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Comparison of endoscopic laser therapy and self expanding metal stents for palliation in patients with non-resectable oesophageal carcinoma

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ABSTRACT

Background: There are currently limited data on the comparative success of endoscopic laser therapy (NLT) and self expanding metal stents (SEMS) as palliative measures in patients with non-resectable oesophageal cancer. This study aims to assess and compare the outcomes of these methods of endoscopic palliation.

Methods: Patients with non-curative oesophageal/gastro-oesophageal cancers with dysphagia were identified prospectively and consented to swallow assessment and follow-up. Patients underwent SEMS or NLT at the discretion of the treating endoscopist. Initial standardised swallow scores (0–4) were assessed. All subsequent interventions were recorded as well as survival.

Results: 31 patients were recruited (30M vs 8F, mean age 70.8). There was no significant difference in age, sex or chemotherapy treatment between groups. 19(61%)patients underwent NLT as primary procedure. 20(64.5%) patients required subsequent intervention(s) (median 1, range 0–8). Primary NLT patients were more likely to require subsequent therapy ($p = 0.004$) and multiple procedures ($p = 0.001$). 8(42.1%)patients initially undergoing NLT subsequently required SEMS, while no SEMS patients underwent subsequent NLT. Swallow scores of 1 or 2 were more likely to be maintained with NLT while scores of 3 or 4 were more likely to progress to SEMS ($p = 0.039$). Time to repeat procedure was greater in the SEMS group ($p = 0.001$). Median survival was 133 days for NLT vs 60 days for SEMS ($p = 0.412$).

Conclusion: In this series, patients selected for NLT had a trend towards longer survival, but were more likely to require repeated procedures. Those with lower early initial dysphagia scores were more likely to be maintained by NLT alone.

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Introduction

In the Western World, the majority of patients presenting with cancer of the oesophagus have incurable disease and therefore do not undergo surgery with curative intent.[1] This is often representative of the late stage of disease at the time of presentation, or patient co-morbidities preventing progression to major surgery.[2] The incidence of oesophageal cancer continues to increase[3] making this an increasing cohort of patients where treatment intent is of a palliative nature with the aim to control symptoms. Ideally, treatment should maintain the patient's ability to swallow and thereby allow adequate nutrition as well as offer control of both pain and haemorrhage.

The optimal palliative intervention for these patients remains to be established, with patients treated with a range of therapies including self-expanding metal stent (SEMS) insertion, endoscopic neodymium:YAG laser therapy (NLT), photodynamic therapy (PDT), argon plasma photocoagulation (APC), brachytherapy, chemotherapy and chemoradiotherapy.[4] Within Ayrshire & Arran two endoscopic modalities are used to provide palliation: SEMS and NLT. SEMS are relatively simple and safe to insert (in comparison to the previous practice of silicon rubber or plastic stents[5]), however patients may experience post-procedural chest pain, eventual stent migration or tumour ingrowth/overgrowth.[6] NLT is suitable for palliation of exophytic tumours, particularly close to the oesophagogastric junction, however may require repeat procedures every 4–6 weeks due to tumour regrowth.[7] There is currently no clear evidence to determine which of these treatments is superior to the other in terms of quality of life, requirement of repeated procedures and survival characteristics.

This retrospective study aims to compare outcomes and survival in patients undergoing endoscopic palliation by NLT and SEMS.

Methods

31 patients referred with non-curative oesophageal/gastro-oesophageal cancers with dysphagia were identified prospectively and consented to swallow assessment and follow-up. All patients had been reviewed by an oesophagogastric surgeon with a multidisciplinary team deciding that the patient was not suitable for operative surgery. Patients underwent prior endoscopy and biopsies to confirm the diagnosis as well as staging CT scans to define tumour size, invasion and presence of metastatic disease.

Patients either underwent SEMS insertion or NLT at the discretion of the treating endoscopist following discussion with the patient prior to the procedure. Initial dysphagia scores (Grade 0–Grade 4) were recorded using a standardised dysphagia score[6] (see Table 1). Patients were followed up for a minimum of 1 year or until death with routine review by either the surgical team or clinical nurse specialists. All subsequent endoscopic interventions were recorded. Survival status at the time of analysis was confirmed either by direct contact with the clinical nurse specialist team or the patients' general practitioner.

Table 1 – Description of dysphagia scores.

Score	Description
0	Able to eat normal diet/No dysphagia
1	Able to swallow some solid foods
2	Able to swallow semi-solid foods
3	Able to swallow liquids only
4	Unable to swallow anything

Interventions

Patients undergoing NLT were treated using a Nd:YAG laser (Ceralas Diode D50, CeramOptec GmbH, Bonn, Germany). The laser was set to an output of 30–35 W with pulse duration of 1 s. All treatments were carried out by one of three experienced endoscopists (K.R, C.S, S.G) certified to perform the procedure. Patients were sedated as standard within the unit (IV midazolam 1–5 mg ± IV fentanyl 50-100mcg dependent on response).

Stents were inserted by the same three endoscopists using a combined endoscopy/fluoroscopy approach. Briefly, under midazolam conscious sedation as above, a guidewire was placed under vision endoscopically with external skin markers placed at the proximal and distant extents of the tumour. An appropriately sized partially covered stent (Boston Scientific, MA, USA) was then advanced over the guidewire under fluoroscopic guidance and deployed. Stent position was then verified both fluoroscopically and endoscopically.

Statistical analysis

All data were analysed using IBM SPSS Statistics Version 22 (IBM Corporation, NY, USA). Continuous data were analysed using t-test for parametrically distributed data and Mann–Whitney U test for non-parametric data. Categorical data were analysed using λ^2-test. Kaplan–Meier analyses were performed for survival data.

Results

A total of 31 patients were recruited. Patients were predominantly male (23 male vs 8 female). Median age was 74 (range 42–87). Primary tumour type was adenocarcinoma in 23 (74.2%) of patients vs squamous cell carcinoma in 8 (25.8%).

19 patients (61.3%) underwent NLT as their primary procedure, vs 12 undergoing SEMS (38.7%). 7 patients (22.5%) had undergone chemotherapy/chemoradiotherapy prior to endoscopic intervention, 5 in the NLT group (26.3%) vs 2 in the SEMS group(16.7%). 7 patients (19.4%) received chemotherapy following intervention. Patient characteristics are summarized in Table 2.

Initial dysphagia scores are shown in Table 3. Mean dysphagia score prior to first intervention was 2.48. Mean dysphagia score was slightly higher in the SEMS group compared to the NLT group (2.64 vs 2.39, $p = 0.55$).

20 patients (64.5%) required at least one further endoscopic intervention (Median 1 procedure, range 0–8). Mean time to requiring repeat intervention was 84 days (range 7–424). Of

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