



Sporadic Fundic Gland Polyps and Gastric Acid Suppression Level



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ABSTRACT

Background: Fundic gland polyps (FGPs) are a common endoscopic finding and are known to be associated with proton pump inhibitors (PPIs) use. It is not known if their prevalence is affected by gastric acidity levels. This study aimed to assess whether there is a correlation between FGPs and gastric acidity levels as identified on 24-hour ambulatory impedance-pH studies in patients on PPI therapy.

Methods: We performed a review of 402 consecutive patients who take at least once daily PPI and underwent esophagogastroduodenoscopy with combined impedance-pH studies in the same setting (time and place) between January 2010 and December 2014. Patients were classified into 2 groups based on the presence or absence of biopsy-confirmed FGPs during endoscopy.

Results: Of the 402 patients, 30 (7%) had FGPs. One of these polyps was found with low-grade dysplasia. There was no significant difference of the distributions of the $[H^+]$ in the FGPs versus the nonpolyp groups ($P = 0.741$). There was no significant difference between the 2 groups regarding PPI dose frequency regimens (once and twice) ($P = 0.074$). However, we found weak ordinal association with PPI duration ($P = 0.01$) (Spearman = 0.1).

Conclusions: FGPs are common endoscopic lesions. Incidence of dysplasia in FGPs is not only rare, but also of unknown clinical significance. Although they seem to be associated with PPIs, the mechanism remains unclear, as we found no correlation between the presence of FGPs and gastric acid control or PPI dose. Future studies would be useful to elucidate an alternate mechanism.

Key Indexing Terms: PPI; Stomach; Polyps. [*Am J Med Sci* 2017;354(6):561–564.]

INTRODUCTION

Proton pump inhibitors (PPIs) have become some of the most commonly prescribed drugs worldwide since their introduction in 1988.¹ PPIs suppress gastric acid production by inhibiting the function of H^+ / K^+ -ATPase in gastric parietal cells. Thus, they are effective in the treatment of gastroesophageal reflux disease and peptic ulcer disease.²

Fundic gland polyps (FGPs) are a common endoscopic finding. They are known to be associated with PPI use, purportedly due to their acid-suppressive effect.¹ Whether or not their prevalence is affected by gastric acidity levels in patients on PPIs, however, is not known. The primary aim of this study was to assess whether there is a correlation between gastric acid control and the presence of FGPs in a cohort of patients on PPI therapy who underwent 24 hour ambulatory gastric and esophageal impedance-pH (Imp-pH) studies and esophagogastroduodenoscopy (EGD).

SUBJECTS AND METHODS

Study Population

The Institutional Review Board at the Medical University of South Carolina approved this retrospective analysis and waiver of informed consent was obtained. The study was conducted in the motility laboratory of the Medical University of South Carolina. We performed a

review of 402 consecutive patients who take at least once daily PPI and underwent EGD with intragastric pH assessment using combined Imp-pH studies in the same setting (time and place) between January 2010 and December 2014. Patients who reported intermittent or no PPI use were excluded. We also excluded patients who had previous gastric surgery.

Patients were classified into 2 groups based on the presence or absence of biopsy-confirmed FGPs during endoscopy. Twenty-four hour mean gastric pH during the Imp-pH study was recorded. We assessed the duration and frequency of PPI consumption from a dedicated questionnaire required to be completed by all patients before performing the Imp-pH study. Demographic data, including age and sex, were recorded.

Testing Procedure

EGDs were done in the context of daily clinical practice and were performed by or under the supervision of a gastroenterology attending physician. No special protocol was followed related to endoscopy indication or biopsy acquisition; however, often the largest polyp seen was biopsied. Specimens were fixed in formalin and embedded in paraffin and stained with hematoxylin and eosin and read by a gastrointestinal pathologist.

Combined Imp-pH testing is similar to pH testing. Patients were asked to fast for at least 4 hours before the probe insertion. Patients taking acid-suppressive

therapy were instructed to take the medications as prescribed, even on the day of testing. The combined Imp-pH probe was placed transnasally into the esophagus. Currently, available probes are 2.1 mm in diameter and have a pH electrode placed 5 cm above and 10 cm below the lower esophageal sphincter to monitor esophageal and intragastric acidity. Once the catheter was positioned and taped to the nose to limit its movement, the recording of pH data was initiated. Data from the pH electrodes were sampled at a frequency of 50 Hz and stored on a portable data recorder (Sleuth; Sandhill Scientific Inc., Highland Ranch, CO). The following day the patient returned the logger and data were downloaded. Data analysis were performed using dedicated software (BioView GER Analysis, Sandhill, Scientific Inc., Highlands Ranch, CO).

Intragastric Acidity Calculation

When comparing the level of PPI gastric acid suppression in patients with and without FGPs, added care must be exercised in analyzing the gastric pH data. The percentage of time of intragastric pH < 4 has become the surrogate marker for measuring the effectiveness of acid suppressing medications. However, this marker has an important limitation in that it does not identify the actual level of intragastric acidity; that is, it shows the same period of value when the pH is 3.9 or 1.0 for the same period of time. To overcome this limitation, several authors proposed calculating the intragastric acidity by computing the antilogarithm of the pH values and have suggested that this parameter should be used when comparing the effectiveness of PPIs.³⁻⁶

We converted all the measured pH values in both of the comparison groups into [H⁺] using the formula pH = -log [H⁺] and then calculated the mean, median and standard deviation. These values can then be converted to pH units.^{7,8}

Statistical Analysis

Statistical analysis was performed using the computer software program SAS University Edition (SAS Institute Inc., Cary, NC). Association between categorical variables was tested using chi-square test.

The distributions of quantitative variables were tested for normality. If it revealed normal data distribution, a parametric test (independent *t* test) was applied. If the data were abnormally distributed, a nonparametric test (Mann-Whitney *U* test) was used. Statistical significance was set at *P* < 0.05.

RESULTS

A total of 1,145 patients had Imp-pH testing on PPI therapy between January 2010 and December 2014. Of these patients, 425 had concomitant EGD procedures. Of this group, 23 were excluded owing to previous gastric surgery or intermittent PPI consumption or both, resulting in 402 patients being

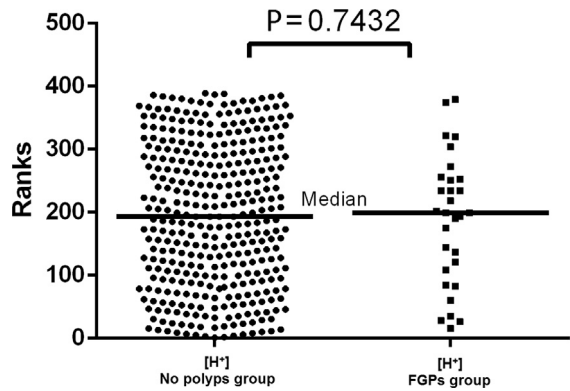


FIGURE. Scatter plot of the ranks of [H⁺] in the fundic gland polyp (FGP) and the nonpolyp groups.

included in the final analysis. The EGD results showed that prevalence of biopsy-confirmed gastric polyps in patients on PPI therapy was 11% (43 of 402 patients), of which 70% (30 of 43 patients) had FGPs, yielding an overall prevalence of about 7% (30 of 402 patients).

Of the identified FGPs, 83% were multiple, whereas 17% were single. One of these polyps was found to have low-grade dysplasia. Of the biopsied polyps, 19% were hyperplastic (8 of 43 patients) and 11% were inflammatory polyps (5 of the 43 patients).

The mean age of patients with and without FGPs was 67 years, 95% CI (64-70 years) versus 58 years, 95% CI (57-60 years), respectively (*P* < 0.0001). In both patients with and without FGPs, approximately two-thirds were females; 21 patients (70%) and 262 patients (73%), respectively. The difference between the groups was not significant (*P* = 0.725).

Comparison of the [H⁺] of the 2 groups showed no significant difference in the level of gastric acid suppression between the FGP and the nonpolyp group (*P* = 0.74) (Figure and Table 1).

There was no significant difference in the percentage of patients with FGPs between those on once versus twice daily PPI dosing regimens (*P* = 0.30). A total of 70% (21 of 30) patients with FGPs were on twice daily PPI, compared to 60% (217 of 359) of patients without FGPs.

TABLE 1. Descriptive statistics of [H⁺] in the fundic gland polyp (FGP) and the nonpolyp groups. The median values of the [H⁺] in both groups are almost exactly the same.

	Nonpolyp		FGP	
	pH	[H ⁺]	pH	[H ⁺]
Mean	2.23	3.1 × 10 ⁻³	2.82	1.5 × 10 ⁻³
Median	4.39	4.1 × 10 ⁻⁵	4.36	4.3 × 10 ⁻⁵
SD	1.27	1.3 × 10 ⁻²	2.32	4.8 × 10 ⁻³

SD, standard deviation.

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