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Laryngopharyngeal reflux disease; how to evaluate

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Abstract

Objective: To study how to evaluate Laryngopharyngeal Reflux(LPR), and to formulate management strategy. *Study design:* Prospective study. Material and methods: A total of 112 patients were studied and followed for a period of at least six months. The study was conducted under the following headings: (1)establish the diagnosis of LPR by using Reflux Finding Score (RFS) and Reflux Symptom Index(RSI), (2)establish diagnosis of GERD by history and endoscopy,(3)treat LPR by lifestyle modification and medical management using proton pump inhibitors(PPI) or surgical management. *Results:* Majority of patients were females (53.3%) and in the age group of 20-50 years.RSI was used to study symptoms and median RSI score was (17).The common symptoms were clearing of throat (97.1%),lump in throat (96.2%),excess throat mucus (93.3%) and heartburn (62.9%).The signs of LPR were studied by using RFS and median RFS was (11) .The common findings were vocal cord edema (97.1%) and erythema (93.3%).Symptoms of GERD were present in less than half of patients (47.6%). EGD was found to be normal in (64.8%). The most common finding on EGD was esophagitis (17.1%) followed by gastritis (14.3%) and hiatus hernia (8.6%). Majority of patients responded to medical management only (96.2%) . RSI improved from a mean score of 17.6% at initiation of treatment to 3.9 at 6 months follow up. RFS improved from a mean score of 11.9 at pre-treatment to (1.7) at 6 months follow up. Symptoms of GERD improved completely in all patients at 4 months only. *Conclusion:* LPR is common and RFS and RSI were used to evaluate LPR and they were reproducible and effective. GERD was present in less than half of the patients. Medical management using twice daily PPI was effective.

Keyword

Laryngopharyngeal Reflux, Upper Esophageal Sphingter, Reflux Finding Score, Gastroesophageal Reflux

1. Introduction

Gastroesophageal reflux (GER) is defined as the movement of gastric material into the oesophagus in the absence of belching or vomiting[15]. Gastroesophageal reflux (GER) that travels proximally and penetrates the upper esophageal sphincter to enter the larynopharynx is called extra-oesophageal reflux or laryngopharyngeal reflux (LPR). The term LPR was adopted by the American Academy of Otolaryngology Head & Neck Surgery in 2002[17]. LPR should never be considered physiologic and even a single episode of pharyngeal reflux (pH < 4.0) is diagnosti

In LPR the incidence of esophagitis and the primary symptom of esophagitis i.e. heartburn, is very low (about 20-43%)[15] whereas nearly all patients with GERD report of heartburn and as many as 40% have been observed to have erosive esophagitis. Thus LPR is often called silent reflux. LPR patients are predominantly upright (daytime) refluxers[1]

Although LPR has been associated with multiple

otolaryngologic disorders, the most common physical findings of LPR are related to laryngeal mucosal edema and injury. Laryngeal mucosal injury can result in serious pathology ranging from ulcerative disease, granulomas, subglottic stenosis to laryngopharyngeal carcinoma. However, the most common findings during laryngoscopy are related to chronic inflammatory changes. The first such finding is pseudosulcus vocalis. Analogous to the RSI, these laryngeal findings have been used to create the reflux finding score (RFS). RFS was also developed by Belafsky et al[2] as an eight item clinical screening scale for finding of laryngoscopic examination.

2. Aims and Objectives

(1) To study the clinical presentation of laryngopharyngeal reflux.
(2) To document endoscopic findings of patients with LPR (fiberoptic laryngoscopy and esophagoscopy).
(3) To correlate LPR with GERD.
(4) To formulate management strategy of LPR.

3. Materials and Methods

The study entitled "Evaluation and management of patients with laryngopharyngeal reflux (LPR) and its correlation with gastroesophageal reflux (GER)" was conducted in the Department of Otorhinolaryngology, Head & Neck Surgery, SMHS Hospital of Government Medical College, Srinagar on the subjects attending Outpatient Department (OPD).

3.1. Inclusion Criteria

- Patients complaining of symptoms suggestive of LPR were included in the study.
- Subjects of all age groups were studied.

3.2. General Study Design

A total number of one hundred twelve (112) patients were studied and followed for a period of at least six (6) months. Seven (7) patients lost follow-up due to various reasons leaving a total of one hundred and five (105) patients in the study.

3.3. General Study Design

The study was conducted under the following headings:

3.3.1. To Establish the Diagnosis of LPR

For establishing the diagnosis of LPR, patients were subjected to a detailed history and physical examination. Symptoms of the patients were evaluated on the basis of the reflux symptom index (RSI) which is a self-administered tool developed by Belafsky et al[8]. Patients were asked to use a 0 to 5 point scale to grade the following symptoms. (i) Hoarseness of voice, (ii) Throat clearing, (iii) Excess throat mucous or postnasal drip, (iv) Difficulty swallowing, (v) Coughing after eating or lying down, (vi) Breathing difficulties or chocking spells, (vii) Troublesome or annoying cough, (viii) Sensation of something sticking or a lump in the throat and (ix) Heart burn, chest pain, indigestion on standing, or acid coming up.

Then laryngeal examination by indirect laryngoscopy and fiberoptic laryngoscope (FOL) / 70% rigid endoscope was done by using 15% lidocaine aerosol spray. These findings were judged on the basis of reflux finding score (RFS) which is an 8 item clinical severity scale. According to the RFS 8 LPR associated findings were rated on a variably weighted scale from 0 to 4. These findings include subglottic edema, ventricular obliteration, erythemia / hyperemia, vocal fold edema, diffuse laryngeal edema, posterior commissure hypertrophy, granuloma and thick endolaryngeal mucus. The results could range from 0 (normal) to 26 (worst possible score).

3.3.2. To Establish Diagnosis of GERD

All the patients who were found to have LPR were evaluated for GERD. GERD was diagnosed on the basis of typical history like heartburn, regurgitation or dysphagia and documentation of reflux esophagitis on upper GI endoscopy with confirmation of esophagitis by biopsy.

3.3.3. Treatment of LPR

After proper diagnosis the patients were subjected to various anti-reflux measures.

3.3.3.1. Patient Education and Behavioural Modification

All patients were educated as to the nature of the problem and counselled on helpful behavioural and dietary changes.

Important behavioural modifications include weight loss, smoking cessation and alcohol avoidance. Ideal dietary changes included restriction of chocolate, fat, citrus fruits, carbonated beverages, spicy foods, wines, and caffeine. Patients were advised to elevate the head end of the bed by 6-8 inches and avoid lying down 3 hours after meals.

3.3.3.2. Medical Management

The patients were put on proton pump inhibitors (PPI) twice daily for a period of six (6) months.

The patients were followed for six (6) months at an interval of 2 months each. Improvement was assessed by again applying RFS and RSI score at 2, 4 and 6 month scores and comparing them with pretreatment scores. Investigations like esophagogastroduodenostomy (EGD) were also repeated.

If patients showed improvement on subsequent follow-up, the drugs were titrated off. But if the patients did not show any improvement, the dose of PPI was doubled or an H_2 receptor antagonist was added.

3.3.3.3. Surgical Management

Patients who failed to respond to adequate medical management were considered for surgical measures like Nissen Fundoplication[12].

4. Results and Observations

The study group consisted of 112 patients who were followed for at least 6 months, 7 patients lost follow-up leaving 105 patients in the study.

Table 1. *Reflux Symptom Index (RSI) Score of the Studied Subjects*

RSI	Score	0	1	2	3	4	5	Total	Median
Hoarseness or a problem with your voice	n	12	9	24	34	22	4	93	3
	%	11.4	8.6	22.9	32.4	21.0	3.8	88.6	
Clearing your throat	n	3	7	16	44	29	6	102	3
	%	2.9	6.7	15.2	41.9	27.6	5.7	97.1	
Excess throat mucus or post nasal drip	n	7	29	36	24	8	1	98	2
	%	6.7	27.6	34.3	22.9	7.6	1.0	93.3	
Difficulty swallowing food, liquid or pills	n	35	40	20	10	0	0	70	1
	%	33.3	38.1	19.0	9.5	0.0	0.0	66.7	
Coughing after you ate or after lying down	n	27	47	25	6	0	0	78	1
	%	25.7	44.8	23.8	5.7	0.0	0.0	74.3	
Breathing difficulties or chocking episodes	n	25	32	33	15	0	0	80	1
	%	23.8	30.5	31.4	14.3	0.0	0.0	76.2	
Troublesome or annoying cough	n	10	12	24	26	30	3	95	3
	%	9.5	11.4	22.9	24.8	28.6	2.9	90.5	
Lump in your throat or sensation of something sticking in throat	n	4	0	23	53	21	4	101	3
	%	3.8	0.0	21.9	50.5	20.0	3.8	96.2	
Heartburn, chest pain, indigestion or stomach acid coming up	n	39	42	11	11	2	0	66	1
	%	37.1	40.0	10.5	10.5	1.9	0.0	62.9	

Table 2. *Reflux Finding Score (RFS) in the Studied Subjects*

Component	Score	n	%	Total (%)	Median
Pseudosulcus (Subglotic Edema)	0	53	50.5	52 (49.5)	0
	2	52	49.5		
Ventricular Obliteration	0	45	42.9	60 (57.1)	2
	2	55	52.4		
	4	5	4.8		
Erythema/Hyperemia	0	7	6.7	98 (93.3)	4
	2	43	41.0		
	4	55	52.4		
Vocal Cord Edema	0	3	2.9	102 (97.1)	2
	1	17	16.2		
	2	50	47.6		
	3	32	30.5		
	4	3	2.9		
Diffuse Laryngeal Edema	0	13	12.4	92 (87.6)	2
	1	39	37.1		
	2	43	41.0		
	3	9	8.6		

Component	Score	n	%	Total (%)	Median
Posterior Commisure Hypertrophy	4	1	1.0	83 (79.0)	1
	0	22	21.0		
	1	41	39.0		
	2	34	32.4		
	3	7	6.7		
	4	1	1.0		
Granuloma/Granulation	0	83	79.0	22 (21.0)	0
	2	22	21.0		
Thick Endolaryngeal Mucus	0	32	30.5	73 (69.5)	2
	2	73	69.5		

Table 3. *Median RFS and RSI Score*

	Median Score
Total Reflux Symptom Index Score	17
Total Reflux Finding Score	11

Table 4. *GERD symptoms in the studied subjects*

GERD	N	%
Yes	50	47.6
No	55	52.4

Table 5. *Correlation of EGD with GERD symptoms in the Studied Subjects*

EGD	No. of Patients	Percentage
Normal	68	64.8
Esophagitis	18	17.1
Gastritis	15	14.3
Haitus Hernia	9	8.6
Total	**105**	**100**

Table 6. *Comparison of Initial RSI with follow-up at 2, 4, 6 months respectively*

RSI	Mean	SD	p value
Initial	17.6	3.5	
2 month follow-up (FU)	14.0	5.1	0.000 (Sig)
4 month follow-up (FU)	8.2	5.1	0.000 (Sig)
6 month follow-up (FU)	3.9	4.5	0.000 (Sig)

Table 7. *Reflux Symptom Index Score over the Study period of 6 months*

RSI	< 13		≥ 13		p value
Initial	0	0.0	105	100.0	
2 month follow-up (FU)	44	41.9	61	58.1	0.000 (Sig)
4 month follow-up (FU)	85	81.0	20	19.0	0.000 (Sig)
6 month follow-up (FU)	101	96.2	4	3.8	0.000 (Sig)

Table 8. *Comparison of Initial RFS with follow-up at 2, 4, 6 months respectively*

RFS	Mean	SD	p value
Initial	11.9	3.6	
2 month follow-up (FU)	8.3	3.4	0.000 (Sig)
4 month follow-up (FU)	4.2	3.5	0.000 (Sig)
6 month follow-up (FU)	1.7	2.8	0.000 (Sig)

Table 9. *Reflux Finding Score over the Study period of 6 months*

RFS	< 7		≥ 7		p value
Initial	0	0.0	105	100.0	
2 month follow-up (FU)	34	32.4	71	67.6	0.000 (Sig)
4 month follow-up (FU)	82	78.1	23	21.9	0.000 (Sig)
6 month follow up (FU)	99	94.3	6	5.7	0.000 (Sig)

Table 10. *Comparison of Initial GERD Symptoms with the GERD at 2 month, 4 month and 6 month Follow Up*

		Yes		No		p value
		n	%	n	%	
Follow-up (FU) GERD 2 months	Positive	23	46	5	9.1	0.000 (Sig)
	Negative	27	54	50	90.9	
Follow-up (FU) GERD 4 months	Positive	0	0	0	0.0	0.000 (Sig)
	Negative	50	100	55	100.0	
Follow-up (FU) GERD 6 months	Positive	0	0	0	0.0	0.000 (Sig)
	Negative	50	100	55	100.0	

Table 11. *Treatment Effectiveness in the Studied Subjects over a period of 6 months*

		N	%
Initial RSI & RFS	None	105	100.0
2 month RSI & RFS	Both Subsided	26	24.8
	RSI Only	18	17.1
	RFS Only	8	7.6
	None	53	50.5
4 month RSI & RFS	Both Subsided	74	70.5
	RSI Only	11	10.5
	RFS Only	8	7.6
	None	12	11.4
6 month RSI & RFS	Both Subsided	99	94.3
	RSI Only	2	1.9
	None	4	3.8

5. Discussion

Gastric contents, refluxing through the upper esophageal sphincter are implicated as a common cause of laryngeal inflammation. As recently as the early 1980s many clinicians questioned whether the backflow of gastric contents into the throat could account for laryngopharyngeal symptoms in the absence of heartburn, the primary symptom of GERD. Indeed, LPR documented by pharyngeal pH monitoring was also not reported till 1986. LPR which is the retrograde movement of gastric contents into the larynx, pharynx, and upper aerodigestive tract; is now reported as an important etiological factor in the development of many inflammatory and neoplastic disorders of the upper aerodigestive tract. Improved methods of diagnosis and treatment with proton pump inhibitors have allowed for increasing recognition and control of this condition.

Earlier to that, many of these head and neck symptoms were presumed to result from vagally mediated reflexes, not from LPR. Now over the past two decades, many studies have shown LPR and GERD to be two unique but related entities with different risk factors. One key distinction is that patients with classic GERD almost always have heartburn or dyspepsia as their primary symptom. In contrast most patients with LPR do not have heartburn but instead present with atypical symptoms of reflux such as hoarseness of voice, globus sensation, throat clearing.

The aim of the current prospective study was to determine in patients presenting with various laryngopharyngeal symptoms to the otolaryngologist the prevalence of gastrointestinal diseases with evaluation of the success rates for specific therapies.

As many as 112 patients complaining of symptoms suggestive of LPR of all age groups were included in the study, out of which 7 lost follow up leaving 105 patients for the study.

In the present study, it was observed that LPR was quite common in the studied population. Among the patients having LPR females (53.3%) outnumbered men (46.7 Similar observations have been reported by W. J. Issing27, Cem Bilgen5 where 36% were males and 64% females. In another study Koufman JA18 reported 53% women with LPR disease. When studied with reference to the affected age group, it was observed that the maximum number of patients were young in the age group of 40-49 years with a mean age of 43.3+18.3 years. This is in accordance with other studies conducted elsewhere.

The mean age of the patients in the study conducted by Koufman JA18 was 49+13 years while as it was 51.3+15.2 years in studies conducted by Stefan Tauber27, Belafsky4 and Johnson PE14 reported affected age group of 57+17 years and 47 years respectively. The socio-demographic characteristics of the patient revealed that those patients having LPR had no significant difference with regard to the dwelling i.e. 46.7% resided in rural and 53.3% in urban areas. But the number of literate people affected were more (89%) as compared to 15.2%illiterate people. This difference might be accounted to the cultural difference in identifying and reporting the disorders.

To diagnose, assess severity and document improvement in patients with LPR RSI developed by Belafsky et al4 was used in the present study. RSI is a nine item reflux symptom index, a standardized instrument to qualify LPR symptoms28. Subjects are asked to grade the symptoms on a scale of 0-5, 0 signifying no problem while 5 signifying severe problem. The score ranges from 0-45. A score of > 13 was taken as abnormal and suggestive of LPR. It was found that RSI was highly reproducible. This is consistent with the study of Belafsky4.

The mean RSI of the patients at the initial pretreatment visit was 17 which was comparable to that found by Belafsky[4] (mean pretreatment RSI was 19.9$\pm$11.1).

Among the studied patients, clearing of throat (97.1%) was found to be the most common symptom followed by lump in throat (96.2%).

These findings are similar to the observations made in the surveys conducted by American Bronchoesophagological Association Members6,11 and the study conducted by Noordziji21. Koufman JA15 in his landmark study found that hoarseness of voice was present in 71%, cough 51%, globus 47%, and throat clearing in 42% subjects. This seems to vary from the present results. This might be attributed to the fact that RSI was not used to grade symptoms in their study. As we have used RSI patients even with the score of 1 i.e. mild symptoms also get included which is not true for the above mentioned study.

Similar to the RSI score the RFS score was used for assessing and grading the laryngeal signs in patients of LPR. This was also developed and validated by Belafsky2. According to this score 8 item grading system were used to assess the severity of disease. A score of > 7 is considered abnormal. The RFS is also highly reproducible as described by Belafsky2. In the present study it was found that in patients the mean RFS was 11 which was similar to that found by Belafsky2 in his study.

In the present study, vocal cord edema was the most common finding (97.1%) followed by erythema (93.3%), diffuse laryngeal edema (87.6%), and posterior commisure hypertrophy (79%). These findings are consistent with other studies conducted elsewhere in the world[11].

The prevalence of symptoms of GERD in our patients of LPR was quite less (47.6%). This shows that more than half of the patients with LPR showed no symptoms of GERD. This is consistent with almost all the studies done to compare GERD and LPR. In the large series of patients described by Koufman[15] only 43% had symptoms of GERD which is comparable to the findings in the present study. This emphasizes the difference between GERD and LPR. LPR is therefore sometimes termed as silent reflux. The patterns, mechanism, manifestation and treatment of LPR and GERD all differ significantly and the gastroenterology model of GERD does not apply to LPR. The laryngeal epithelium is more susceptible to reflex related injury than esophageal epithelium. In all the patients of LPR endoscopy of the upper GI system was done to find any abnormalities. We found that 64.8% of patients had absolutely normal EGD. The most common abnormality was that of esophagitis which was present in 14% of patients. The next common finding was antral gastritis present in 9% and hiatal hernia in 7% of patients. The world literature seems to agree on the fact that a large percentage of patients of LPR do not have signs and symptoms of GERD. Koufman JA[18] documented esophagitis in 12% of subjects while in the study conducted by Stefan Tauber[27] the prevalence of esophagitis was 43%.

6. Treatment

The patients were given treatment in three phases:

6.1. Dietary and Life Style Modification

Low fat, high protein diet is recommended for patients with GERD, thus it is recommended that fats, chocolates, mints, carbonated beverages and caffeine are to be avoided. Similarly ethanol and use of tobacco are both discouraged because these agents adversely influence several pathophysiologic GER mechanisms.

No food or drink within 3 hours of recumbency is also recommended.

The life style modification include elvation of the bed or sleeping on a wedge. This has shown to improve acid clearance time in two-third of patients. The patients were instructed to avoid wearing corsets, high belts, and tight fitting clothing which increase the abdominal pressure.

6.2. Medical Management

The patients were treated with PPIs like Omperazole, Pantoperazole, Rabeprazole. These are H^+K^+ inhibitors (hydrogen ion blocker). The last stage of hydrogen ion production in the acid clearing pathway within the parietal cell is a hydrogen ion pump in which potassium is exchanged for hydrogen. This step is carried out by H^+K^+ ATPase. PPIs act on this final step in the stimulating process of acid secretion and totally inhibits both stimulated and basal acid secretion.

In this study, the patients were treated with twice a day of PPI in accordance with various studies conducted on LPR patients[3,8,9,10,15,18,19,2O,23,24,30]. The efficacy of using the increased dose of PPI was shown in studies conducted by Koufman[15,18], Belafsky[3], Pach W[23], Peghini PL[24], Noordziji JP[20], Katz[19], Wetscher GJ[30], Eherer AJ[8], Fass[10], El-Seray[9]. When compared at 0, 2, 4 and 6 months it was that the mean RSI improved from 17.6% at pre-treatment to 14.0 at 2 months follow up, 8.2 at 4 months and 3.9 at 6 months follow up.

Similarly when RFS was compared at 0, 2, 4 and 6 months it was found that mean RFS improve from 11.9% at pre-treatment level to 1.7 at 6 months follow up. These studies were consistent with that done by Bilgen[5] who documented a mean RFS score of 1.4 ± 0.9 at 6 months interval.The subjects were followed for 6 months after an interval of every 2 months. The parameters that were followed were RSI, RFS, symptoms of GERD and EGD findings

At 6 months reviewing all the patients, it was found that 3.8% (4) had no improvement signs and symptoms of LPR. This was documented by Amin MR1. These patients were considered for surgical management12,13,22,29. In various studies like that conducted by Westcott CJ29, Hunter GJ13, Oelschlager22, Fuch12 surgical management was found to be helpful for treating symptoms of LPR. In this study, empirical trial of PPIs was also used to diagnose LPR5,18 The duration of empiric treatment was 2 months5. The trial of PPI for diagnosing has been shown to be an effective means of diagnosing LPR. It has been proven to be an alternative to ambulatory double probe pH monitoring for diagnosing LPR. This was suggested by Bilgen5 and Koufman18 in their studies.

Hence it is concluded that maximum number of patients of LPR improved with PPI but the dose of PPI required was high i.e. twice daily dosage and they required the treatment for a larger duration i.e. for 6 months period. This was attributed to the fact that as few as 3 episodes per week has been shown to be associated with development of significant disease the difference appears to be due to the fact that the extrinsic and intrinsic differences of the laryngeal epithelial are much weaker than the esophagus since none of the PPI's exert intragastric and suppression for more than 16.8 hours patients with LPR treated with PPI requires at least twice daily dosing15,18.

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