Patients with Isolated Laryngopharyngeal Reflux are not Obese

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Objectives: The gastroenterology literature suggests that gastroesophageal reflux disease (GERD) is often associated with obesity. The National Institutes of Health uses body mass index (BMI) to identify patients who are overweight (BMI 25–30) or obese (BMI > 30). The aim of this study was to determine whether there is a relationship between laryngopharyngeal reflux (LPR) and elevated BMI. Study Design: The study involved a retrospective review of 500 pH-probe studies performed consecutively within the department. Methods: Studies performed on antireflux medication or after fundoplication were excluded. From the included study reports, age, sex, height, weight, use of tobacco or alcohol, and pharyngeal and esophageal probe findings were recorded. After controlling for other factors, the relationship between LPR and BMI was determined and statistical analysis performed. Results: Two hundred and eighty-five of the 500 pH studies met inclusion criteria. The overall mean BMI was 27.9 ± 6.42. The mean BMI for patients with normal studies was 25.6 ± 5.07, for those with isolated LPR 25.9 ± 6.44, for those with isolated GERD 28.3 ± 6.81, and for those with globally abnormal studies (LPR and GERD) 28.8 ± 6.55. Abnormal pharyngeal reflux did not correlate with increasing BMI; however, abnormal esophageal reflux events correlated with increasing BMI (P = .002). The mean number of pharyngeal reflux events was not elevated in obese patients, whereas the mean number of esophageal reflux events was significantly elevated in obese (P = .02) when compared with nonobese patients. Conclusion: This study demonstrates that pharyngeal reflux is not associated with increasing BMI or obesity in LPR patients. In contrast, abnormal esophageal reflux (GERD) is associated with increasing BMI and obesity. Because of the LPR patient selection bias of this study, these findings may not be applicable to the GERD populations routinely seen by gastroenterologists. Key Words: Reflux, body mass index, obesity, pH probe testing.

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INTRODUCTION

Over recent years, investigators have demonstrated that gastroesophageal reflux disease (GERD) plays a causative role in esophageal pathology ranging from esophageal strictures to Barrett’s esophagus to esophageal cancer. Similarly, laryngopharyngeal reflux (LPR) has been associated with laryngeal pathology, including vocal fold nodules, granulomas, stenosis, and potentially cancer. Thus, appropriate diagnosis and treatment of GERD and LPR is essential in the diagnosis, treatment, and prevention of many disorders. However, in counseling patients, GERD and LPR need to be recognized as distinctly different in many ways, with dissimilar risk factors, symptoms, reflux patterns, manifestations, and pathophysiology.

Some have suggested that GERD is strongly correlated with obesity, even when controlling for diet. Increased body mass index (BMI) has also been shown to correlate with increased risk of GERD-related hospitalization. Although conclusive pH–probe-based BMI data are not available in the gastroenterology literature, it is generally agreed that obesity and GERD are strongly associated.

No previous studies have investigated the relationship between LPR and obesity. The aim of this study was to review a large number of pH-probe evaluations to determine 1) if there is a positive correlation between increasing BMI and abnormal pharyngeal or esophageal reflux patterns, and 2) if there is an association between obesity and LPR.

METHODS

Five hundred consecutive pH-probe studies performed in this institution were reviewed. Studies were excluded if patients had history of fundoplication surgery or were on antireflux medications at the time of the study. Data collection included patient age, weight, height, tobacco use, alcohol use, comorbidities (coronary artery disease, diabetes, etc), pharyngeal reflux events (time, position, and duration) pH less than 4, and esophageal reflux events (time, position, and duration) pH less than 4. Pharyngeal reflux disease was defined as one or more pharyngeal reflux events pH less than 4. Esophageal reflux disease was...
determined by the criteria in Table I. BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m²). Mean BMI was calculated for the whole group and then for those subgroups with pharyngeal or esophageal reflux disease. Correlation between number of pharyngeal reflux events, esophageal reflux events, and increasing BMI was determined using a two-tailed Pearson correlation coefficient, with obesity defined as BMI greater than 30, as established by the National Institutes of Health. The association between obesity and pharyngeal or esophageal reflux events was also determined, with significance established using a two-tailed independent sample t test. Power analysis was included to demonstrate the probability of a type II error (possibility of failing to detect a true relationship between obesity and pharyngeal reflux events based on sample size).

RESULTS

After review of 500 consecutive pH studies performed at our institution, 215 were excluded from analysis because of the use of antireflux medications or prior antireflux surgery at the time of the pH study. Two hundred and eighty-five reports were included in the data analysis. These study population consisted of 184 females and 101 males, with a mean age of 49 years.

Indications for pH testing were the presence of clinical LPR as determined by history, reflux symptom index (RSI), and reflux finding score (RFS); these measures were previously described. The mean RSI of the group was 21. RFS data were not available for data analysis in this study. Comorbidities included known coronary artery disease in 26 patients and diabetes in 11 patients.

The mean BMI for patients with normal and abnormal studies is shown in Table II. There was no significant difference in mean BMI when groups were subdivided into upright versus supine pharyngeal or esophageal reflux.

BMI and number of pharyngeal reflux events demonstrated no significant correlation (\(P = 0.037\)), with \(r = 0.005\) (Fig. 1). In contrast, the correlation of BMI and number of esophageal reflux events reaches significance (\(P = 0.0113\)), with \(r = 0.18\) (Fig. 2).

Obesity was not associated with the pharyngeal reflux events but had a significant association with esophageal reflux events (Table III). For the study population, power analysis revealed a 80% chance of detecting a 30% difference in pharyngeal reflux episodes. Mean reflux events (pharyngeal or esophageal) demonstrated no significant association with alcohol use, tobacco use, sex, or age.

DISCUSSION

Over the past 2 decades, many studies have shown LPR and GERD to be two unique but related disease entities with different risk factors, symptoms, pathophysiology, and responses to therapy. Several survey-based studies in GERD patients have demonstrated GERD symptoms to be associated with obesity, although no investigator has yet provided pH-testing data in this area. One multi-institutional study involving 6,215 GERD patients demonstrated 10.4% of patients had laryngeal symptoms including hoarseness, sore throat, throat clearing, and globus sensation. Multivariant analysis demonstrated laryngeal symptoms in this GERD population to be significantly related to higher age, GERD duration of over 1 year, and obesity and inversely related to nicotine consumption.

This study demonstrated that patients with both LPR and GERD by pH-probe criteria (globally abnormal studies) had elevated BMI when compared with patients with normal studies or isolated pharyngeal reflux (i.e., LPR) (Table II). There was also a positive correlation between abnormal esophageal reflux and elevated BMI (Fig. 2). In contrast, this study showed that LPR (alone) had no association with obesity and that the number of pharyngeal reflux events had no significant correlation with elevated BMI. Future pH studies involving a GERD patient population might be helpful in further establishing the relationship between GERD-pattern reflux and obesity. Furthermore, weight reduction studies are necessary to determine whether there is a causal relationship between obesity and esophageal reflux events.

CONCLUSIONS

This study suggests that elevated BMI and obesity do not have a relationship with pharyngeal reflux events. However, LPR commonly coexists with GERD, as demonstrated by the large number of globally abnormal pH-probe tests in this study, and esophageal reflux events do appear to have a relationship with obesity. On the basis of these findings, it may be reasonable to recommend weight reduction in overweight patients with LPR and GERD in hope that esophageal reflux would be reduced with weight reduction. It should be recognized, however, that a causal relationship between obesity and esophageal reflux has not been established in this study, and future pH-probe-based studies are needed in this area. Finally, the current study suggested that in patients with isolated LPR, weight reduction counseling may not be routinely necessary or helpful in reducing pharyngeal reflux.
Fig. 1. Scatterplot of pharyngeal reflux events (pH < 4) versus body mass index demonstrates no correlation.

Fig. 2. Scatterplot of esophageal reflux events (pH < 4) versus body mass index demonstrates a positive correlation.


**BIBLIOGRAPHY**


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**TABLE III.**

<table>
<thead>
<tr>
<th></th>
<th>Nonobese (BMI ≤ 30)</th>
<th>Obese (BMI &gt; 30)</th>
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<tbody>
<tr>
<td>n</td>
<td>Mean Pharyngeal Reflux Events pH &lt; 4</td>
<td>4.8</td>
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<tr>
<td></td>
<td>Mean Esophageal Reflux Events pH &lt; 4</td>
<td>4.5</td>
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Mean esophageal reflux events differ significantly between nonobese and obese patients (*P = .02*).

BMI = body mass index.

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