Analyzing the Reflux Symptom Index Using Pharyngeal pH Probe Findings

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Introduction

The diagnosis of laryngopharyngeal reflux disease (LPRD) is commonly made based on certain symptoms as demonstrated by the symptom-specific survey, Reflux Symptom Index (RSI), and findings on laryngoscopy. Empiric medical treatment is often started based on these parameters. The pharyngeal pH probe, a more objective measure, can be used to identify reflux specific to the pharynx in these circumstances. In our study, correlation between pharyngeal pH probe findings and individual symptoms of the RSI was assessed.

Pic 1. Restech oropharyngeal pH probe

Methods

A prospective cohort analysis of 52 subjects was performed. This included asymptomatic controls and symptomatic subjects. Subjects were screened based upon their presenting complaint to the clinic. Each subject completed the RSI questionnaire, and their scores were recorded. An overnight pharyngeal pH probe study was conducted utilizing the Restech Dx-pH oropharyngeal probe system (Restech, San Diego, California, See Pic 1). The pH probe status was determined to be (+) or (-) based on these results as calculated by the Ryan score. Once the studies were completed, statistical analysis was performed by comparing the results of the pH probe test to the RSI scores.

Methods (cont)

These analyses specifically focused on calculation of total RSI score when compared to pH probe status. Additionally, sensitivity, specificity, negative predictive value (NPV) and positive predictive values (PPV) were calculated to determine if any particular symptom, when severe (RSI of 4-5/5 in that symptom category), was associated with a (+) pH probe study.

Results

Of the 52 subjects that had a pH probe study performed, 31 (60%) were found to have a (+) pH probe, and 21 (40%) were determined to be pH probe (-). The mean RSI score of pH probe (-) subjects was 11 (± 9.4), with a mean score of 19 (± 10.9) for the pH probe (+) subjects. This was significant with *p* value of 0.0052.

After comparing the pH probe status to the RSI score categories where subjects indicated a severe score of 4 or 5 out of 5, there were several significant findings. Overall sensitivity was relatively low for each of the symptoms (highest sensitivity of 42% with excess mucous).

However, there were four main symptoms identified that, when severe, correlated most strongly with a (+) pH probe. These included coughing after eating and lying down (specificity 100% , PPV 1.00), breathing difficulties (specificity 95% , PPV 0.86), troublesome or annoying cough (specificity 95% , PPV 0.89), and heartburn (specificity 100%, PPV 1.00), with $p<0.05$ for all four of these categories (See Table 1).

Conclusions

Symptoms that are most predictive on the RSI for a (+) pH probe status include coughing after eating/lying down, a troublesome/annoying cough, heartburn, and breathing difficulties. If a subject does not have these symptoms strongly weighted in their RSI score, we recommend obtaining a pH probe before starting empiric therapy. However, if these symptoms are strongly represented, it is plausible to start empiric medical therapy.

Symptoms of RSI	Sensitivity (%)	Specificity (%)	NPV	PPV
Hoarseness/voice problem	16	86	0.41	0.63
Throat clearing	39	81	0.47	0.75
Excess mucous/postnasal drip	42	81	0.49	0.76
Difficulty swallowing (food, pills)	26	81	0.43	0.67
Cough after eating/lying down*	23	100	0.47	1.00
Breathing difficulty/choking*	19	95	0.44	0.86
Troublesome/annoying cough*	26	95	0.47	0.89
Globus sensation	35	67	0.41	0.61
Heartburn/indigestion*	16	100	0.45	1.00

Table 1. RSI symptoms and associated sensitivity, specificity, NPV, and PPV as compared to pH probe status.
* represents 4 categories with the highest specificity and PPV for the pH probe

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