

The Correlation between the Characteristic of Reflux Based on 24 Hours-Multichannel Intraluminal Impedance-pH Monitoring with the Quality of Life of Refractory Laryngopharyngeal Reflux Patients

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Abstract

The evaluation of the quality of life of LPR patients is crucial to assess the success of medical therapy and help with diagnosis. Assessment of life quality of patients with refractory LPR by using the selected LPR-HRQL questionnaire because it is more practical to use, easy to set scoring and analyze data. **Objective:** This study aims at investigating the reflux characteristic and the correlation with refractory Laryngopharyngeal Reflux (LPR) patients quality of life. **Method:** The examination is performed on ten refractory LPR patients using 24hour - Multichannel Intraluminal Impedance pH monitoring, then grouped according to the characteristics of the reflux acid, non-acidic, and mixed. Furthermore, the assessment of life quality by using LPR-HRQL questionnaire. Data analysis using Chi-Square and Spearman's Rho methods. **Results:** The sample LPR refractory is generally female (66.7%), while males (33.3%). Mixed reflux type as much as 44.4%, then 33.3% acid reflux, and a non-acidic reflux 22.2%. LPR occurrence of majority at upright position (66.7%). Non-acid reflux patients consistently for all symptoms/complaints, indicating quality of life is disrupted based on questionnaires found in the LPR-HRQL (100%). **Conclusion:** The quality of life of non-acid reflux patients is more disturbed than the acidic and mixed reflux group.

Keywords : laryngopharyngeal reflux, 24hour - Multichannel Intraluminal

Introduction

Laryngopharyngeal reflux (LPR) is a disease that often raises controversial opinion in diagnosis and treatment. In the LPR there is a retrograde flow of gastric contents into the larynx and pharynx subsequently causing discomfort and laryngeal changes^{1,2} When the condition of the patient does not experience improvement in clinical symptoms or reduction of complaints either subjective or through objective examination with the endoscope, after undergoing empirical treatment of proton pump inhibitor (PPI)/standard therapy for a minimum of 3 months, this condition will develop into a refractory laryngeal reflux³⁻⁵

The diagnosis of LPR has so far been based on anamnesis and clinical findings assessed using the scoring system introduced by Bellafsky at Al^{6,7} namely Reflux Symptom Index (RSI) and Reflux Finding

Score (RFS). The values of RSI > 13 and RFS > 7 are expressed abnormal. There are other test methods that are considered more effective for LPR diagnosis is with 24-hour multi-channel Intraluminal Impedance (pH-MII) pH monitoring, specifically detecting LPR patients who do not respond to PPI therapy. On that basis, the examination with 24 hours- pH MII is said to more accurately evaluate the chronology of reflux episodes and larynx symptoms.^{6, 8, 9,10}

It is also the underlying study examines the relation between laryngeal reflux characteristic with the patient's quality of life using the tested LPR-HRQL questionnaire¹¹

Materials and Method

This study is an experimental analytical using the design of the cross sectional method. The subject of

the study was the refractory laryngeal reflux patients who came to the hospital Dr. Wahidin Sudirohusodo Makassar period in July until October 2019. The number of samples of 10 patients who have been diagnosed with refractory LPR is based on anamnesis, physical examination, and endoscopic examination. The ten patients undergo a pH-MII test, one sufferer on exclusion because the results of the pH-MII show no impedance activity. The sample consisted of three males (33.3%) and six women (66.7%). This study was declared to fulfill the ethical requirements to be implemented from the Biomedicine Research Ethics Commission on the Human Faculty of Medicine at Hasanuddin University.

Inclusion criteria:

The refractory LPR patients is willing to be the subject of study after being informed consent, cooperative and able to understand Indonesian language well, and range between 18-65 years old.

Exclusion criteria

History of laryngeal surgery or laryngeal trauma, patients with intralaryngeal disorders (e.g. mass), degenerative diseases, pregnant and smokers.

Physical examination

Anamnesa about the history of LPR patients treatment to ensure that the patient actually includes refractory LPR that is the patients does not experience improvements in the clinical condition after three months empirical therapy with PPI And objectively confirmed by laryngoscopy fiber optic examination¹² Further positive patients diagnosed with LPR refractory will undergo a 24-hour pH monitoring examination-Multichannel Intraluminal Impedance (pH-MII)

24 Hour -Multichannel Intraluminal Impedance pH monitoring (pH-MII)

The pH-MII dual probes used in the study consists of a 2.3 mm polyurethane catheter that combines 6 impedance segments and two pH gauge electrodes. The catheter Model (UNISENSOR AG Bahnstrasse 12a 8544 Attikon, Switzerland) is used adjusted to the length of the patient's esophagus. This catheter form allows recording of changes in the impedance at each point achieved. In addition, pH monitoring of the Hypopharynx (proximal,

pH1) and esophageal (distal, pH 8) is performed. With the direct visualization, the scope of the optic fiber is inserted in the nasal cavum to help put the prob. The pH-MII dual probe catheter is then inserted into the nose on the opposite side of the fiberoptic that has entered earlier. The electrode has two pH sensors along the appliance, the bottom is placed on the bottom oesophagus, about 5 cm above the lower sphinkter of the esophagus and the top is laid on the larynx, about 1-2 cm above the spinkter of the oesophagus. Then 6 channels of in impedance (Z1, Z2, Z3, Z4, Z5, and Z6) were placed on 17.15, 9, 7, 5, and 3 cm above the sphinkter of the esophagus below respectively. The inspection equipment (prob) is attached to the external electronic data recorder for 24 hours to monitor the pH of the esophagus. During the 24-hour appliance, the patient is instructed to record and suppress the recorders data during meal times, changes in the position of the body (when lying or standing), drug consumption, and when the complaint arises. The tool is then released the next day, then the pH data is downloaded for analysis (Medical Measurement system Database Program).

LPR-HRQL (Laryngopharyngeal Reflux-Health Related Quality of Life)

This questionnaire consists of 43 question points, more specifically, and easy to use. LPR-HRQL uses a standard 7 point Likert scale to group patients based on the symptoms complained of. Scale for each question range 0 (never) to 6 (6-7 days per week). LPR-HRQL consists of 5 domains: voice/hoarseness (12 questions), cough (6 questions), throat clearing (6 questions), swallowing (5 questions). In addition, each domain is followed by a question aimed to explaining the primary domain affecting the overall quality of life (HRQL). The last domain, the Overall Impact Of Acid Reflux (OJAR), consists of 10 questions that assess the combination of symptoms that are associated with Refluks. The last question of each domain and OJAR question is worth a range of 1 (no effect on quality of life) up to 10 (a big impact on quality of life). In the Carrau et al study, this questionnaire showed convincing results.⁽¹²⁾

Results and Discussion

The proximal reflux that is assessed as a meaningful reflux for the LPR diagnostic Enforcement is an episode of reflux that reaches two impedance sensors closest to

the oropharynx and occurs more than one reflux time. Reflux that reads with the pH of < 4 is expressed as an acid reflux (RA), a reflux with a pH > 4 expressed

non-acidic reflux (RnA). And if the proximal reflux episode shows the pH of < 4 and > 4 alternately during the inspection process, then the patient is placed in the mixed reflux group.^{13,14}

Table 1. General characteristics of subjects (age and gender)

Variable	N= 9	Percentage (%)
Age (year):		
20 - 30	1	11.1
31 - 40	4	44.4
41 - 50	3	33.3
51 - 60	1	11.1
gender:		
man	3	33.3
woman	6	66.7

In this study, there were the most sample life distribution in the age group of 31-40 years (44.4%). With female samples (66.6%), males (33.3%). The average age of patients diagnosed with LPR in this study was 41 years.

Most of refractory LPR patients presented with a globus faringeus complaint (a sense of bump in the throat) as much as 66.7%. Two LPR patients (22.2%) comes with the main complaint of disphony and one person (11.1%) with heartburn complaints. Although *heartburn* is commonly found in GERD, $\pm 70\%$ of cases, some previous studies have stated that $< 40\%$ of LPR patients are reported to have complained of *heartburn*^{15, 16,17}

Based on the results of the pH-MII test, the patients is grouped into three categories based on the reflux type of non-acid reflux (NAR) group of 2 patients (22.2%),

the Acid Reflux Group (AR) 3 patients (33.3%), and the mixed reflux group as much as 4 patients (44.4%).

It appears that mixed reflux patients dominates as much as 44.4%. In line with Lee JS's research at AI (2017) in his research on comparison of reflux characteristics based on LPR reflux type which also found that from 83 samples there were 59% that suffered from LPR mixed reflux and 41% non-acid reflux¹⁸

Previous studies have shown that not only acid reflux which causes damage to LPR patients but also pepsin (weak/non-acidic acid) and bile acids (can cause inflammation of both acidic and non-acidic ph conditions based on experimental studies) ^(19,20) Furthermore, recent studies have shown that pepsin is an agent that responsible for damage to the laryngeal mucosa of non-acidic reflux categories^{19,21}

Table 2. The category of reflux based on the content of reflux is fluid (liquid reflux) or a mixture of fluid + gas and the position of the reflux.

No.	Reflux Characteristics	Reflux content		Body position when reflux occur		
		Liquid	Liquid +	Upright	Supine	Upright +
			gas			Supine
1	NAR	-	2	1	-	1
			22.20%	11.10%		11.10%
2	AR	1	2	1	-	2
		11.10%	22.20%	11.10%		22.20%
3	Mixed	-	4	4	-	-
	(NAR+ AR)		44.50%	44.50%		
Total		1	8	6	-	3
		11.10%	88.90%	66.70%		33.30%

Abbreviations :

NAR : Non Acid Reflux

AR : Acid Reflux

Table 2 illustrates that the majority of patient reflux detected by pH-MII is a mixture of fluid and gas reflux content, which is 88.9%. Only 11.1% have reflux with purely fluid content alone, regardless of any reflux characteristics (acid, non-acid, or mixed).

The majority of faringeal reflux is gases, without pH decreased and is the same in normal people and laryngitis patients. Reflux in the form of a mixture of gases and liquids and only gas reflux with a significant decrease in pH more often in patients with laryngeal reflux disease^{14, 22,23,24}.

It is apparent that majority of reflux occur when

upright position (66.7%), while 33.3% patients experience reflux event in both positions when the upright and supine. None of these samples were subjected to reflux events while lying alone. LPR patients generally experience reflux when an upright position is known as a day-time reflux term, while the GERD sufferer is subjected to the main reflux when lying down.^(1,5,11) in line with this, previous research by Arash et al against 109 reflux events at the time of TLESr, showing 91% of reflux events occurring in the upright position (upright) and 88% at the Baring position (supine). The relaxation of (Upper Sphincter Esophagus) USE at the transient of (Lower Sphincter Esophagus) LSE’s relaxation is at an upright position with the occurrence of gastric fluid reflux and gas (81%), whereas USE contraction occurs most frequently in a bearing position dominated by gastric fluid regurgitation (82 %).⁽²⁵⁾

Table 3. Correlation of Acid reflux (AR), non-acid (NAR), and mixture (AR+ NAR) with complaints based on the LPR-HRQL questionnaire

No.	Complaints	Questionnaire	Reflux Characteristics			Total
		LPR-HRQL	NAR	AR	Mixture	
1	Voice/hoarse	Disturbed	2 (100%)	2 (66,7%)	1 (25%)	5 (55,6%)
		Not disturbed	0 (0%)	1 (33,3%)	3 (75%)	4 (44,4%)
2	Cough	Disturbed	2 (100%)	1 (33,3%)	1 (25%)	4 (44,4%)
		Not disturbed	0 (0%)	2 (66,7%)	3 (75%)	5 (55,6%)
3	Clear Throat	Disturbed	2 (100%)	0 (0%)	2 (50%)	4 (44,4%)
		Not disturbed	0 (0%)	3 (100%)	2 (50%)	5 (55,6%)
4	Swallow	Disturbed	2 (100%)	3 (100%)	2 (50%)	7 (77,8%)
		Not disturbed	0 (0%)	0 (0%)	2 (50%)	2 (22,2%)
5	Overall impact	Disturbed	2 (100%)	2 (66,7%)	4 (100%)	8 (88,9%)
	Of Acid Reflux	Not disturbed	0 (0%)	1 (33,3%)	0 (0%)	1 (11,1%)

Impaired quality of life due to complaints swallowing 100% occurred in the acid and non-acid reflux group, while in the mixed reflux group only 50% that disturbed the quality of life due to complaints of swallowing disorders.

The final scoring point of the LPR-HLQR Questionnaire on table 3 is that the overall reflux effect on the quality of life appears to greatly affect the non-acid reflux group and the mixture is reaching 100%, while in the Acid Reflux group, as much as 66.7% expressed overall reflux effect disrupting quality of life.

The correlation between the characteristics of reflux (acid, non-acidic, and mixed) with quality of life assessed using the LPR-HRQL questionnaire appears

on tables 3. Consistently, a group of non-acidic reflux (NAR) patients demonstrated impaired quality of life (reaching 100%) based on the five main complaints that are focused on the questionnaire that is related to sound disorder/hoarseness, cough disorders, clear throat, swallowing disorders, and overall reflux impact on quality of life.

For a group of acid reflux, the quality of life seems disturbed with regards to cough, swallowing, noise disturbances, and overall reflux effects. The value of 100% disturbed quality of life only appears on complaints due to swallowing disorders. Likewise with a mixed reflux group, the value of 100% of quality of life is disrupted only at one point of the questionnaire that is related to the overall reflux impact on the quality of life.

In line with the research of Lee JS et al comparing the physical components of the non-acidic reflux group and the mixture based on the SF-12 questionnaire found that non-acidic reflux groups complained more symptoms compared to mixed reflux groups.¹⁸

Baclofen has been advised on the treatment of refractory GERD patients with the provision of twice daily. Although it shows improvements in handling the symptoms of GERD, its use in clinical practice is still limited due to the effects of intolerance.

Conclusion

From this study can be concluded that there are differences in the quality of life of patients with refractory LPR reflux based on the difference in reflux character where the quality of life of non-acid reflux group is more disturbed than the acid and mixed reflux group.

Ethical Clearance- Taken from Hasanuddin University ethical committee

Source of Funding- Self

Conflict of Interest – Nil

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