

Role of Reflux Symptom Index and Reflux Finding Score in the Diagnosis and Evaluation of Treatment Outcomes in Patients with Laryngopharyngeal Reflux

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ABSTRACT

Introduction: Laryngopharyngeal reflux means reflux of gastric contents into the larynx and pharynx so that mucous membranes of the larynx, pharynx, and other respiratory organs are inflamed causing symptoms like foreign body sensation in the throat, cough, heartburn, difficulty in swallowing and hoarseness. Diagnosis is made by a set of non-specific clinical symptoms, endoscopic laryngeal examination signs, reflux symptom index and reflux finding score. **Aims:** To assess the role of reflux symptom index and reflux finding score in diagnosing and assessing the treatment outcomes in patients with laryngopharyngeal reflux. **Methods:** A prospective study was conducted among 140 patients presented in Department of Otorhinolaryngology, Nepalgunj Medical College Teaching Hospital, Kohalpur. Patients with signs and symptoms of laryngopharyngeal reflux were assessed using the reflux symptom index and reflux finding score questionnaire. Patient having a reflux symptom index score of ≥ 13 and reflux finding score of >7 were included in the study. They were treated with proton pump inhibitors for 8 weeks. Then pre and post therapeutic reflux symptom index and reflux finding score were compared. **Results:** A total of 140 patients with age range of 18-60 year were included in the study. Most common symptom was foreign body sensation in throat and sign was erythema of arytenoids. Mean reflux symptom index score was 14.79 while mean reflux finding score was 7.51 which was reduced to 8.39 and 4.03 after 8 weeks treatment with proton pump inhibitors. **Conclusion:** Reflux symptom index and reflux finding score are valuable tools for diagnosing laryngopharyngeal reflux and assessing the treatment outcomes with proton pump inhibitors. Their use may prevent the unnecessary costs of invasive laboratory studies and imaging and time consuming examinations.

Keywords: Laryngopharyngeal reflux; Reflux finding score; Reflux Symptom Index

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INTRODUCTION

Laryngopharyngeal reflux (LPR) is a retrograde flow of gastric contents into laryngopharynx causing damage to laryngeal tissue. Laryngopharyngeal mucosa does not possess protective mechanism against acido-peptic activities of stomach contents, which leads to damage.¹ The term LPR was coined by James in 1980.² In 1996, Koufman proposed the term to designate LPR symptoms, signs or tissue damage resulting from the aggression of the gastrointestinal contents in the upper aerodigestive tract.³ Laryngopharyngeal reflux can present with symptoms such as hoarseness of voice, globus, chronic throat clearing, dysphagia, odynophagia, sore throat, excessive throat mucus, halitosis, exacerbation of asthma, heartburn etc.^{4,5} The main pathophysiology of LPR is lower oesophageal sphincter incompetence causing regurgitation of gastric secretions into the oesophagus, hence the gold standard test for diagnosing

LPR is 24-h pH-metry.⁶ But it is an expensive and time consuming investigation. Thus there is delay in initiation of appropriate therapy. In an effort to help diagnose LPR, Belafsky et al⁷ developed simple non-invasive, economical tools; the reflux symptom index (RSI) and reflux finding score (RFS). RSI is a 9 items self-administered questionnaire tool with 9 questions being answered on a 5 point scale. An RSI of more than 13 is considered to indicate LPR. It ranges from 0 to 45 (worst possible score). RFS on the contrary, is an 8 items clinical severity rating scale based on endoscopic findings, where a score of more than 7 has more than 95 % probability of having LPR. It ranges from 0 to 26.⁸ The aim of the study was to assess the roles of RSI and RFS in diagnosing LPR and assess the treatment outcomes in patients with LPR disease, facilitating accurate management, and reducing the risk of complications associated with LPRD in the future.

METHODS

This prospective study was conducted in the Department of Otorhinolaryngology at Nepalgunj Medical College Teaching Hospital, Kohalpur on 140 patients⁹ with symptoms suggestive of laryngopharyngeal reflux disease like heartburn, sore throat, hoarseness, globus, chronic throat clearing, dysphagia etc from January 2025 to December 2025 after obtaining ethical clearance from the Institutional Review Committee. After obtaining written consent, precise history was taken and complete ENT examinations were done. The primary tools employed for data collection were two questionnaires developed by Belafsky et al⁸ i.e. The Reflux Symptom Index (RSI) and Reflux Finding Score (RFS). The Reflux Symptom Index (RSI), a quantitative questionnaire consisting of 9 items questions scored from 0 (no problem) to 5 (severe problem), with a maximum score of 45. Reflux symptom index (RSI) score >13 were defined as abnormal. (Table.I)

SN	Symptoms	Score (0 to 5)
1	Hoarseness	
2	Throat Clearing	
3	Excess mucus in throat	
4	Difficulty in swallowing	
5	Cough after eating / lying down	
6	Annoying cough	
7	Breathing difficulty / choking episodes	
8	Foreign body sensation in throat	
9	Heart burn / chest pain	

Table I: Reflux Symptom Index (RSI)

Another scoring system; Reflux Finding Score (RFS), an 8 items clinical severity scale, calculated based on the Laryngeal endoscopy findings by using 70° rigid endoscope. Score more than 7 out of 26 were taken as an indicator of the presence of LPR. (Table II)

SN	Laryngeal Findings	Score	Reference
1	Ventricular Obliteration		2-Partial 4-Complete
2	Erythema / hyperemia		2-Arytenoids only 4- Diffuse
3	Subglottic edema		0-Absent 2-present
4	Diffuse laryngeal edema		1-Mild 2-Moderate 3-Severe 4-Obstructing
5	Post. Commissure hypertrophy		1-Mild 2-Moderate 3-Severe 4-Obstructing
6	Granuloma / granulation tissue		0-Absent 2-present
7	Thick endolaryngeal mucus		0-Absent 2-present

8	Vocal cord edema	1-Mild 2-Moderate 3-Severe 4-Obstructing
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Table II: Reflux Finding Score (RFS)

Inclusion criteria: Patients of age between 15 to 60 years with symptoms suggestive of laryngopharyngeal reflux disease for the last 1 month having RSI greater than 13 and RFS greater than 7. Patients who had not taken any form of proton pump inhibitors (PPI) within at least 6 weeks prior. **Exclusion Criteria:** Patients below 15 years and above 60 years, prior surgery for gastro esophageal reflux disease or received any medical treatment previously and having gastritis, unwilling to participate in the study, had a history of neurological illness, co-morbidities such as asthma, chronic obstructive pulmonary disease (COPD), or any other laryngeal pathologies. Every patient who met the specified requirements filled out a questionnaire at the beginning of the study. The questionnaire comprised sections on demographic data and the presence of symptoms as per the RSI. The patients were asked the questions from the RSI questionnaire and answer was recorded and then laryngeal endoscopy of the patients was done by 70° rigid endoscope and findings were recorded. Then RSI score and RFS score were calculated. Patients with RSI score ≥ 13 and RFS ≥ 7 were considered as positive for LPR diseases and were included in the study. They were prescribed Proton Pump Inhibitors (PPI); Pantoprazole 40 mg BD in empty stomach for a duration of 8 weeks. Then they were followed up after 8 weeks. In the follow up, patients were again assessed for improvement of laryngeal signs and symptoms of LPR with RSI questionnaire and a repeat laryngeal endoscopy and RFS was recorded and compared with the previous scores.

Statistical Analysis

Data collected from each patient was entered into an excel sheet after coding of variables and appropriate analysis was done with the help of SPSS 21 software. Results were presented as Mean $\pm$ SD values for continuous data and frequencies as numbers. Comparisons of post treatment changes in RSI and RFS values were done by paired t-test. Chi-square test was used to analyze categorical data. A p-value of <0.05 was considered statistically significant.

RESULTS

This study consisted of 140 patients between 18 to 60 years of age with mean age of 39.02 ± 9.74 years with symptoms and signs of Laryngopharyngeal reflux (LPR). Majority of patients, 51 (36.43%) were in the age group of 31-40 years and the minimum, i.e. 2 (1.43%) were in the age group of 11-20 years (Figure 1) with a slight female predominance 79 (56.43%) female vs 61 (43.57%) male. (Figure 2).

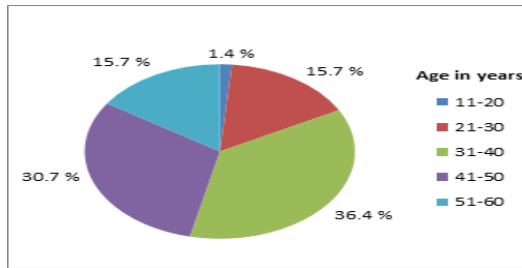


Figure 1: Age distribution of Patients

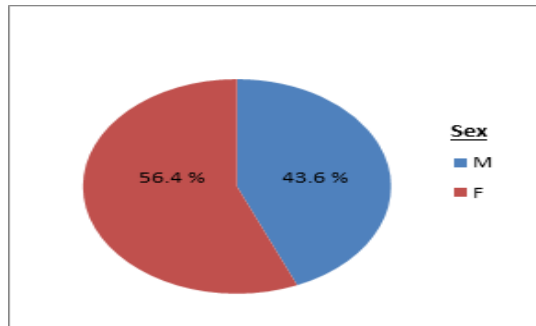


Figure 2: Sex distribution of Patients

Reflux Symptoms Index (RSI)

The most common symptoms in our study was foreign body sensation in throat (89.3%), clearing of throat (86.4%) and heart burn (85.7%) followed by excess mucus in throat (51.4%), hoarseness (30.7%), difficulty in swallowing (23.6%), cough after eating (20.7%), annoying cough (16.4%) and choking (10.7%).(Figure 3). The mean pre-treatment RSI score for 140 patients was 14.79 ± 1.23 and the mean post-treatment RSI score was 8.39 ± 2.18 . (Table.III)

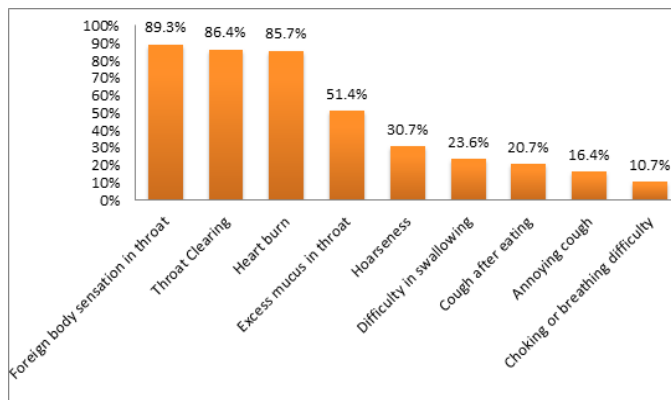


Figure III: Distribution of laryngeal symptoms (N = 140)

	Number (N)	Mean	Std. Deviation
Pre-treatment score	140	14.79	1.23
Post-treatment score	140	8.39	2.18

Table III: Mean pre and post-treatment RSI score

	Mean difference	Std. deviation	t	df	p-value
Pre and Post treatment score	6.40	1.982	38.258	139	0.000

Table IV: Mean difference of pre and post-treatment RSI score

Table III and IV show that there was decreased in the mean value of the RSI score of 6.40 ± 1.98 in the study population before and after giving PPI therapy for 8 weeks which was statistically significant ($p < 0.05$).

Reflux Finding Score (RFS)

The most common sign was erythema (91.4%), vocal cord edema (75%) and posterior commissure hypertrophy (41.4%) followed by endolaryngeal mucus (16.4%), ventricular obliteration (15%), diffuse laryngeal edema (8.6%), granuloma (3.6%) and subglottic edema (1.4%) (Figure 4). The mean pre-treatment RFS was 7.51 ± 0.77 and the mean post-treatment RFS was 4.03 ± 1.41 . (Table.V)

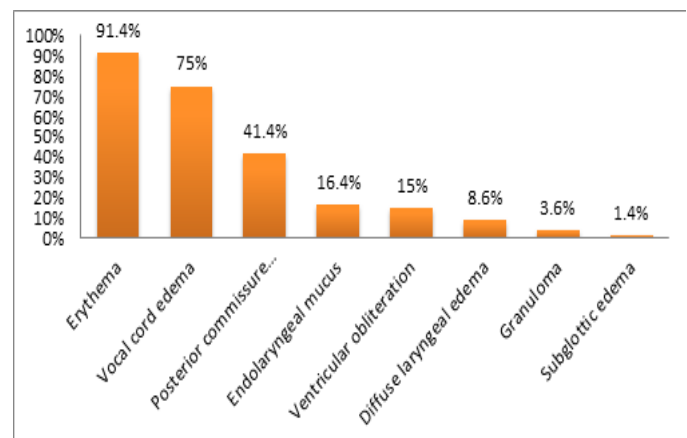


Figure IV: Endoscopic findings (N = 140)

	Number (N)	Mean	Std. Deviation
Pre-treatment score	140	7.51	0.77
Post-treatment score	140	4.03	1.41

Table V: Mean pre and post-treatment RFS

	Mean difference	Std. deviation	t	df	p-value
Pre and Post treatment score	3.48	1.437	28.647	139	0.000

Table VI: Mean difference of pre and post-treatment RFS

Table V and VI show that there was decreased in the mean

value of the RFS score of 3.48 ± 1.43 in the study population before and after giving PPI therapy for 8 weeks which was statistically significant ($p < 0.05$). Statistically significant difference was observed in RSI and RFS between pre and post treatment with Proton Pump Inhibitor (PPI). Mean total score of RSI and RFS before therapy was 14.79 ± 1.23 and 7.51 ± 0.77 and had reduced to RSI and RFS of 8.39 ± 2.18 and 4.03 ± 1.41 respectively after therapy indicating significant clinical improvement in LPR symptoms and laryngeal findings ($p < 0.001$ for both).

DISCUSSION

Laryngopharyngeal Reflux disease (LPR) is a frequently encountered disease in the outpatient department of otorhinolaryngology. In spite of a large number of studies being conducted on LPR, controversies exist.¹⁰ Though the disease itself was found to be a non-specific one, the combined symptoms and clinical findings are characteristic. Many of the studies have highlighted the varying degrees of laryngoscopic findings of LPR.¹¹ RSI and RFS score scales are currently primarily used to screen patients for diseases, making it possible to swiftly and reliably evaluate patient's clinical symptoms and indicators while accurately diagnosing diseases.¹²

In this study, symptoms of laryngopharyngeal reflux disease were more common in females (56.4%) as compared to males (43.6%), which was in accordance with Mahmoud et al¹³, Bajoliya S et al¹⁴, pokhrel et al¹⁵, Somashekara & Kamath's et al¹⁶, Patigaroo et al¹⁷, Seref Bahar Maja et al¹⁸ and Makhadoom Naeem et al.¹⁹ The higher incidence of LPR in women than men is because women have a higher stress level than men. Stress will stimulate the vagus nerve through sympathetic innervation in the hypothalamus to produce acetylcholine. Acetylcholine will then stimulate histamine to stimulate gastric parietal cells increasing gastric acid production.²⁰ In contrast a study done by Belafsky et al⁸ and Bhargava A et al²¹ demonstrated a male predominance of 56% and 53.33%. In our study, we had taken 140 patients of age group 18-60 years with LPR. It was found that the majority of cases were in 31-40 years (36.4%) and the mean age was 39.02 ± 9.742 years which correspondence to the study done by Patigaroo et al¹⁷, Bhargava A et al²¹, Jindal S et al⁹, Akshita et al²² and Osman HA et al.²³

In our study the most common complaint were foreign body sensation in throat (89.3%), throat clearing (86.4%) and heart burn (85.7%) which correspondence to study by Bhargava A et al²¹, jindal S et al⁹ - heartburn (83%) followed by foreign body sensation (80%), Sharma A et al²⁴ - globus 96.9%, throat clearing 96.9% and heart burn / reflux 95.4% and Nitin chhabra et al.²⁵ In contrast study done by Schneider JA²⁶ found dysphonia (71%) was the most common symptom, followed by cough (51%), and globus pharyngeus (47%). Da Silva CE et al²⁷ found that the most frequent symptom was a dry cough followed by foreign body sensation.

Similarly, in our study erythema (91.4%) followed by vocal cord edema (75%) were the most common sign seen in larynx noticed in direct laryngoscopy which was similar to the study conducted by Bhargava A et al²¹ - hyperemia (72%), posterior commissure hypertrophy (62%), jindal S et al⁹ - erythema

(84%), granuloma (70%) and diffuse laryngeal edema (66%) and Sharma A et al²⁴ erythema / hyperemia (100%), vocal fold edema (81.5%).

The main finding was that the mean RSI score changed from 14.79 ± 1.23 at the beginning to 8.39 ± 2.18 at 8 weeks of treatment ($p < 0.001$). In a prospective study conducted for 2 years by Patigaroo SA et al¹⁷ in 2011 similar findings were noted. Another study conducted by Lee et al²⁸ also stated a significant change in the RSI score after receiving PPI therapy for four weeks, from 13.15 to 10.03 ($p < 0.01$). It is also in line with a study conducted by Silva AS et al²⁹, which showed a significant decrease in the RSI score after PPI administration, from the mean initial score before treatment of 16.0 to 10.5 after being given therapy ($p < 0.001$). Similar study has been done by Bhargava A et al²¹ in which pretreatment RSI was 23.37 ± 7.26 and was reduced to 5.24 ± 2.51 .

In our study the comparison of reflux finding score of pretreatment group with that of the post treatment group showed a difference of 3.48 i.e. a reduction from 7.51 to 4.03 with 8 weeks of treatment ($p < 0.001$). Belafsky et al³⁰ in 2001 carried out a prospective study in 40 patients with a clinical diagnosis of LPRD and had similar observations. In a prospective study in 100 patients conducted by Anagha Atul Joshi et al³¹ in 2017, for assessing treatment response in patient with LPR by using RSI and RFS scores, it was found that mean value of RFS improved after PPI therapy in a period of 2 to 6 months ($p < 0.001$). They found that improvement started only after 2 months of treatment. Patigaroo SA et al¹⁷ in their study of 50 Indian patients with LPRD, showed a mean reduction in Reflux finding score from 12 in the pretreatment to 6.5 in the posttreatment group. Similar study has been done by Bhargava A et al²¹ in which pretreatment RFS was 10.36 ± 3.11 and is reduced to 4.31 ± 2.00 . These values are comparable to our study.

In the present study comparison of mean RSI and RFS before and after treatment revealed significant improvement with the course of PPI therapy and the result was statistically significant ($p < 0.001$). The study was found comparable with Silva AS et al²⁹ and Belafsky et al.⁸ Belafsky continued treatment for a period of six months, whereas in our study, treatment was given for two months and in contrast to our study Guo et al³² and Lam et al³³ found that treatment with PPI improve only RSI but no improvement in RFS. Proton pump inhibitor therapy has significant role in control of symptoms associated with laryngopharyngeal reflux. Thus, it is sure that RSI and RFS are the important clinical parameters to be considered in the diagnosis of LPR and monitoring the treatment. Physician can evaluate it independently, and it indicates whether or not to proceed with other tests.

LIMITATIONS

The limitation of our study was a single center study with a small sample size, and there can be different results for other geographical location inside our country. Due to the invasive nature and cost of the test, we did not use ambulatory 24 hour double probe pH monitoring in our patients to confirm reflux instead used RFS and RSI. We relied completely on the obser-

vation of Belafsky et al⁸ that the probability of LPR is > 95% if RSI is >13 and RFS is >7. Future studies are required to clarify the pathophysiology and treatment of LPRD.

CONCLUSION

From our study, we concluded that RSI and RFS scoring systems are convenient and valuable tools for diagnosing LPR and for monitoring the treatment, and they can be easily implemented in ENT clinics for the subjective and objective assessment of LPR. Their use may prevent the unnecessary costs of invasive laboratory studies and imaging. A significant reduction in RSI and RFS scores were seen after 2 months of proton-pump inhibitor therapy, indicating that PPI therapy is the mainstay of LPRD treatment in the current era. Proper behavioral therapy, dietary recommendations and PPI therapy definitely help in LPRD management.

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