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EFFECTS OF PROTON PUMP INHIBITOR THERAPY FOR LARYNGOPHARYNGEAL REFLUX ON POST-TREATMENT SYMPTOMS AND HYPOPHARYNGEAL pH

Waxman J, Yalamanchali S, Valle ES, Pott T, Friedman M. *Otolaryngol Head Neck Surg*. 2014 Mar;150(6):1010-1017.

OBJECTIVES: To determine the effect of twice-daily proton pump inhibitor (PPI) treatment on the relationship between laryngopharyngeal pH environment and symptoms in patients with laryngopharyngeal reflux (LPR).

RESULTS: Most patients (67.4%) had symptom normalization; however, most patients (60.5%) did not have pH normalization. For all patients whose symptoms did not normalize, pH scores also did not normalize; 32.6% of patients showed no subjective or objective treatment response. For individuals whose symptoms normalized but whose pH scores did not normalize, there was a significant decrease in upright pH score. For the entire group, pretreatment symptom and upright pH scores were strongly positively correlated. Improvements in symptom and upright pH scores following treatment were moderately positively correlated.

CONCLUSION: Laryngopharyngeal pH failed to normalize for most individuals after PPI treatment; only pH improvement was necessary for symptom normalization. Many patients had no treatment response. Laryngopharyngeal reflux patients may make up a heterogeneous group, and PPI responsivity may help explain conflicting results from previous studies. Post-treatment pH monitoring is recommended in studies investigating the efficacy of PPI therapy for LPR.

PROTON-PUMP INHIBITOR THERAPY INDUCES ACID-RELATED SYMPTOMS IN HEALTHY VOLUNTEERS AFTER WITHDRAWAL OF THERAPY

Reimer C, Søndergaard B, Hilsted L, Bytzer P. *Gastroenterology*. 2009;137(1):80-7.

OBJECTIVES: Rebound acid hypersecretion (RAHS) has been demonstrated after 8 weeks of treatment with a proton-pump inhibitor (PPI). If RAHS induces acid-related symptoms, this might lead to PPI dependency and thus have important implications.

RESULTS: There were no significant differences between groups in GSRS scores at baseline. GSRS scores for acid-related symptoms were significantly higher in the PPI group at week 10 (1.4 1.4 vs 1.2 0.9; P .023), week 11 (1.4 1.4 vs 1.2 0.9; P .009), and week 12 (1.3 1.2 vs 1.0 0.3; P .001). Forty-four percent (26/59) of those randomized to PPI reported 1 relevant, acid-related symptom in weeks 9–12 compared with 15% (9/59; P .001) in the placebo group.
The proportion reporting dyspepsia, heartburn, or acid regurgitation in the PPI group was 13 of 59 (22%) at week 10, 13 of 59 (22%) at week 11, and 12 of 58 (21%) at week 12. Corresponding figures in the placebo group were 7% at week 10 (P .034), 5% at week 11 (P .013), and 2% at week 12 (P .001).

CONCLUSION: PPI therapy for 8 weeks induces acid-related symptoms in healthy volunteers after withdrawal. This study indicates unrecognized aspects of PPI withdrawal and supports the hypothesis that RAHS has clinical implications.

PHARYNGEAL PH MONITORING BETTER PREDICTS A SUCCESSFUL OUTCOME FOR EXTRAESOPHAGEAL REFLUX SYMPTOMS AFTER ANTIREFLUX SURGERY

Worrell SG, DeMeester SR, Greene CL, Oh DS, Hagen JA. *Surg Endosc*. 2013 Jul;27(11):4113-8.

OBJECTIVES: The aim of this study was to determine whether proximal esophageal or pharyngeal pH monitoring better identified patients with extraesophageal symptoms that improved after antireflux surgery.

RESULTS: There were 20 patients identified. Antireflux surgery led to a successful outcome in 14 patients (70 %). Restech better identified patients with extraesophageal symptoms who had a successful outcome with antireflux surgery (12 of 14 [86 %] based on abnormal Restech versus 5 of 10 [50 %] based on abnormal proximal probe, p = 0.06). Comparing only the 15 patients who had both proximal esophageal and pharyngeal pH monitoring, Restech again better identified those who had a successful outcome with antireflux surgery (9 of 10 [90 %] based on abnormal Restech versus 5 of 10 [50 %] based on abnormal proximal probe, p = 0.05). The positive and negative predictive values for symptomatic improvement after a fundoplication were better for an abnormal Restech score than for an abnormal proximal esophageal score (80 vs. 71 % and 60 vs. 38 %, respectively). In two patients with a successful outcome, Restech was the only positive test.

CONCLUSION: In patients with extraesophageal reflux symptoms, proximal esophageal pH monitoring failed to identify half of the patients who had a successful outcome after antireflux surgery. In contrast, an abnormal Restech pH test was present in 90 % of patients with a successful outcome. Further, a negative Restech study more reliably indicated the absence of reflux-induced extraesophageal symptoms. Our results indicate that Restech pharyngeal pH monitoring should be utilized in the evaluation of patients with extraesophageal symptoms that may be associated with reflux disease.

OROPHARYNGEAL REFLUX MONITORING AND ATYPICAL GASTROESOPHAGEAL REFLUX DISEASE

Patel D, Harb A, Vaezi M. *Curr Gastroenterol Rep*. 2016 Mar;18(3):12.

The prevalence of gastroesophageal reflux disease (GERD) has been increasing since the 1990 s, with up to 27.8 % of people in North America affected by this disorder. The healthcare burden of patients who primarily have extra-esophageal manifestations of GERD (atypical GERD) is estimated to be 5 times that of patients with primarily heartburn and regurgitation due to lack of a gold standard diagnostic test, poor responsiveness to PPI therapy, and delay in recognition. Empiric twice daily PPI therapy for 1-2 months is currently considered the best diagnostic test, but due to poor responsiveness to PPIs in patients with atypical GERD in multiple randomized controlled trials, newer modes of diagnostic procedures such as oropharyngeal pH monitoring have gained significantly more traction. The utility of oropharyngeal pH monitoring systems such as Restech Dx-pH is currently limited due to lack of consensus on normal and abnormal cutoff values. Recent studies suggest its utility as a prognostic tool and its ability to predict responsiveness to medical and surgical therapy. However, routine use of oropharyngeal pH monitoring is still not widespread due to the lack of well-controlled prospective studies.

IMPACT OF PH MONITORING ON LARYNGOPHARYNGEAL REFLUX TREATMENT: IMPROVED COMPLIANCE AND SYMPTOM RESOLUTION

Friedman M, Maley A, Kelley K, et al. *Otolaryngol Head Neck Surg.* 2011;144(4):558-62.

OBJECTIVES: Treatment of laryngopharyngeal reflux (LPR) often suffers from poor patient compliance and hence poor symptom improvement. The aim of this study was to determine whether 24-hour oropharyngeal pH monitoring was associated with higher rates of treatment compliance and symptom improvement compared with empirical treatment for LPR.

RESULTS: One-hundred and seventy patients were included in 2 groups. Group I consisted of 73 patients who underwent pH monitoring. Group II consisted of 70 patients treated empirically. Compliance with medication therapy (68.5% vs 50.0%, P = .019) and lifestyle modification (82.2 vs 25.7%, P = .0001) were greater among patients in group I. Symptom improvement was greater among patients in group I following treatment compared with patients in group II, with a significantly greater reduction in RSI (36.6% vs 24.4%, P = .023).

CONCLUSION: Among our patient population, treatment of LPR based on pH monitoring resulted in greater compliance, as well as greater symptom improvement, compared with empirical therapy alone.

CLINICAL UTILITY OF 24-HOUR PHARYNGEAL pH MONITORING FOR HOARSENESS

Beaver ME, Karow CM. *J Laryngol Voice.* 2012;2(2):60-3.

OBJECTIVES: To evaluate the contribution of 24 hour pharyngeal pH monitoring of patient presenting with symptoms of hoarseness, globus, throat clearing, and sore throat.

RESULTS: 71 studies (43%) were normal with zero events below pH 5.5. 32 studies (19%), or 33% of all positive studies showed supine pharyngeal reflux only. 46 studies or 48% of all positive studies showed combination upright daytime reflux events and supine reflux. 18 studies or 19% of all positive studies had only upright events. There was no significant difference in presenting symptoms, symptom duration, or severity scores in the patients that had negative vs. positive pharyngeal pH studies.

CONCLUSION: 24 hour pharyngeal pH study eliminates the diagnosis of reflux in a significant percentage of patients with hoarseness. Severity or duration of symptoms of hoarseness, globus, or throat clearing does not reliably predict presence of reflux.

THE RELATIONSHIP OF RESTECH PH PROBE RESULTS WITH LARYNGOPHARYNGEAL REFLUX SYMPTOMATOLOGY AND EXAMINATION FINDINGS

Anderson LC, Oyer SL, Halum SL. *J Surg Transplant Sci.* 2014;2(1):1005.

OBJECTIVES: To determine the utility of the new Restech pH-probe in diagnosis of laryngopharyngeal reflux by showing that patients with higher Reflux Symptom Indices and Reflux Finding Scores will have positive Restech studies.

RESULTS: Twenty patients were included in the study. Of these, thirteen patients (65%) had positive pH events during Restech evaluation. Sixteen patients (80%) of patients had Reflux Symptom Index of 10 or greater. Eighteen patients (90%) had Reflux Finding Scores of 7 or greater. There was a trend toward a higher scores and indices in the patients (n=9) with the abnormal Restech results, but this difference did not reach significance when all patients were included. When those patients who had diffusely elevated review of systems (greater than 10 complaints) were excluded, those patients with abnormal Restech (n=6) had significantly higher scores and indices (p=0.047 and p=0.030, respectively) than those patients with normal studies (n=10).

CONCLUSION: The Restech pH-probe may be a useful diagnostic tool for patients with laryngopharyngeal reflux in correlation with symptoms and examination findings.

THE VALUE OF ROUTINE PH MONITORING IN THE DIAGNOSIS AND TREATMENT OF LPR

Friedman M, Hamilton C, Samuelson CG, et al. *Otolaryngol Head Neck Surg.* 2012; 146(6):952-8.

OBJECTIVES: To assess the need for pH testing in diagnosing laryngopharyngeal reflux (LPR).

RESULTS: No significant difference in RSI was seen between Ryan-positive (17.50 ± 11.47) and Ryan-negative (14.95±11.43) patients (P = .161). Overall, RSI correlated poorly with percentage time spent below pH thresholds 6.5, 6.0, 5.5, and 5.0 and upright and supine Ryan parameters at these thresholds (as determined by linear regression analysis). The sensitivity, specificity, positive predictive value, and negative predictive value of RSI ⩾ 13 for Ryan positivity were 55.7%, 47.3%, 44.3%, and 58.7%, respectively.

CONCLUSION: Our findings show that in our population of otolaryngology patients, the diagnosis of LPR cannot be reliably made on the basis of symptoms alone. Diagnosis, and in particular treatment decisions, should ideally be made on the basis of a combination of symptoms, signs, and confirmatory testing.

A NEW TECHNIQUE FOR MEASUREMENT OF PHARYNGEAL PH: NORMAL VALUES AND DISCRIMINATING PH THRESHOLD

Ayazi S, Lipham JC, Hagen JA, et al. *J Gastrointest Surg.* 2009 Aug;13(8):1422-9.

OBJECTIVES: The aim of this study was to use this probe to measure the pharyngeal pH environment in normal subjects and establish pH thresholds to identify abnormality.

RESULTS: The study population consisted of 55 normal subjects. The pattern of pharyngeal pH environment was significantly different in the upright and supine periods and required different thresholds. The calculated discriminatory pH threshold was 5.5 for upright and 5.0 for supine periods. The 95th percentile values for the composite score were 9.4 for upright and 6.8 for supine.

CONCLUSION: A new pharyngeal pH probe which detects aerosolized and liquid acid overcomes the artifacts that occur in measuring pharyngeal pH with existing catheters. Discriminating pH thresholds were selected and normal values defined to identify patients with an abnormal pharyngeal pH environment.

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