Diagnosing Dysplasia in Barrett's Esophagus Using Volumetric Lipid Endomicroscopy: Submucosal Gland Characteristics

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Purpose: To determine if submucosal gland number and architectural features are associated with dysplasia in Barrett's esophagus (BE) using volumetric lipid endomicroscopy (VLE).

Methods: Endoscopic mucosal resection (EMR) specimens of patients enrolled in a BE surveillance program were imaged using VLE immediately following resection and submitted for histological evaluation. A single investigator blinded to tissue diagnosis reviewed and analyzed each EMR VLE scan for gland number and architectural features. Gland architecture was defined as normal if the gland was symmetrically round and as atypical if irregularly shaped or cribriform. The number of glands per EMR was dichotomized into two groups (≤5 and >5). Measurement of surface area occupied by glands was also performed and compared to the total surface area of each EMR. Gland characteristics were compared to histology categorized into non-dysplastic (non-dysplastic BE and low grade dysplasia) and dysplastic (high-grade dysplasia and intramuscosal cancer) groups.

Results: A total of 32 EMR VLE scans were selected based on image quality and histological characteristics. EMR histology showed 8 non-dysplastic BE, 6 low-grade dysplasia, 8 high-grade dysplasia and 9 intramuscosal adenocarcinoma. We dichotomized these results into 17 (54.8%) dysplastic and 14 (45.2%) non-dysplastic EMRs. 11 (64.7%) dysplastic and 3 (21.4%) non-dysplastic EMRs contained more than 5 glands per EMR. Dysplastic EMRs were more likely to have more than 5 glands per EMR compared to non-dysplastic EMRs (χ²= 5.8, p=0.016). The mean (SD) surface area of dysplastic and non-dysplastic EMR specimens was 82.6 mm² (26.5) and 90.8 mm² (33.1) respectively with no difference between groups (p=0.45). The mean (SD) surface area occupied by glands was significantly higher for dysplastic EMRs, 18.3 mm² (15.8), compared to non-dysplastic EMRs, 3.6 mm² (2.9); p<0.001. A total of 13 (76.5%) dysplastic and 2 (14.3%) non-dysplastic EMRs contained atypical glands. Dysplastic EMRs were 20 times more likely to contain atypical glands compared to non-dysplastic EMRs (odds ratio [OR] 19.5, 95% confidence interval [CI] 3.0-100; p<0.01).

Conclusion: Glandular atypia and the presence of more than five glands are features associated with dysplasia in BE using VLE. We believe that this represents abnormal stromal tissue in patients with BE associated dysplasia which enhances mucosal proliferation and glandular atypia.

Disclosure - Dr Wang, and Ms Lutzke disclose research support from NinePoint Medical. The other authors do not have a Disclosure related to this study.
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101 Outcomes of Endoscopic Therapy in Treating Barrett's Esophagus with Dysplasia and Superficial Adenocarcinoma
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**Purpose:** Endoscopic therapy (ET) has been reported to be effective and safe in treating Barrett's esophagus (BE) associated with dysplasia and superficial esophageal adenocarcinoma (AC) and offers an alternative to esophagectomy. We present data covering the last 12 years.

**Methods:** Patients with BE associated with low-grade dysplasia (LGD), high-grade dysplasia (HGD), or T1 AC who were treated with Photodynamic therapy (PDT) or Radiofrequency ablation (BARRX) + Endoscopic Mucosal Resection (EMR) as initial therapy were evaluated and compared retrospectively.

The response at 12 months for complete eradication (CE) of BE, dysplasia, and AC was evaluated. The number of ET's required to achieve a CE at 12 months and relapses and complication rates were compared.

**Results:** Fifty-five patients were identified between 1998 and 2010: 28 in PDT and 27 in BARRX group. 17 (30.9%, p=0.104) patients got EMR before PDT/BARRX. Mean age was 69.28 (±10.27) years with 48 (84.2%) males. The frequency of LGD, HGD and AC was 7 (12.7%), 27 (49.2%) and 21 (38.1%), respectively. CE was seen in 40 (72.7%) at 12 months with no differences between the groups (p=0.467) requiring an average of 2.42 ±1.18, p=0.117 ET's. The average reduction in length of BE was 4.92 cm (SD=±4.5, p=0.118). 42 (76.4%) had CE of dysplasia at the end of the study with an average follow up of 2.34 (±2.46) years. The complication rate was much higher in the PDT group -11 (40.7%), 6 (21.42%) p=0.104; they were all strictures. Relapses were significantly more for PDT group -11 (38.3%), 4 (12.7%) p=0.39. Food allergies (42.3%), bronchial asthma (36%) and atopic dermatitis (8.1%) were all significantly higher in the pediatric population. One in 4 patients conducted population had required esophageal dilatation vs 25% and 27% in the adult and elderly group (p<0.001).

**Conclusion:** This is the currently largest available population based-study estimating the prevalence of eosinophilic esophagitis in the United States which is about 29 cases per 100,000 persons in patients over 18 years. Our findings suggest a much lower prevalence (almost half) of what has been reported thus far in the literature. The prevalence is decreasing with age.

103 Medical Intervention for Eosinophilic Esophagitis: A Systematic Review and Meta-Analysis
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**Purpose:** Eosinophilic esophagitis is an uprising diagnosis of dysphagia. The underlying pathophysiology is not well understood, but allergic and immune mediated mechanisms are suggested. Current medical therapies include steroids, leukotriene receptor antagonists and immune modulators. Whereas some patients have a histological response to topical glucocorticoids as demonstrated by a decrease in eosinophil counts, symptomatic improvement is not consistent. Given that the condition is rare, we aimed to improve the power to detect clinically significant effects by conducting a systematic review and meta-analyses on medical therapies for EE.

**Methods:** Two reviewers developed a search engine using Pubmed, Embase and Cochrane database without language and date restriction. Both reviewer independently evaluated and selected potential studies and disagreement was resolved by a third reviewer. Quality for each included study was assessed by the CONSORT statement. Meta-analysis was done using random effects model for dichotomous variables and standardized mean difference for quantitative outcomes. Heterogeneity of the studies was analyzed by Cochran's Q statistics and I-squared; publication bias was assessed by funnel plot exam.

**Results:** Out of 288 studies, twelve RCTs were selected involving 787 patients. Symptomatic improvement (n=7 studies, 303 participants) was noted in 56% of all treatment groups comparing to 44% in the control group, risk difference RD: 0.11 (95% confidence interval 95% CI: -0.11-0.24, p=0.18), a RR of 1.18 (I-squared 32.8%). Treatment subgroup analysis showed topical steroid treatment (n=5 studies, 145 participants)-induced symptomatic improvement in 54.3 % compared to 45.6% in the placebo group, RD: 0.18 (95% CI 0.01-0.34, p=0.00). No meta-analysis was done on PPI and biologic drugs since only one study in each group was included as symptomatic improvement. Histologic improvement (n=9 studies, 291 participants) was 37.6% and 31.7% in all treatment groups comparing to placebo respectively RD: 0.07 (95% CI -0.15-0.29, P<0.001). Subgroup analysis for the histologic improvement showed that topical steroid (n=7 studies, 219 participants)-induced complete response in 36.8% compared to 22.8% in the placebo group RD: 0.13 (95% CI -0.12-0.37, P<0.001).

102 Eosinophilic Esophagitis Is Much Less Common Than Previously Thought: A Large, Nationwide Database Study
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**Purpose:** There is scant data about the prevalence of eosinophilic esophagitis (EoE). Some tertiary centers have reported a rapidly increasing prevalence of this condition over the last 10 years especially in the adult population (45-65 per 100,000 persons). However, the true disease burden in the community has not been assessed. Therefore, we decided to perform a population based study from a nationwide database (Explorys Inc.) to assess the prevalence of the disease.

**Methods:** Explorys is a private cloud based data store. A number of health care systems throughout the country (includes referral centers and community hospitals) which uses electronic health records participate and feed information to this database. Using this database we performed a search on an aggregate cohort of patients with a diagnosis of EoE. Data regarding basic demographic features, symptoms, associated risk factors as well as treatment was analyzed.

**Results:** A total of 14,360,300 patients were identified nationwide as being active in the electronic health database between March 2010 to March 2013. Amongst them 4,480 patients had EoE. A decreasing trend in the prevalence of EoE was seen with the highest in the pediatric group (<18 years) at about 40 per 100,000 persons. The adult population group (18-65 years) had a significantly lower prevalence of 34 per 100,000 persons (p<0.0001) as well as the elderly (>65 years) with the 14 cases per 100,000 persons. The disease was most prevalent in male Caucasians across all age groups. 57% of the patients in the adult group reported dysphagia as compared with 25% in the pediatric group (p<0.0001). Vomiting was mainly seen in the pediatric group compared to adults (34% vs 15%, p<0.0001). Food allergies (42.3%), bronchial asthma (36%) and atopic dermatitis (8.1%) were all significantly higher in the pediatric population. Only 1% in the pediatric population required esophageal dilatation vs 25% and 27% in the adult and elderly group (p<0.0001).

**Conclusion:** This is the largest currently available population based-study estimating the prevalence of eosinophilic esophagitis in the United States which is about 29 cases per 100,000 persons in patients over 18 years. Our findings suggest a much lower prevalence (almost half) of what has been reported thus far in the literature. The prevalence is decreasing with age.