PWE-093

TOWARDS REAL-TIME 'BIOCHEMICAL ENDOSCOPY' FOR DIAGNOSIS OF EARLY BARRETT'S NEOPLASIA

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Introduction Raman spectroscopy is a powerful analytical technique that can rapidly and accurately identify biochemical changes in cells that have become neoplastic. We aim to transfer this laboratory based technique to the bedside in order to identify high-grade dysplasia and early malignant change within Barrett's oesophagus. Here we demonstrate the feasibility of a novel fibre-optic Raman probe to map the pathology encountered in a resected human distal oesophagus.

Figure 1 PWE-093 Mapping of a distal oesophagus using a perspex grid for probe positioning

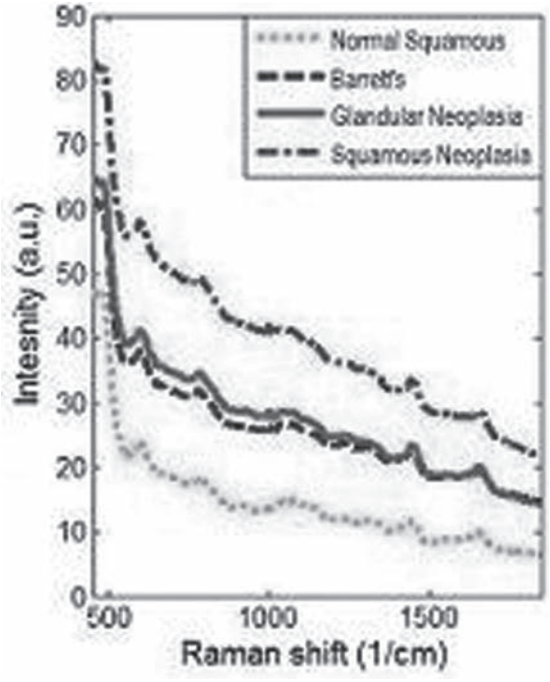

Figure 2 PWE-093 Example mean Raman probe spectra measured on normal squamous, Barrett's and neoplastic oesophageal tissue

Methods A novel Raman probe[1 2] designed to fit through the 2.8 mm instrument channel of a standard endoscope was used to map a distal oesophagus ex vivo. Following Ivor-Lewis oesophagectomy (with curative intent in patients with oesophageal adenocarcinoma), a reproducible mapping grid was placed over the distal oesophagus and Raman spectra were measured at specified grid positions using 1 and 5 s acquisition times (Figure 1). A monochromatic 830 nm laser was used for excitation and a Renishaw system 100 spectrometer for the measurement of Raman spectra.

Results Laboratory based Raman systems can delineate eight pathological groups in the distal oesophagus with sensitivities between 73% and 100%.[3] To date we have measured 76 spectra from 3 oesophageal specimens using the novel endoscopic probe and data collection and analysis is currently on-going (Figure 2). Histopathological diagnosis has been confirmed by expert pathologists following point biopsy at each grid position in order to correlate the Raman signal with the gold standard. Multivariate analysis will be used to extract subtle spectral features to evaluate the accuracy of the probe for delineating between pathological groups.

Conclusion Further data collection (currently on-going) is needed to generate a robust classification algorithm in order to delineate between Barrett's metaplasia, low/high-grade dysplasia and cancer in the distal oesophagus. Preliminary spectra obtained using a novel endoscopic probe are consistent with laboratory data and suggest profound potential for in vivo endoscopic diagnosis using Raman spectroscopy.

Competing interests None.

Keywords Barrett's intraepithelial neoplasia, Barrett's oesophagus, Raman spectroscopy.

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