PTU-143 DIGITAL IMAGE ANALYSIS ENHANCES QUANTITATIVE IMMUNOHISTOCHEMISTRY IN THE SQUAMOUS-METAPLASIA-DYSPLASIA-CARCINOMA SEQUENCE

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¹E S Bloom, ^{1,2}M A Butt, ^{1,2}R J Haidry, ³D Oukrif, ¹S-U-R Khan, ³S Ahammed, ^{1,2}V Sehgal, ¹J Louis-Auguste, ^{1,2}M R Banks, ⁴M Gandy, ³M Rodriguez-Justo, ³M Novelli, ^{1,2}L B Lovat. ¹NMLC, UCL; ²GI services; ³Pathology, UCH; ⁴UCL-AD, UCL, London, UK

Introduction We have previously shown how the Allred scoring system may be used to semi-quantify expression of nuclear biomarkers in the Barrett's (BE) to oesophageal adenocarcinoma (OA) sequence. Recently, a number of digital image analysis (DIA) platforms have been clinically validated for quantification of immunohistochemistry (IHC) in breast tissue. This study aims to compare pathologists scores (PS) with DIA for the quantification of nuclear biomarkers in BE to OA sequence.

Methods Paraffin embedded specimens were selected from 34 patients. Pathology grade (PG) was scored as 1 (non-dysplastic BE; n = 5), 2 (low grade dysplasia; n = 5), 3 (high grade dysplasia; n = 11) and 4 (OA; n = 14). Sections were immunostained with antibodies PLK1-M, PLK1-L and Geminin. Intensity (I-PS) (0 to 3+) and extent (E-PS) (0; < 1% = 1; 1–10% = 2; 10–33% = 3; 33–66% = 4; > 66% = 5) of staining were scored by 2 GI pathologists, and mean PS calculated. Intensity and proportions of +ve staining were digitally quantified using Ariol® software. Analysis classifiers were trained to identify thresholds of positive (brown/DAB) and negative (blue/Hx) nuclei (Figure A) in the areas of interest. Background tissue was digitally excluded. Mean intensity (I-DIA) and mean counts for DIA positive (red) and negative (green) nuclei (Figure B) were quantified to calculate percentage positivity (E-DIA) and compared with I-PS, E-PS and total Allred score (A-PS) using Pearson correlation coefficient.

Results Significant correlation was seen between E-DIA and A-PS ($r = 0.76$, $p = 0.006$; $r = 0.73$, $p = 0.008$; $r = 0.94$, $p = 0.0004$) with all biomarkers (PLK1-M; PLK1-L; Geminin). PLK1-L showed additional correlation between DIA and PS for intensity ($r = 0.985$, $p = 0.02$) and extent ($r = 0.95$, $p = 0.90$). Geminin showed additional correlations between DIA and PS for extent ($r = 0.99$, $p = 0.0008$) and PG ($r = 0.97$, $p = 0.03$). Following training, Ariol® analysis took a mean of 4mins (Range 3–5) per tissue region highlighted.

Conclusion This study has demonstrated how DIA may be used to quantify expression of nuclear biomarkers. Significant correlation between DIA with Allred score was seen with all biomarkers, but only PLK1-L correlated with intensity and Geminin with PG. Background staining ignored by pathologists was found to be a confounder for DIA, particularly with PLK1-M. Nonetheless, DIA has great potential to enhance current grading and risk stratification

systems for BE, and help select patients for targeted therapies dependent on biomarker expression.

Disclosure of Interest None Declared

PTU-144 CAN WE PREDICT PATIENTS WITH BARRETT'S DYSPLASIA WHO WILL PROGRESS TO MALIGNANCY DESPITE ENDOTHERAPY; RESULTS OF A PROSPECTIVE, SINGLE CENTRE EXPERIENCE

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¹H C McEwan, ²J Going, ³G Fullarton, ⁴A J Morris. ¹Walton Building, University Department of Surgery, Glasgow Royal Infirmary; ²Pathology, Southern General Hospital; ³Surgery; ⁴Gastroenterology, Glasgow Royal Infirmary, Glasgow, UK

Introduction In the treatment of Barrett's patients with intramucosal cancer (IMC) and high grade dysplasia (HGD), there is mounting evidence to support a combined endoscopic approach of endoscopic mucosal resection (EMR) and radiofrequency ablation (RFA). Despite the efficacy and safety of endotherapy in the treatment of IMC and HGD, some patients fail to respond to treatment or progress to oesophageal adenocarcinoma (EAC). We sought to examine the factors associated with the failure to respond or the progression to EAC from a tertiary referral practise.

Methods 105 patients with a mean age of 70 (range 43 – 90) years with HGD or IMC were treated between July 2008 and December 2012. The treatment protocol involved EMR of all nodular areas with subsequent RFA of all remaining Barretts epithelium. The RFA technique involved a combination of circumferential (HALO 360) followed by subsequent focal ablation (HALO 90) of residual areas of Barrett's tongues or islands. Patients were deemed to have completed endotherapy on eradication of dysplasia. A maximum of 2 HALO 360's and 3 HALO 90's were allowed. Patients who failed to respond to endotherapy or developed EAC were withdrawn from endotherapy. Median follow up was 9 (3 – 41) months.

Results 105 patients were treated (29 IMC and 76 HGD). Eighty patients have completed the treatment protocol to date (median of 1 HALO 360 and 1 HALO 90) and 42 (52%) of these had initial EMR. Eleven patients died during follow up, 2 from oesophageal cancer and the remaining 9 from non-oesophageal related causes. Eradication of Barrett's dysplasia was achieved in 80/91 (87%) and eradication of metaplasia in 61/91 (67%). Five (4.7%) patients progressed to EAC and 3 (2.8%) patients failed treatment as their IMC or HGD was refractory to RFA and required surgery. The demographics for those that progressed to EAC compared to those that did not (Non-EAC) are as follows. EAC; males 5 (100%), mean initial Barrett's length 7cm, those having pre-halo EMR 4 (80%) and initial pathology of 2 IMC (40%) and 3 HGD (60%). Non-EAC group; males 71 (73%), females 26 (27%), mean initial Barrett's length 7 cm, those having pre-halo EMR 42 (43%) and initial

Abstract PTU-143 Figure