Correlation between Reflux Symptom Index and Reflux Finding Score in Laryngopharyngeal Reflux

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ABSTRACT

Introduction: Laryngopharyngeal reflux is an extra esophageal variant of gastro esophageal reflux disease and is characterized by change in voice, recurrent throat clearing, chronic cough, discomfort in throat, globus. The larynx and pharynx are devoid of the normal acid clearance mechanism even three episodes of reflux per week seems to be associated with a significant disease. **Aims**: The aim of the study was to evaluate the correlation between the reflux symptom index and reflux finding score in patients with Laryngopharyngeal reflux. **Methods**: This prospective analytical study was conducted from November 2019 to October 2020 in total of 65 patients presented in department of Otorhinolaryngology, Nepalgunj Medcial College and Teaching Hospital, Nepalgunj. Reflux symptom index questionnaire with nine Questions were answered by patients on a 5 point scale. Reflux symptom index of more than 13 out of total score of 45 was considered to indicate Laryngopharyngeal reflux were as, reflux finding score was based on laryngoscopic findings after evaluating 8 items. Score more than 7 out of 26 was taken as an indicator for presence of Laryngopharyngeal reflux. **Results**: The reflux symptom index was more than 13 on 22 patients withmean11.85±3.48 and reflux finding score was more than 7 on 11 patients with mean 5.02±3.23 with statistically moderate correlation between reflux symptom index and reflux finding score (p=0.000,r=0.595).**Conclusion**: There is moderate correlation between the reflux symptom index and reflux finding score. The combined use of these questionnaires and laryngoscopic findings can be more precise, practical and cost effective in the diagnosis of laryngopharyngeal reflux.

***Keywords*:** Correlation, Laryngopharyngeal reflux (LPR), Reflux finding score (RFS)**,** Reflux Symptom Index (RSI)

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INTRODUCTION

Laryngopharyngeal reflux (LPR) is a retrograde flow of gastric contents into laryngopharynx causing damage to laryngeal tissue. Laryngopharyngeal mucosa do not possess protective mechanism against acidopeptic activities of stomach contents, which leads to damage.[1]In 1996 Koufman proposed LPR to designate its symptoms, signs and its effects on laryngeal tissue.[2]The two theories have been proposed for pathophysiology of LPR. The micro aspiration theory proposed, laryngeal injury occurs due to acid, pepsin, bile and trypsin. Second proposed explanation is esophageal bronchial reflex theory, where vagally mediated response by acidification leads to bronchoconstriction.[3] The larynx and pharynx are devoid of the normal acid clearance mechanism, hence even 3 episodes of reflux per week seems to be associated with a significant disease.[4]

Belafsky et al developed the reflux symptom index (RSI) and reflux finding score (RFS).RSI questionnaire with 9 questions being answered on a 5 point scale. An RSI of more than 13 is considered to indicate LPR. RFS is based on laryngoscopic findings.This evaluates 8 items were a score of more than 7 indicates presence of LPR.[5]An accurate and timely diagnosis with the smallest probability of misdiagnosis, missed diagnosis, or delayed diagnosis is crucial for managing any disease.[6]When the diagnostic tools are less sensitive and specific, such errors are bound to occur. It can be overcome by combining diagnostic tools which have higher strength of correlation. So in this study we tried to correlate collection of symptoms and signs i.e. RSI and RFS, so that they could be better diagnostic tools when combined.

METHODS

This prospective analytical study was conducted from November 2019 to October 2020 in total of 65 patients presented in otorhinolaryngology OPD of Nepalgunj Medical College Teaching Hospital, Banke, Nepal. After random sampling 65 patients presenting with symptoms of LPR were enrolled for the study. Ethical clearance was obtained from institutional review committee (IRC).Precise history was taken, RSI were noted, nasopharyngeal laryngoscopy was performed and RFI were noted. RSI questionnaire with 9 questions were answered by patients on a 5 point scale. RSI of more than 13 out of total score of 45 was considered to indicate LPR were as, RFS was based on laryngoscopic findings after evaluating 8 items. Score more than 7 out of 26 was taken as an indicator of the presence of LPR.

Inclusion criteria: All patients more than 10 years old presented in OPD with all symptoms of LPR were included in the study.

Exclusion criteria: Children less than 10 years of age, patients with psychiatric illness, URTI within a month, vocal cord paralysis, laryngopharyngeal mass, seasonal allergies, untreated thyroid diseases, pregnant and lactating mother and who did not like to participate in the study were excluded in the study.

How did the problem listed below affect you within the last month		0 = no problem, 5 = severe problem					
		0	1	2	3	4	5
1.	Hoarsness or voice problems						
2.	Throat clearing						
3.	Excess mucus or post nasal drip						
4.	Difficulty in swallowing solid, fluids, tablet						
5.	Coughing after eating or lying down						
6.	Breathing difficulty or choking episodes						
7.	Annoying cough						
8.	Sensation of a lump or F.B in throat						
9.	Heart burn, chest pain, indigestion, reflux						
	Total						

Laryngopharyngeal reflux is considered if RSI>13 (Belafsky et al).

Table I: Reflux Symptoms Index (RSI).

	Findings	Score
1.	Subglottic edema	0 = absent, 2 = present
2.	Ventricular obliteration	0 = absent 2 = partial 4 = complete
3.	Erythema/hyperemia	0 = absent, 2 = only in the arytenoids, 4 = diffuse
4.	Vocal fold edema	0 = absent, 1= mild, 2 = moderate 3 = severe, 4= polypoid
5.	Diffuse laryngeal edema	0 = absent, 1 = mild, 2 = moderate 3 = severe, 4 = obstruction
6.	Posterior commissure hypertrophy	0 = absent, 1 = mild, 2 = moderate 3 = severe, 4 = obstruction
7.	Granuloma/ granulation tissue	0 = absent, 2 = present
8.	Thick endolaryngeal mucus	0 = absent, 2 = present
	Total	

Laryngopharyngeal reflux is considered if RFS>7 (Belafsky et al).

Table II: Reflux Finding Score (RFS).

Statistical Analysis

Data were analyzed using SPSS 20. Pearson's correlation test was used for analysis. 'p' value less than 0.01 was considered significant.

Strength of correlation was measured using the absolute criterion:

- 0 – 0.19: no correlation,
- 0.2 – 0.39: low correlation,
- 0.40 – 0.59: moderate correlation,
- 0.60 – 0.79: moderately high,
- ≥ 0.80: high correlation, report the correlation determinations, i.e. squared correlation coefficients.

RESULTS

Demographic Profile

There were 65 patients in the study. The age of the patient ranged from 17 years to 87years with mean age of 39.23±15.33 years. The present study shows female preponderance, female: male ratio= 42 (64.6%): 23 (35.3%).

S.N	Symptoms	Scores 0 = No Problem, 5 = Severe Problem					
		0	1	2	3	4	5
		n =65 (percentage %)					
1	Hoarseness	19 (29.2)	22 (33.8)	9 (13.8)	11 (16.9)	4 (6.2)	
2	Throat clearing	2 (3.1)	11 (16.9)	28 (43.1)	18 (27.7)	6 (9.2)	
3	Excess mucus or post nasal drip	27 (41.5)	21 (32.3)	14 (21.5)	3 (4.6)		
4	Dysphagia	42 (64.6)	6 (9.2)	12 (18.5)	5 (7.7)		
5	Coughing after eating/ Lying down	24 (36.9)	12 (18.5)	25 (38.5)	4 (6.2)		
6	Breathing Difficulty/ Choking	57 (87.7)	5 (7.7)	1 (1.5)	1 (1.5)	1 (1.5)	
7	Annoying Cough	51 (78.5)	7 (10.8)	5 (7.7)	2 (3.1)		
8	Globus	2 (3.1)	4 (6.2)	20 (30.8)	20 (30.8)	14 (21.5)	5 (7.7)
9	Heart Burn/ Reflux	3 (4.6)	17 (26.2)	24 (36.9)	10 (15.4)	11 (16.9)	

RSI>13 = 22 patients Mean RSI = 11.85±3.48

Table III: Symptoms in RSI and their occurrence.

S.N	Reflux Findings	Score	n =65 (percentage %)
1	Subglottic Edema	0=absent	63 (96.9)
		2=present	2 (3.1
2	Ventricular Obliteration	0=absent	55 (84.6)
		2=partial	10 (15.4)
		4=complete	-
3	Erythema/ Hyperemia	0=absent	-
		2=only in arytenoid	46 (70.8)
		4=diffuse	19 (29.2)
4	Vocal Fold Edema	0=absent	12 (18.5)
		1=mild	30 (46.2)
		2=moderate	21 (32.3)
		3=severe	1 (1.5)
		4=polypoidal	1 (1.5)
5	Diffuse Laryngeal Edema	0=absent	58 (89.2)
		1=mild	7 (10.8)
		2=moderate	-
		3=severe	-
		4=obstructive	-
6	Posterior Commissure Hypertrophy	0=absent	41 (63.1)
		1=mild	19 (29.2)
		2=moderate	4 (6.2)
		3=severe	1 (1.5)
		4=obstructive	-
7	Granuloma/ Granulation	0=absent	64 (98.6)
		2=present	1 (1.5)
8	Thick Endolaryngeal Mucus	0=absent	57 (87.7)
		2=present	8 (12.3)

RFS > 7= 11patients **Mean RFS = 5.02**±3.23

Table IV: Signs in RFS and their occurrence.

Coefficient of Determination (r^2): $0.595^2 = 0.354$
Hence only 35% of the occurrence of RFS is explained by the RSI.
There was moderate correlation between the obtained RSI and RFS.

		Total RSI Score	Total RFS
Total RSI Score	Pearson Correlation	1	0.595
	Sig. (2-tailed)		0.000
	N	65	65
Total RFS	Pearson Correlation	0.595	1
	Sig. (2-tailed)	0.000	
	N	65	65

Correlation is significant at the 0.01 level (2-tailed)

Table V: Correlations between RSI and RFS.

DISCUSSION

LPR is a multi-factorial clinical entity with multiple clinical presentations, so it requires a multidisciplinary approach. LPR presents with nonspecific symptoms and signs. Symptoms of LPR significantly overlap with symptoms of other disorders. To minimize the subjective evaluation of RSI, in 2001 Belafsky et al validated RFS as a diagnostic parameter of LPR.[5] The RFS has demonstrated high reproducibility and reliability of 94% with score above 7.However, Branski et al. concluded that only laryngoscopic finding as a diagnostic tool was highly subjective, so for evaluating the patients with LPR, RSI along with RFS will be helpful to override overlapping signs and symptoms with other disorders.[7] RSI and RFS are simple, noninvasive and inexpensive so, have been widely used for diagnosis of LPR.[8]Various diagnostic tools such as laryngoscopy, esophagoscopy, proximal pH monitoring etc. have been used for diagnosis of LPR. Yet a large number of studies confirm their specificity and sensitivity as low as 75-80%.[4]A better diagnostic approach for the early and accurate diagnosis of LPR is the current demand. Here we tried to correlate RSI and RFS, to find out the required better approach. In our study the age of the patient ranged from 17 years to 87years with mean age of 39.23±15.33 Female preponderance was seen in present study female 42 (64.6%) and male 23 (35.3%). In present study globus 96.9%, throat clearing 96.9% and heart burn/ Reflux 95.4% were the most common symptoms followed by hoarseness 70.7%, coughing after eating or lying down 63.2%, excess mucus/ PND 58.4% and dysphagia 35.4%. Similar findings were observed in the study by Erdas Karakays et al 2015 were the hoarseness, throat clearing, heartburn and globus were 98.2%, 92.7%, 86.3% and 71.3% respectively.[9]Similarly Satish et al. study shows heartburn 79.2% was the most common symptom followed by throat clearing 72.7% and globus 71.6%.[4]In present study, the most common signs were erythema/ hyperemia 100%, Vocal fold edema81.5%, posterior commissure hypertrophy 36.9%, least common signs were Granuloma/Granulation 1.5%, Subglottic edema3.1%, Diffuse Laryngeal Edema 10.8%. Similarly Erdas Karakays et al 2015 observed hyperemia 98.2%, vocal fold

edema 100%,and posterior commissure hypertrophy 100% followed by diffuse laryngeal edema , ventricular obliteration, subglottic edema were 98.2%, 71.3% and 36.2% respectively,[9] which is in contrast than present study. In another study done by satish et al the most common finding was arytenoids congestion 70.1%, followed by vocal fold edema 15.6% and subglottic edema 13.6%.[4]

In present study RSI>13 was seen on 22 patients and mean of RSI was 11.85±3.48.Similarly, RFS > 7 was seen on 11patients and mean of RFS was 5.02±3.23.There was a statistical correlation between RSI and RFS, though the strength of correlation was moderate (r=0.595, p=0.000). According to the coefficient of determination calculated only 35% occurrences of RFS were explained by the RSI. Similar to our study, a study done by M Gelard et al. in 3932 patients with LPR showed that a moderate correlation exited between RSI and RFS (r=0.484, p<0.0001).[10]

Mesallam and stemple on 40 patients showed statistically significant correlation between the RFS and RSI (r = 0.86; p< 0.0001).[11]similarly, in another study done by Vázquez de la Iglesia et al on 34 patients, a statistically significant correlation was found between the RSI and RFS (r = 0.3, p = 0.007).[12]Unlike all these studies, Satish et al study result shows no correlation between the RSI and RFS (p=0.501).[4]

LIMITATION

The post treatment correlation between reflux symptom index and reflux finding score has not done in the present study.

CONCLUSION

LPR is a common entity. There is a moderate correlation between the reflux symptom index and reflux finding score. The combined use of questionnaires and laryngoscopic findings can be more precise, practical and cost effective way to diagnose LPR.

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