22%)	
Diabetes mellitus type 2	Yes	22 (43.14%)	0.008
	No	29 (56.86%)	
Hypertension	Yes	18 (35.29%)	0.234
	No	33 (64.71%)	
Chronic ear discharge	Yes	13 (25.49%)	0.049
	No	38 (74.51%)	
Tobacco use	Yes	19 (37.25%)	0.024
	No	32 (62.75%)	
Alcohol consumption	Yes	13 (25.49%)	0.325
	No	38 (74.51%)	
Bronchial asthma	Yes	12 (23.53%)	0.018
	No	39 (76.47%)	
Sleeping within 2 hours of meal	Yes	35 (68.63%)	0.004
	No	16 (31.37%)	
Stressful lifestyle	Yes	34 (66.67%)	0.189
	No	17 (33.33%)	
Dental problems	Yes	15 (29.41%)	0.048
	No	36 (70.59%)	
Consuming spicy foods often	Yes	26 (50.98%)	0.299
	No	25 (49.02%)	

Table 2: Clinical Features of patients with LPRD

Clinical Features	No. of patients with LPRD (n=51)
Globus sensation	47 (92.16%)
Voice changes	42 (82.35%)
Urge to clear throat	39 (76.47%)
Foreign body sensation in throat	34 (66.67%)
Heartburn	20 (39.22%)
Chronic cough	15 (29.41%)
Dysphagia	8 (15.69%)
On laryngoscopy	
Thick mucus secretions	41 (80.39%)
Erythema of glottis	39 (76.47%)
Ventricular obliteration	32 (62.75%)
Glottic edema	35 (68.63%)
Diffuse edema of vocal cords	33 (64.71%)
Subglottic edema	16 (31.37%)
Granuloma formation	6 (11.76%)
Hypertrophy of posterior commissure	15 (29.41%)

Findings were statistically significant for obesity (P value 0.043), chronic ear disease (P value 0.049), diabetes mellitus type 2 (P value 0.008), tobacco use (P value 0.024), bronchial asthma (P value 0.018), sleeping < 2 hours after eating (P value 0.004) and periodontitis (P value 0.048). Patients who were positive for LPRD were treated with oral

Pantoperazole 40mg daily on empty stomach for 6 weeks. Along with this, lifestyle modification was also advised. After completion of 6 weeks treatment with PPI all 51 LPRD positive subjects were examined clinically and by laryngoscopy. There was significant improvement of symptoms and signs after treatment with PPI (P < 0.05).

Table 3: Comparison of RSI and RFS before and after treatment with PPIs

Reflux Symptom Index	Pre treatment	Post treatment
Mean	19.5	12.2
SD	4.2	4.4
Minimum	10.0	4.0
First Quartile	16.0	8.0
Median	20.0	12.0

Third Quartile	24.0	13.0
Maximum	31	22
Wilcoxon signed Rank test – Z		6.542
P Value		< 0.004
Reflux Finding Score	Pre treatment	Post treatment
Mean	9.8	6.2
SD	3.6	4.2
Minimum	4.0	1.0
First Quartile	7.0	3.7
Median	9.0	6.0
Third Quartile	12.0	8.0
Maximum	20	16
Wilcoxon signed Rank test – Z		7.348
P Value		< 0.008

Discussion

Laryngopharyngeal reflux disease typically results due to the effect of the gastric acidic contents on the vocal cords and glottis. Normally gastric acid is cloistered within the stomach, but when it refluxes in the esophagus, it can spill to reach the larynx thus causing LPR. Patients of LPRD show a multitude of symptoms like hoarseness of voice, heartburn, urge to clear throat, globus sensation. Pathophysiology of LPRD depends on dysfunction in any of the 4 barriers to contain gastric acid viz. upper and lower esophageal sphincters, peristaltic movements and mucosal barriers. It is estimated that about 10% patients attending ENT clinics have symptoms of LPR and around 55% of patients having voice changes have LPRD as the causative factor. Patients having LPRD present most commonly by hoarseness of voice. The retrograde flow of acid and pepsin damages mucosa of larynx and hinders mucociliary functions. The clinical picture is blurred when there is overlapping gastroesophageal reflux disease (GERD) along with LPRD.

Additional features consist of post nasal drip, Eustachian tube dysfunction, regurgitation etc. GERD is posture dependent occurring mostly in supine position and in night while LPRD can occur in upright status and in daytime. Site of pathology in GERD is at lower esophageal sphincter while that in LPRD is upper one. For LPRD patients RSI questionnaire is used for diagnosis and tracking down the outcome of treatment.

Reflux Symptom Index [9]

The RSI is a validated, reliable patient-reported outcome measure for assessment of the severity of LPR. This contains a nine-item questionnaire applied on patients to score for each of their symptoms on a scale of 0 to 5. An RSI score of greater than ten is correlated with a high likelihood of reflux pathology, although the maximum score is 45. The nine domains are:

- Hoarseness

- Throat clearing
- Mucus or postnasal drip
- Dysphagia
- Coughing after eating or lying down
- Breathing difficulties or choking episodes
- Chronic cough
- Globus sensation
- Heartburn, indigestion, or regurgitation

Reflux Finding Score [10]

It takes into account the laryngoscopic findings. Domains considered are:

- Glottis edema
- Diffuse laryngeal edema
- Ventricular obliteration
- Interarytenoid hypertrophy
- Subglottic edema
- Edema of vocal cords
- Thick mucus at endolarynx
- Granuloma formation

Our study included 292 individuals with no statistical difference in prevalence of LPRD between the two genders, which was similar with the findings in previous studies [10, 11]. Prevalence of LPRD at our center was found to be 17.46%. Most commonly found symptoms were globus sensation followed by hoarseness of voice and excessive urge to clear throat with 92.16%, 82.35% and 76.47% respectively; while the least reported were dysphagia and chronic cough (15.69%, 29.41%). The results were similar to what found in studies done by Hamdan AL et al, Campagnolo AM et al and Ford CN [11,12,13]. The most commonly observed clinical signs in LPRD patient were thick endolaryngeal mucus followed by glottic erythema and partial ventricular obliteration with 80.39%, 68.63% and 62.75% respectively. These findings are in accordance with findings of other authors. The least observed signs were granuloma (11.76%) and posterior commissure hypertrophy (29.41%) similar to Nunes HS et al and Vaezi MF et al [14,16]. The present study showed that obesity, diabetes,

asthma, tobacco use, sleeping within 2 hours of eating and periodontitis had significant correlation with LPRD. 51 patients were positive for LPRD and were advised for behavioural modification. Behavioural changes aimed for decreased episodes of LPR. Recommended steps were weight reduction, avoiding lying down immediately after eating, and elevation of head end of bed by 6-8 inches, avoidance of tobacco, alcohol, fried spicy foods and caffeinated drinks.

The patients positive for LPRD were treated by oral pantoperazole 40 mg once daily at bed time for 6 weeks. The effect of treatment of LPRD was assessed primarily based on Reflux Symptom Index and Reflux finding Score. In our study the mean Reflux Symptom Index (RSI) for pre-treatment group was 19.5 and it was reduced to 12.2 in the post treatment group. Test used was Wilcoxon Signed Rank test done for the pre-treatment and post treatment group and it gave a z value of 6.542 and $p < 0.004$ which is highly significant. The comparison of Reflux Finding Score (RFS) of pre-treatment group with that of the post treatment group showed a difference of 3.6 i.e. a reduction from 9.8 to 6.2 with 6 weeks of treatment. The data was analysed used Wilcoxon Signed Rank test and it showed a p value < 0.008 which is highly significant. In a study by Belafsky et al in North Carolina, United States showed a reduction of mean RSI from 21.2 to 12.8 among pre-treatment and post treatment group.[9]

Another study by Mattoo et al in Indian population, showed a reduction of mean RSI from 20.7 to 8.9 between pre-treatment and post treatment group when treated with twice daily dose of PPI and Domperidone for 4 months.[17] The results derived from both of the studies were comparable to our findings.

Conclusion

LPRD is prevalent considerably in the population having a significant impact on our health. A collaborative inter professional team is needed to manage and prevent the complications caused by it.

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