AB027. 172. Illuminating neoplasia with systemic indocyanine green and near-infrared endoscopic system—clinical experience

Haseeb Khokhar[1,2,3,4], Eamon Loughman[1,2,3,4], Conan McCaul[1,2,3,4], Donal O'Shea[1,2,3,4], Ronan A. Cahill[1,2,3,4]

[1]Department of Surgery, [2]Department of Medical Physics, [3]Department of Anaesthetics and Critical Care, Mater Misericordiae University Hospital, Dublin, Ireland; [4]Department of Medicinal Chemistry, RCSI, Section of Surgery & Surgical Specialties, School of Medicine, University College Dublin, Dublin, Ireland

Background: Tumors comprise neoplastic cells and host stroma whose dynamic interaction manifests significant pathophysiological local tissue distortion. Tumor metabolomic hallmark characterization should so be revealed by direct endoscopic near-infrared (NIR) perfusion imaging.

Methods: Patients undergoing surgical assessment or resection for colorectal neoplasia were studied over a three month interval. Systemic indocyanine green (ICG) at a dose of 0.25 mg/kg was administered with direct endoscopic evaluation (PINPOINT Endoscopic System, Novadaq Corp.) continuously for up to 40 minutes afterwards and episodically then for up to 3 hours both endoscopically and laparoscopically as appropriate. Selected tumors underwent similar examination *ex vivo* alongside standard pathological examination. Mean Fluorescence Intensity with texture analysis was determined on video recordings post-hoc (Image J, NIH).

Results: Sixteen patients (10 males) with colorectal neoplasia (12 with cancer) were studied. Five patients with rectal cancer along with four others with benign rectal lesions were evaluated endoscopically with significantly different fluorescence signal to background ratio between lesion and adjacent tissue and between malignant and benign lesions (most notably early at inflow and again >10 minutes wherein cancers retained fluorescence selectively). Seven patients with colon cancer had selective fluorescence evident serosally on laparoscopic evaluation including one undergoing solitary retroperitoneal metastasectomy six months after primary resection. Selective fluorescence was evident *ex vivo* within cancers up to 6 hours after systemic ICG.

Conclusions: Systemic ICG can selectively illuminate neoplasia with evident signaling differences between benign and malignant lesions allowing machine-learning algorithmic determination. Late selectivity suggests intracellular accumulation distinctive from early phase enhanced permeability/retention (EPR) phenomenon.

Keywords: Colon; neoplasia; indocyanine green (ICG); infrared; detection

doi: 10.21037/map.2018.AB027

Cite this abstract as: Kothar H, Loughman E, McCaul C, O'Shea D, Cahill RA. Illuminating neoplasia with systemic indocyanine green and near-infrared endoscopic system—clinical experience. Mesentery Peritoneum 2018;2:AB027. doi: 10.21037/map.2018.AB027