

individuals with complaints of daytime heartburn alone. Subjects had to have a Carlsson GERD Scale score above 4 indicating symptomatic GERD. All subjects underwent 24 hour pH monitoring which included nighttime polysomnography. All subjects were administered the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESS). RESULTS: Subjects with nighttime heartburn had significantly increased acid contact time during sleep ($p < .05$). No significant difference was noted in the percent of acid exposure in the upright position (daytime). The average duration of reflux events was also significantly greater in the nighttime heartburn group ($p < .05$). The PSQI scores were notably higher in the nighttime heartburn group ($p = .058$). The number of subjective arousal responses from sleep was significantly greater in the nighttime heartburn group ($p < .05$). CONCLUSIONS: 1. GERD patients with nighttime heartburn have a pattern of GER which reveals a specific increase in sleep related GER compared to patients with predominantly daytime heartburn. 2. Subjective arousals from sleep and sleep quality as measured by the PSQI were worse in the nighttime heartburn group. 3. GERD patients with nighttime heartburn reveal a pattern of GER and subjective sleep disturbance suggesting that this patient group is distinctly different from patients with predominantly daytime heartburn.

Sa1217

Esophageal Dysmotility as a Major Causative Factor for Reflux in Lung Transplant Candidates

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Background and aims: Gastroesophageal reflux (GER) disease has been postulated to be one of the major contributing factors in the development of bronchiolitis obliterans syndrome (BOS) in patients who have had lung transplant. Long term survival after lung transplantation is threatened by BOS which is a surrogate marker of chronic rejection. Mechanism of acid reflux in those patients could be related to esophageal motility disorder. The main purpose of our study is to determine the prevalence of GER and esophageal dysmotility in end-stage lung disease patients who are candidates for lung transplants and compare them with high risk patients for GER evaluated for refractory reflux or atypical GER symptoms Methods: Retrospective analysis of twenty four-hour pH and esophageal manometry was conducted in 52 patients with advanced lung disease and 159 patients with refractory or atypical GER symptoms who had their tests performed in a tertiary care center between 2000 and 2008. Results: The mean age and the use of proton pump inhibitors were noted to be comparable in both groups. Esophageal manometry showed a significantly higher prevalence of hypotensive lower esophageal sphincter (30.8% vs. 12.7%, $P<0.05$) and impaired esophageal motility (21.2% vs. 6.3%, $P<0.05$) in patients with advanced lung disease when compared to patients with GER disease. However, there was no significant difference between the two groups in terms of 24- hour pH evaluation. Conclusion: In patients with end-stage lung disease, GER is highly prevalent. In this population, esophageal dysmotility specifically appears to be the main contributing factor that is implicated in the pathogenesis of GER and bronchiolitis obliterans syndrome.

Esophageal manometry findings

	Transplant (n=52)	Control (n=159)	P-value
LES pressure mmHg	13.7 (0.0-45.2)	18.0 (2.1-53.0)	0.016
Wave amplitude	57 (0-190)	73 (2-202)	0.021
Hypotensive LES (< 10 mm Hg)	30.8% (16/36)	12.7% (20/137)	0.003
Wave amplitude(<30 mm Hg)	21.2% (11/41)	6.3% (10/148)	0.002

LES, lower esophageal sphincter; Continuous data presented as median (min-max) and compared using nonparametric Mann-Whitney test; Categorical data presented as percentages and compared using Chi-square test
Ambulatory pH findings

	Transplant (n=52)	Control (n=159)	P-value
DeMeester score- median (min- max)	17.3 (1.1-111.9)	14.0 (0.3-131.6)	0.533
Proximal probe- median (min- max)	0.6 (0-24.0)	0.7 (0-11.4)	0.868
DeMeester score (>14)	36.5% (19/33)	50% (79/79)	0.091
Proximal reflux (>1.1)	55.8% (29/23)	67.9% (55/81)	0.157

Proximal reflux is defined as pH <4 at the proximal probe > 1.1% of the study time; Distal reflux is defined as DeMeester score >14; Continuous data presented as median (min-max) and compared using nonparametric Mann-Whitney test; Categorical data presented as percentages and compared using Chi-square test

Sa1218

Erosive Esophagitis is Associated With Fatty Liver in School Workers

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Backgrounds and Aim Reflux esophagitis is related to obesity and metabolic syndrome. Nonalcoholic fatty liver disease is a hepatic manifestation of the metabolic syndrome. The aim of this study was to investigate an association between reflux esophagitis and fatty liver. Methods The subjects were school staffs working in three Korean universities. Between January 2007 and December 2009, the subjects who visited the Health Care Center (Goyang, Korea) and received anthropometric measurement, and endoscopy were enrolled. Fatty liver was diagnosed by abdominal ultrasonography. Results Of the 2340 subjects, 278 (11.9%) had erosive esophagitis. The subjects with erosive esophagitis had higher portion of male gender (71.6% vs. 41.1%) and overweight (38.8% vs. 29.3%), and fatty liver (27.7% vs. 16.4%) in univariate analysis. The multivariate regression showed that female gender and fatty liver had 3.4 times and 1.5 times increased risk of erosive esophagitis, respectively. In lipid profile, the subjects with erosive esophagitis had higher levels of LDL cholesterol and

triglyceride, and lower level of HDL cholesterol than those without erosive esophagitis. Elevated triglyceride level (≥ 150 mg/dL) was associated with erosive esophagitis in multivariate analysis. Conclusion Fatty liver is an independent risk factor for erosive esophagitis in school workers. Elevated triglyceride level (≥ 150 mg/dL) is significantly associated with erosive esophagitis in school workers.

Table 1. Multivariate analysis for risk factors of erosive esophagitis

	Erosive esophagitis (n=278)	
	Odds ratio (95% confidence interval)	P value
Age	*	0.288
Gender (female)	3.4 (2.6-4.6)	<0.0001
Overweight	1.1 (0.8-1.4)	0.588
Hypertension	0.7 (0.5-1.2)	0.189
DM	1.1 (0.6-2.2)	0.685
Fatty liver	1.5 (1.1-2.0)	0.018

*Age was classified to eight levels every 10 years.

Sa1219

Estimating Severity of Gastroesophageal Reflux Disease (GERD) Using Administrative Claims Data

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BACKGROUND: While studies of administrative claims data can provide useful information on GERD treatment and outcomes, lack of clinical findings limits researchers' ability to confirm severity of disease. The objective of our study was to assess the utility of a GERD staging tool based on administrative claims data. METHODS: This retrospective analysis identified commercial enrollees 18-75 years of age with a medical claim for GERD (ICD-9-CM: 530.81 or 530.11) and prescription claim for a proton pump inhibitor (PPI) during 01/01/05 - 06/30/09. A GERD staging tool was developed based on the presence of medical claims for other symptoms during a 12 month period centered on their first GERD diagnosis: Stage A (GERD diagnosis, no other symptoms); Stage B (GERD + respiratory symptoms); Stage C (GERD + Barrett's esophagus); Stage D (GERD + esophageal stricture); Stage E (GERD + iron deficiency anemia or acute hemorrhage). Patients in each of the stages were compared with respect to mean age, gender, Charlson Comorbidity Index (CMI) score, prevalence of common cardiovascular or gastrointestinal diagnoses, initial strength of PPI (low strength vs. high strength PPI, based on the milligram strength associated with the prescription claim), and/or presence of endoscopy or esophageal surgery using univariate statistics. RESULTS: 555,342 patients were included in the analysis (Table). The mean patient age increased significantly from stages A/B to stages C-E (49.4 years versus 53.1 years, $p<0.0001$). Patients in the advanced stages (C-E) were more likely to be male (42% versus 46%, $p<0.0001$). The mean CMI and usage of high dose PPIs increased significantly from Stage A to Stage E ($p<0.0001$). The presence of gastritis and/or duodenitis increased with GERD stage (10% Stage A versus 25% Stage E, $p<0.0001$). Esophageal surgery was more common in the advanced stages (0.6% versus 7%, $p<0.0001$). Upper gastrointestinal perforation rates were also increased with advancing GERD stage (0% Stage A versus 0.1% Stages D-E, $p<0.0001$). CONCLUSIONS: Patients with advanced GERD stages, including Barrett's esophagus, esophageal stricture, and the presence of hemorrhage or anemia, were more likely to be older males with co-morbid conditions requiring high dose PPI therapy. This GERD severity tool can be used to identify cohorts of GERD patients requiring more advanced therapy for treatment of GERD.

GERD Stage, Comorbid Conditions, and PPI Usage

Variable	GERD Stage					Total
	A	B	C	D	E	
Number	382 372	112 497	17 010	15 621	27 842	555 342
Mean Age (SD)*	49.1 (12.9)	50.4 (12.9)	54 (11.0)	53.2 (11.7)	52.5 (12.9)	49.8 (12.9)
Female Gender*	212259 (55.5%)	72978 (64.9%)	6613 (38.9%)	7572 (48.5%)	18406 (66.1%)	317 828 (57%)
Mean CMI (SD)*	0.4 (0.9)	0.9 (1.2)	0.6 (1.1)	0.6 (1.2)	1.4 (1.8)	0.6 (1.1)
Comorbid Conditions						
Angina*	5464 (1.4%)	2060 (1.8%)	262 (1.5%)	222 (1.4%)	754 (2.7%)	8 762 (1.6%)
Hypertension*	119830 (31%)	39361 (35%)	5771 (34%)	4871 (31%)	12268 (44%)	182 101 (33%)
Dyslipidemia*	118502 (31%)	35857 (32%)	6227 (37%)	4985 (32%)	10620 (38%)	176 191 (32%)
Index PPI mg						
Low*	161896 (42%)	47275 (42%)	6168 (36%)	6657 (43%)	10640 (38%)	232 636 (42%)
High*	220476 (58%)	65222 (58%)	10842 (64%)	8964 (57%)	17202 (62%)	322 706 (58%)
Esophageal Surgery*	2251 (0.6%)	708 (0.6%)	278 (1.6%)	3533 (22.6%)	429 (1.5%)	7 199 (1.3%)
Upper Endoscopy	98769 (25.8%)	27665 (24.6%)	15624 (91.9%)	14782 (94.6%)	17087 (61.4%)	173 927 (31.3%)

*p<0.0001 (differences across stages) Low dose PPI: dexlansoprazole 20 mg, esomeprazole 10 or 20 mg, lansoprazole 15 mg, omeprazole 10 or 20 mg, pantoprazole 20 mg, rabeprazole 20 mg High strength PPI: dexlansoprazole 60 mg, esomeprazole 40 mg, lansoprazole 30 mg, omeprazole 40 mg, pantoprazole 40 mg

Sa1220

Gastroesophageal Reflux Disease in Children With Dental Erosions

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Dental erosions are loss of tooth enamel caused by prolonged and/or repeated acid exposure, occurring in 2 to 5% of the general population. Acid in the mouth may occur from ingestions of soft drinks or fruit juices. Acid in the mouth may also occur from gastroesophageal reflux disease (GERD), although this relationship is not well established in children. The aims of this study were to assess correlations between dental erosions and GERD in pediatric subjects, and correlate the stage and number of teeth involved with dental erosions to the presence of GERD. We did a retrospective chart review from July 2009 to June 2010, which included 14 subjects (12 male), 5 to 12 yr old (mean 9 yr), referred by pediatric dentists for GERD evaluation because of dental erosions. A GERD diagnosis was confirmed by positive results of esophagoscopy, esophageal biopsies, impedance and/or pHmetry. We assessed symptoms associated with GERD, including recurrent or chronic heartburn, chest pain, coughing, nausea, abdominal pain, spitting up, vomiting, anorexia, and sour taste in the mouth. Of the 14 subjects 3 had GERD (21%), diagnosed based on abnormal pHmetry in 2 (1 with abnormal impedance) and on abnormal histology in 1. Two of 14 subjects met symptom-based (Rome) criteria for rumination syndrome. Nine of 13 subjects had symptoms. Of the symptomatic subjects, 1 had GERD. Of 4 asymptomatic subjects, 2 had GERD. Symptoms were not associated with the presence or absence of GERD. We had staging data for 12 subjects: 1 with stage 1, 3 with stage 2, 7 with stage 3, and 1 with stage 4 dental erosions. There was no correlation between the stage of dental erosions or number of affected teeth and GERD. Conclusion: GERD may not be the major cause for dental erosions in children. Because rumination syndrome is thought to be uncommon, it appeared that the risk of dental erosions may be increased by co-morbid rumination syndrome.

Sa1221

Comparison of the Laryngopharyngeal/Esophageal Symptoms Between High and Low Endoscopic Laryngeal Findings in Japanese Patients With Laryngopharyngeal Reflux Symptoms

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Background and aim: In patients with laryngopharyngeal reflux symptoms (LPRS), the association between throat/abdominal symptoms and laryngeal signs has not been clarified. A multicenter clinical trial in LPRS subjects was conducted to assess changes in symptoms and endoscopic laryngeal findings before and after a 4-week treatment with rabeprazole (RPZ). The aim was to compare the laryngopharyngeal/esophageal symptoms between high and low endoscopic laryngeal findings from that trial. Methods: Subjects consisted of outpatients visiting the otolaryngology departments of participating institutions from Oct 2007 to May 2008 who fulfilled the inclusion criteria and whose consent could be obtained. 68 patients (55 RPZ and 13 control group) were included in the analysis. 136 endoscopic laryngeal images were presented to 15 otolaryngologists with the subjects' names and pre-and-post therapy status blinded. Each of 15 otolaryngologists scored each endoscopic image as 0 (none), 1 (mild), 2 (moderate), 3 (severe) or NE (not evaluable) for findings including "infraglottic edema with pseudoulcer formation", "laryngeal mucosa edema (including post-cricoid area)", "posterior commissure hypertrophy", "granulation formulation", "thick endolaryngeal mucous", "redness in the intra-arythenoid medial wall", and "mucous pooling in the pyriform sinus". The median value of the 15 scores for each item from each subject was

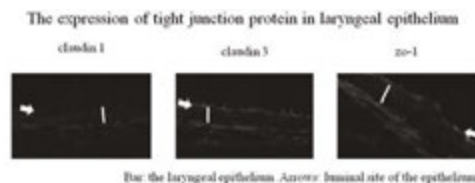
obtained. The laryngopharyngeal/esophageal symptoms assessed by the Frequency Scale for Symptoms of GERD (FSSG) were compared between the two group: one with a high pretreatment score (total score ≥ 4 , n = 25) and the other with a low pretreatment score (total score < 4, n = 43). The changes in these symptoms after the 4-week RPZ treatment were also did. Results: The pretreatment total endoscopic laryngeal score for all 68 subjects ranged from 0 to 7 (median 3, mean 3.01). The patients were divided into two groups: one with a high pretreatment score (total score ≥ 4 , n=25) and the other with a low pretreatment score (total score < 4, n=43). The patients with a low endoscopic laryngeal score experienced more frequent "acid-related dyspepsia" symptoms than with a high score (0.98 vs 0.40, p=0.007). No significant differences were seen between the two groups for baseline characteristics and the other laryngopharyngeal/esophageal symptoms. Further, no significant differences were seen between the two groups in changes for laryngopharyngeal/esophageal symptoms after the 4-week RPZ treatment. Conclusions: The LPRS patients with a low endoscopic laryngeal score showed similar symptomatic characteristics and responses to the 4-week of acid suppression therapy to those with a high score. The result suggests the presence of patients with "functional laryngitis syndrome", in which LPRS occurs with minimal changes undetectable by endoscopic laryngeal examinations.

Sa1222

The Expression of Tight Junction Protein in Laryngeal Epithelium

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Background: Reflux laryngitis which is one of the extraesophageal syndrome of gastroesophageal reflux disease(GERD) is defined as the retrograde reflux of gastric contents up to the laryngeal epithelium. We previously reported that tight-junction proteins(claudin 1 and 3) were expressed multilayered at spinous layer and the expression pattern was altered in a rat model with chronic acid reflux esophagitis(Asaoka D et.al. J Gastroenterol. 2005), however the defence mechanism of laryngeal epithelium has been unknown. This study aimed to investigate the expression of tight junction protein which bears paracellular sealing of the laryngeal epithelium. Methods: Specific-pathogen-free (SPF) male Wistar rats aged 8 weeks was sacrificed and the larynx was resected. After obtaining the larynx, the larynx tissue was embedded in O.C.T. compound and was immediately frozen with liquid nitrogen. After preparing 5 μ m frozen sections, they were dried and fixed in 4% paraformaldehyde. Immunohistochemical staining for claudin 1, claudin 3 and Zo-1 was performed. The expression pattern of tight junction proteins (claudin 1,3, zo-1) in subglottic laryngeal epithelium was investigated with confocal laser microscopy. Results: Claudin 3 and zo-1 proteins were expressed single-layered at the luminal site in the laryngeal epithelium. Claudin 1 was not expressed in the laryngeal epithelium. Data are shown in the figure. Conclusion: The variety and expression pattern of tight junction protein in the larynx was different compared with that in the esophagus.



Sa1223

Risk Factors Associated With Undesiderated Weight Changes in GERD Patients

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Background: Obesity is a multifactorial disease and is recognized as a risk factor for gastroesophageal reflux disease (GERD). Recent data showing that long term PPI therapy is associated with weight gain in GERD patients, indirectly suggest that GERD symptoms may, per se, affect body weight. AIM: To examine the contribution of factors other than GERD on body weight changes. METHODS: The subjects were 200 consecutive patients (63 male, age 46 \pm 13 years) with clinical and instrumental (upper GI endoscopy and 24h pHmetry) diagnosis of GERD. At baseline BMI was recorded and patients divided in normal weight, overweight or obese according to internationally accepted criteria. Also, GERD symptoms were scored according to standardized questionnaire and coexistence of diabetes, hypertriglyceridemia, hypertension and hypercholesterolemia were also recorded. All patients were treated with standard dosage of PPIs for 8 weeks and further advised only for lifestyle modifications, but not for selective diet and weight management. In case of symptoms recurrence, patients were instructed to reintroduce PPIs therapy on an demand regimen. BMI, persistence of GERD symptoms and needing for additional PPI therapy were recorded after 1 year of follow-up. Data were analysed by considering the effect of all of the variables on BMI changes (< or > 5% respect to baseline BMI). RESULTS: Averaged BMI values were unchanged at baseline and at the follow up (26 \pm 5 vs. 26 \pm 5). Similarly, patients with normal weight, overweight and obesity were respectively 37, 46 and 17 vs. 37, 44 and 19 %. No significant differences in terms of demographic factors, persistence of GERD symptoms and needing for additional PPI therapy were found in patients with either decreased or increased BMI, respectively. When all variables were computed in a multivariate analysis, only pre-existing normal weight (OR 2.6, 95% CI 1-6.7, p=0.03) and diabetes (OR 5, 95%CI 1-18, p=0.007) were significantly associated to the risk of increased BMI. Conversely, only obesity (OR 5, 95% CI 1.7-19, p=0.005) was a risk factor associated with reduced BMI. Conclusions: other factors rather than symptoms persistence and PPI therapy are associated with BMI changes in a population of GERD patients. As baseline obesity or normal weight and diabetes were independent risk factors associated with undesiderated BMI changes, we suggest their accurate screening to avoid BMI changes in GERD patients.