

**Introduction** It is proposed that the presence of oesophageal mucosa dilated intercellular spaces (DIS) underlies heartburn in patients with NERD. However, 20% of asymptomatic subjects display DIS in distal oesophageal biopsies. Furthermore, oesophageal experimental acidification in healthy volunteers provokes DIS, but often without heartburn despite ongoing acid perfusion. These observations suggest that mucosal impairment above and beyond DIS may be relevant in heartburn perception. Functional mucosal integrity in response to acid challenge can be tested in oesophageal mucosal biopsies “in vitro” by measuring changes in transepithelial electrical resistance (TER).

We aimed to further assess the relationship between presence of DIS, changes in functional oesophageal mucosal integrity (TER) and heartburn perception.

**Methods** We took distal oesophageal biopsies from patients with and without heartburn. Histological examination for epithelial intercellular space diameter (ISD) was done using light microscopy by taking 50 random measurements at several levels from the basal epithelial layers for each biopsy. DIS was declared at above the 95% CI for normal values as previously published ( $> 0.72 \mu\text{m}$ ).

We identified 11 subjects with DIS (4 with predominant daily troublesome heartburn, 7 with predominant dyspepsia and no heartburn). Biopsies were placed in mini-Ussing chambers, and baseline TER was measured. The luminal aspect of the biopsy was then exposed for 30min to an acidic solution (pH2 + 1 mg/ml pepsin + 1 mM taurodeoxycholate). During exposures, % changes in TER relative to baseline were analysed.

#### Results

The mean ISD in all subjects was  $0.94 \mu\text{m}$  (range  $0.74\text{--}1.18 \mu\text{m}$ ). There was no significant difference in ISD ( $0.95$  vs.  $0.91 \mu\text{m}$ ) or baseline TER ( $144$  vs.  $165 \Omega\cdot\text{cm}^2$ ) between predominant heartburn and predominant dyspepsia groups.

Despite the pre-existing DIS in all subjects, 30 minutes acid exposure was able to induce a further reduction in TER ( $-23.0\%$  change from baseline,  $p < 0.01$ ).

The reduction in TER was greater in subjects with predominant reflux vs. those with predominant dyspepsia ( $-40.4 \pm 10.3\%$  vs.  $-11.2 \pm 3.7\%$ ,  $p = 0.01$ ).

**Conclusion** In subjects with pre-existing DIS with and without heartburn, trans-epithelial electrical resistance can be further impaired with in vitro acid exposure, suggesting that the mechanism for acid-induced mucosal integrity impairment is not limited to DIS. Furthermore, acid-induced functional integrity impairment was greater in patients with heartburn. This difference in mucosal behaviour in the presence of acid suggests that other mechanisms beyond DIS might be needed to further stimulate afferent nerves in heartburn generation.

**Disclosure of Interest** None Declared

#### PTU-163 PROXIMAL OESOPHAGEAL FUNCTIONAL MUCOSAL INTEGRITY DURING DISTAL OESOPHAGEAL ACIDIFICATION IN PATIENTS WITH NERD AND FH

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**Introduction** Although macroscopically normal, the oesophageal mucosa in patients with non-erosive reflux disease (NERD) displays epithelial dilated intercellular spaces (DIS). Such loss of barrier integrity is thought to be important in disease pathogenesis. Patients with NERD have DIS in both the distal and proximal oesophagus. Patients with functional heartburn (FH) do not have DIS. In healthy volunteers acid perfusion of the distal oesophagus induces DIS not only in the exposed distal, but also the unexposed proximal oesophagus. It is unknown what impact distal acid perfusion has in the proximal oesophageal mucosa in symptomatic

patients. Oesophageal impedance measurements can be an “in vivo” surrogate marker of functional mucosal integrity.

We aimed to assess with impedance the proximal oesophageal mucosal integrity during distal acid perfusion in symptomatic patients with NERD (+ve DIS) and FH (-ve DIS).

**Methods** We studied 22 patients (mean age 48, range 20–75) with typical reflux symptoms and negative endoscopy. 24-hour MII-pH monitoring identified 11 patients with NERD and 11 with FH. A pH-impedance catheter was inserted transnasally such that the proximal impedance segment was 15cm above the LOS. A 10 minute perfusion (10ml/min) of a neutral (pH7), then acidic (pH1) solution was performed in the distal oesophagus (10 cm from LOS) whilst simultaneously measuring proximal impedance. The absence of proximal fluid contamination was suggested by a lack of impedance drop during the neutral perfusion. Baseline impedance, and percentage change from baseline during the perfusion was calculated.

**Results** Distal perfusion of neutral solution caused no fall in proximal impedance (mean impedance  $107 \pm 2.8\%$  of baseline). Distal perfusion of acidic solution caused a significant reduction in proximal impedance (mean impedance  $80.3 \pm 5.3\%$  of baseline,  $p < 0.01$ ). The drop of proximal impedance started at a mean of 175 seconds after commencement of acid perfusion. Proximal impedance did increase to a mean of 90% of baseline until 30 minutes after cessation of the acid perfusion. There was no significant difference in baseline proximal impedance ( $3165 \pm 216\Omega$  vs.  $3116 \pm 232\Omega$ ) or acid-induced change in proximal impedance ( $79.4 \pm 8.1\%$  vs.  $81.2 \pm 7.1\%$  of baseline) between FH and NERD patients respectively.

**Conclusion** In keeping with morphological studies of healthy volunteers, distal oesophageal acidification modifies mucosal functional integrity of the proximal, unexposed oesophagus. This appears to occur regardless of the presence of pre-existing proximal DIS, suggesting that mechanisms of functional mucosal integrity as measured by impedance are beyond DIS formation.

**Disclosure of Interest** None Declared.

#### PTU-164 COST EFFECTIVENESS OF AN ER DOMINANT APPROACH IN THE MANAGEMENT OF HIGH GRADE INTRAEPITHELIAL NEOPLASIA AND MUCOSAL CANCER IN BARRETT'S OESOPHAGUS

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**Introduction** Endoscopic resection (ER) is an established effective treatment for high grade intraepithelial neoplasia (HGIN) and intramucosal cancer (IMC) arising in Barrett's oesophagus. ER can lead to recurrence so it is suggested that all patients should undergo radiofrequency ablation (RFA) after ER as a complimentary treatment strategy. However no comparative study to support this concept has been performed. We aimed to compare the cost-effectiveness of an EMR-dominant approach vs an EMR-RFA approach for the treatment of HGIN and IMC in Barrett's oesophagus.

**Methods** All ER procedures between 2005 and 2012 were recorded in a prospective database which was analysed. Demographic data, histology, procedure success, long-term outcome and complications were assessed. Costs were calculated using NHS HRG codes plus equipment costs for ER and RFA.

**Results** 92 patients were treated for dysplastic Barrett's oesophagus or early Barrett's cancer by ER. The mean age at first procedure was 69 years and 87% of the patients were male. 21 of 92 patients had advanced histological features on the initial ER specimen and were referred for surgical or oncological treatment. Of the remaining 71 cases, 63 have follow-up data with a mean duration of 4.3 years. 59 of 63 cases (94%) had successful eradication of HGIN/IMC by ER. The remaining 4 patients were referred for surgery for advanced disease (3) or extensive bulky disease not amenable to ER