

ORAL PRESENTATIONS 6B
OESOPHAGOGASTRIC

0142 WHAT ARE THE NORMAL POST-OPERATIVE CT APPEARANCES OF A GASTRIC CONDUIT FOLLOWING TWO PHASE OESOPHAGECTOMY?

O Markiewicz, C Von Stempel, A Rea, N Newton, K Dawas
University College Hospital and University College London

Introduction: A complication of an oesophagectomy is gastric conduit twisting. The CT appearances of the conduit are poorly described. We aimed to identify the normal CT appearances of the conduit and assess progressive changes.

Method: 11 post-operative patients from a regional centre (between 2011-2015) were included. All had good conduit function at 8 months post-operatively. 2 CT series of axial 1.5mm cut thorax views were analysed per patient: one within 14 days of surgery (range 3-14); another at 8-24 months. Using OsiriX, regions of interest points(ROI), points were assigned to the gastric conduit staple lines. ROI segmentation of gastric conduit lumen allowed volumetric reconstruction generation. The helical curve described by the lesser curve of the stomach staple line was the difference between the most proximal and distal staples. A control patient with known conduit volvulus was included.

Result: A twist in the staple line was observed (range 0 to 150 degrees) in anti-clockwise and clockwise directions. In the immediate post-operative period mean twist was 72°(range 30-150 °); interval scan mean twist 54°(range 0- 120°). Mean change in the position of the top staple was <7°; and 10° anticlockwise in the distal staple. The symptomatic patient demonstrated a twist of 240°.

Conclusion: A description of appearances of the conduit on CT is demonstrated. Patients with good functional outcomes have distinct features compared to a symptomatic patient. These appearances may influence conduit emptying. The authors suggest a twist of less than 75° in the immediate post-operative period is predictive of good function.

Take-home message:

CT based assessment of the gastric conduit post oesophagectomy may predict function

0143 IMPACT OF SURGICAL PROFICIENCY GAIN UPON LONG-TERM SURVIVAL FOLLOWING OESOPHAGECTOMY FOR CANCER

SR Markar (1), H Mackenzie (1), A Johar (2), P Lagergren (2), GB Hanna (1), J Lagergren (2,3)
(1) Department of Surgery & Cancer, Imperial College London, UK (2) Department of Molecular Medicine & Surgery, Karolinska Institutet, Sweden (3) Division of Cancer studies, King's College London, UK

Introduction: The objectives of this national study were to identify the presence and length of an oesophagectomy proficiency gain curve in terms long-term mortality, and measurable changes observed as surgeons gain proficiency.

Method: All adult patients undergoing oesophagectomy for oesophageal cancer between 1987–2010 were identified from the Swedish cancer registry. Proficiency-gain curves were created using risk-adjusted Cumulative Sum analysis for 30-, 90-day, 1-, 3- and 5-year all-cause and disease-specific mortality, and lymph node harvest.

Result: Over the study period 1361 oesophagectomies for cancer with an R0 resection performed by 139 surgeons were included. The change-point in proficiency gain curve was early for 30-day mortality at 15 cases, where the mortality fell from 7.9% to 3.1% (P<0.0001). In comparison a later change-point was observed for long-term mortality (1-, 3- and 5-year) that ranged from 35 to 59 cases, where all-cause mortality fell from 34.9% to 27.7% (P=0.011), 47.4% to 41.5% (P=0.049), and 31.4% to 19.1% (P=0.009) respectively. Similar reductions were observed in disease-specific mortality at 1-year and 3-years. There were two change-points in lymph node harvest at 20 and 150 cases, and significant increases in lymph node harvest were also observed at the change-points seen in long-term survival. Surgery by HV surgeons was independently associated with reduced 30-day 90-day and 3-year mortality.

Conclusion: The gain of proficiency in oesophagectomy is associated with measurable changes in short- and long-term mortality. The adverse impact of proficiency gain upon patient outcomes may be negated with the introduction of supervised and structured national programs.

Take-home message:

This study is the first to evaluate the change in long-term mortality at a national level as surgeon's gain proficiency in performing an established open operation. The adverse impact of proficiency gains upon patient outcomes may be negated with competency-based training programs before surgeons embark on independent practice followed by a mentoring and continual proficiency scheme during the initial practice as specialists.

0144 POST-OPERATIVE ELEVATION OF THE NEUTROPHIL:LYMPHOCYTE RATIO PREDICTS COMPLICATIONS FOLLOWING OESOPHAGEAL RESECTION

P Vulliamy, S McCluney, L Ashby, S Mukherjee, T Amalesh
Barking, Havering and Redbridge NHS Trust

Introduction: Complications following oesophagectomy are a significant source of morbidity. The aim of this study was to investigate the utility of the neutrophil:lymphocyte ratio (NLR) in the early identification of complications following oesophagectomy, as compared to other routinely available parameters.

Method: We performed a retrospective cohort study of patients undergoing Ivor-Lewis oesophagectomy at a single centre between 2010-2013. Baseline characteristics and complications occurring within the first thirty days of surgery were recorded. White blood cell counts and C-Reactive Protein (CRP) levels immediately following surgery (day 0) and over the subsequent three post-operative days were analysed.

Result: Sixty-five patients were included, of whom 29 (45%) developed complications. The median NLR was similar among patients with and without a complicated recovery on day 0 (12.7 vs 13.6, $p=0.70$) and day 1 (10.0 vs 9.3, $p=0.29$). Patients who developed complications had a higher NLR on day 2 (11.8 vs 7.5, $p<0.001$) and day 3 (9.0 vs 6.5, $p=0.001$) compared to those whose recovery was uncomplicated. Receiver-Operating Characteristic plots for the diagnostic performance of the NLR, neutrophil count, lymphocyte count and CRP level at each time-point demonstrated that the NLR on day 2 had the greatest discriminatory ability in predicting complications, with an area under the curve of 0.83 (95% confidence interval 0.73-0.94). An NLR of >8.3 on day 2 had a sensitivity of 93% and a specificity of 72% for predicting complications.

Conclusion: The NLR is a simple and routinely available parameter which has a high sensitivity in the early detection of complications after oesophagectomy.

Take-home message:

Elevation of the neutrophil:lymphocyte ratio (NLR) in the early postoperative period is a sensitive predictor of complications after oesophagectomy. In this study, NLR elevation showed greater diagnostic performance compared to other routinely available parameters.

O145 APPLICATION OF GOLD NANORODS FOR UPPER GASTROINTESTINAL CANCER THERANOSTICS.

M Singh, E Nabavi, Y Zhou, H Zhao, D Ma, AEG Cass, GB Hanna, DS Elson
Imperial College London

Introduction: Gold nanoparticles can be utilised as photothermal therapeutic agents because of their strongly enhanced absorption of near infrared light (NIR) resulting in hyperthermia induced by their surface plasmon resonance. We investigate the fluorescence-guided photothermal effect from gold nanorods (GNRs) on in vivo upper gastrointestinal adenocarcinoma.

Method: Coated gold nanorods (GNRs) were functionalised with a fluorophore (Cy5.5) modified with anti-EGFR antibody. Tumour xenografts were established in immunodeficient mice by subcutaneous inoculation of human oesophageal adenocarcinoma (FLO-1) cells. Functionalised GNRs were then administered either intratumourally (IT) or intravenously (IV). Fluorescence imaging was performed to observe tumour targeting, followed by tumour irradiation by an 808 nm (NIR) continuous wave laser for 3 minutes. A thermal imaging camera recorded temperature changes. Inductively coupled plasma mass spectrometry (ICP-MS) measured gold concentrations in blood and organs after 30 days.

Result: Functionalised GNRs had a peak optical absorption at 808 nm. In vivo, high fluorescence signals were emitted specifically from the tumour, providing diagnostic information. NIR irradiation established significant hyperthermia in tumours receiving both IV and IT GNRs. This photothermal effect resulted in the successful ablation of tumour sites which was confirmed histologically. ICP-MS revealed no evidence of harmful accumulation of gold in all organs. No behavioural changes, morbidity or weight loss was observed.

Conclusion: This study examines the theranostic potential of GNRs on adenocarcinoma in vivo. Fluorescence imaging of GNRs that localise to cancerous tissue can enhance cancer diagnosis. When coupled with NIR irradiation, this method effectively induces irreversible tumour photodestruction.

Take-home message:

Gold nanorods can safely provide adenocarcinoma theranostics in vivo. Fluorescence imaging provides diagnostic information even for subtle tumours, while minimal thermal energy radiation induces tumour ablation.

O146 ERYTHROCYTE AND PLASMA UPTAKE OF OMEGA-3 FATTY ACIDS FROM AN INTRAVENOUS FISH OIL BASED LIPID EMULSION IN PATIENTS WITH ADVANCED OESOPHAGOGASTRIC CANCER

AM Eltweri (1), AL Thomas (2), PC Calder (3), M Metcalfe (1), AR Dennison (1), DJ Bowrey (1)
(1) Department of Surgery, University Hospitals of Leicester NHS Trust, Leicester LE1 5WW, UK (2) Department of Cancer Studies, University of Leicester, Leicester LE1 5WW, UK (3) Human Development and Health Academic Unit, Faculty of Medicine, University of Southampton, Southampton SO16 6YD, UK (4) NIHR Southampton Biomedical Research Centre, University Hospital Southampton NHS Foundation Trust and University of Southampton, Southampton SO16 6YD, UK

Introduction: Short term intravenous (IV) administration of omega-3 polyunsaturated fatty acids (PUFAs) is more effective than oral supplementation at promoting incorporation of the bioactive omega-3 PUFAs eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) into plasma, blood cells and tissues. We investigate the effect of repeated short term IV administration of omega-3 PUFAs in patients

with advanced oesophagogastric cancer while receiving palliative chemotherapy.

Method: Patients with advanced oesophagogastric cancer (n = 21) were recruited into a phase II pilot clinical trial. All patients were scheduled to have an intravenous infusion of Omegaven® (fish oil containing EPA and DHA) at a rate of 2 ml/kg body weight over 4 hours once a week for up to six months. Blood samples were collected for assessment of omega-3 PUFA uptake into plasma non-esterified fatty acids (NEFAs) and phosphatidylcholine (PC) and into red blood cell (RBC) membranes. Fatty acid profiles were analysed by gas chromatography.

Result: Twenty patients who had at least one Omegaven® treatment were included in the intention to treat analysis. Each infusion of omega-3 PUFAs resulted in increased EPA and DHA in plasma NEFAs, but there was little effect on PUFAs within plasma PC during the infusions. However, with repeated weekly infusion of omega-3 PUFAs the EPA content of plasma PC and of RBC membranes increased.

Take-home message:

Repeated weekly omega-3 PUFA infusion is safe in patients with advanced oesophagogastric cancer receiving palliative chemotherapy, and is effective in enriching plasma PC and RBC membranes in EPA.

O147 INDIVIDUAL PATIENT 3D OESOPHAGEAL CANCER MODELS FOR TAILORED TREATMENT

JH Saunders (1,2), D Onion (1), MS Dorrington (1), P Collier (1), SL Parsons (2), AM Grabowska (1) (1) Cancer Biology, Division of Cancer and Stem Cells, University of Nottingham (2) Nottingham University Hospitals NHS Trust

Introduction: The response to chemotherapy in oesophago-gastric (OG) cancer is only 45%, so half of these patients will have ongoing cancer progression whilst also suffering the toxic chemotherapy side-effects. A model to predict chemotherapy response would provide a marked clinical benefit, by enabling tailored treatment of their OG cancer.

Method: OG tumour biopsies were obtained endoscopically from patients before they underwent neo-adjuvant chemotherapy. Tumour growth was established in-vitro using a feeder layer system and supplemented medium. Cells were then characterised using flow cytometry to ensure they represented malignant oesophageal adenocarcinoma. A 3D-tumour growth assay (3D-TGA) was developed, where the individual patient's primary tumour cells form 3D cancer cell clusters. This 3D-TGA with its humanised tumour micro-environment (TME) was modelled with and without stromal support, and then subjected to chemo-sensitivity testing using the standard chemotherapy administered in clinic.

Result: Individual patient tumours were grown in over half of samples obtained, and within a clinically applicable timescale of 2-4 weeks. Incorporating a humanised TME with stromal support cells into the 3D-TGA significantly changes the growth and drug resistance profiles (p <0.005). This 3D-TGA chemo-response accurately reflects clinical outcomes, with correlation between the predicted chemo-sensitivity and actual clinical response for the 10 patients so far evaluated.

Conclusion: We have developed a novel method of growing individual patient OG cancers in the laboratory, enabling tumour modelling and chemo-sensitivity testing. The tumour micro-environment has a significant effect upon enhancing chemotherapy drug resistance in OG cancer, and could prove a useful target for future drugs.

Take-home message:

Individual patient oesophageal cancers can be grown in complex 3D laboratory models with a tumour micro-environment, allowing chemo-sensitivity testing. The 3D models chemo-response correlates with individual patients chemo-sensitivity and could be developed to potentially guide tailored patient treatment.