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Impact of prophylactic gastrostomy or reactive NG tube upon patient-reported long term swallow function following chemoradiotherapy for oropharyngeal carcinoma: A matched pair analysis

Brinda Sethugavalar [a,1], Mark T. Teo [a,1], Catriona Buchan [b], Ekin Ermiş [a], Gillian F. Williams [c], Mehmet Sen [a], Robin J.D. Prestwich [a,*]

[a] Department of Clinical Oncology, Leeds Cancer Centre, St. James's Institute of Oncology, Leeds, UK
[b] Department of Radiotherapy, Leeds Cancer Centre, St. James's Institute of Oncology, Leeds, UK
[c] Dietetic Department, Leeds Cancer Centre, St. James's Institute of Oncology, Leeds, UK

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SUMMARY

Objectives: The purpose of this matched pair analysis is to assess patient-reported long term swallow function following chemoradiotherapy for locally advanced oropharyngeal cancer in relation to the use of a prophylactic gastrostomy or reactive nasogastric (NG) tube.

Materials and methods: The MD Anderson Dysphagia Inventory (MDADI) was posted to 68 consecutive patients with stage III/IV oropharyngeal squamous cell carcinoma who had completed parotid sparing intensity modulated radiotherapy with concurrent chemotherapy between 2010 and 2012, had not required therapeutic enteral feeding prior to treatment, minimum 2 years follow up post treatment, and who were disease free. 59/68 replies were received, and a matched pair analysis (matching for T and N stage) was performed for 52 patients, 26 managed with a prophylactic gastrostomy and 26 with an approach of an NG tube as needed.

Results: There were no significant differences in patient demographics, pre-treatment diet and treatment factors between the two groups. Patient-reported swallowing function measured using the MDADI was superior for patients managed with an NG tube as required compared with a prophylactic gastrostomy: overall composite score 68.1 versus 59.4 ($p = 0.04$), global score 67.7 versus 60 ($p = 0.04$), emotional subscale 73.5 versus 60.4 ($p < 0.01$), functional subscale 75.4 versus 61.7 ($p < 0.01$), and physical subscale 59.6 versus 57.1 ($p = 0.38$).

Conclusions: Compared with an approach of an NG tube as required, the use of a prophylactic gastrostomy was associated with inferior long term patient-reported long term swallow outcomes.

Introduction

Long term dysphagia remains a major treatment-related morbidity of organ preserving approaches to the treatment of head and neck cancers [1–5], with the use of concurrent chemotherapy identified as a significant clinical factor associated with risk of long term dysphagia [6,7]. Dysphagia has a major detrimental effect upon health-related quality-of-life, with multiple studies reporting an association between health-related quality of life and dysphagia [4,8,9]. In a patient questionnaire study, swallowing was rated by a majority of patients as a priority concern 12 months following completion of (chemo)radiotherapy [8].

The timing, route and duration of enteral feeding during and after treatment may have an important influence upon the severity of late dysphagia. During concurrent chemoradiotherapy, the majority of patients require enteral tube feeding support either during or soon after treatment. Rates of enteral tube feeding vary widely between institutions between around 50–100% [10–13]. The chosen route of enteral tube feeding is generally either with a nasogastric (NG) tube or a gastrostomy (percutaneous endoscopic gastrostomy (PEG) or radiologically guided gastrostomy (RIG)). The choice of placement of a prophylactic feeding tube (usually a gastrostomy) prior to definitive chemoradiotherapy or a reactive approach (often with an NG tube) remains an area of highly variable practice. Reported outcomes are variable and in

* Corresponding author at: Level 4, Bexley Wing, Leeds Cancer Centre, St. James's Institute of Oncology, Beckett St., Leeds LS9 7TF, UK.
E-mail address: Robin.Prestwich@nhs.net (R.J.D. Prestwich).
[1] These authors contributed equally.

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general prophylactic PEG tubes have been advocated for reduced weight loss [14–17] (albeit a small difference in several series [11,18]), lower rates of hospitalisation [11,16,17] and improved quality of life [18,19]. However, the duration of enteral feeding with a prophylactic gastrostomy has been shown to be consistently longer than with a reactive approach [11,20]. There is concern raised in some [21,22] but not all series [1,18] that prophylactic gastrostomy feeding may have a detrimental impact upon long term swallow function. It is hypothesised that prophylactic tube placement may promote a reliability upon enteral feeding, whilst NG tubes are hypothesised to promote swallowing, discourage protracted tube dependence and consequently reduce late fibrosis [23]. The potential of the choice of timing and route of enteral feeding tube to influence long term swallow outcomes remains highly controversial [10].

Dysphagia can be evaluated by a multitude of different tools, including physician reported and patient reported outcomes [4]. However, clinician and patient reported outcomes do not necessarily correlate, with the observation that patients may rate dysphagia more severely than clinicians [24]. Patient reported outcome measures are hence a key tool in assessing long term outcomes in relation to the route and timing of enteral feeding. We examined long term swallow outcomes in our previously reported cohort [11] of patients treated with chemoradiotherapy for oropharynx carcinoma [1]. We compared MDADI scores in 43 patients managed with a prophylactic PEG and 13 with a reactive NG tube; there was no difference between the two groups in any domain of the MDADI. However, the interpretation of this study is limited by the small number of patients managed with a reactive NG tube and by the use of non-parotid sparing 3D-conformal radiotherapy.

The aim of this study is to used a matched pair analysis to assess patient-reported long term swallow outcomes with the MDADI tool in patients with oropharyngeal carcinoma treated with chemoradiotherapy and parotid-sparing IMRT, in relation to the approach of using a prophylactic PEG tube or reactive NG tube if required.

Methods

Study design

The study was registered with the Institutional Quality Improvement Board.

Consecutive patients with locally advanced squamous cell carcinoma treated with concurrent chemoradiotherapy between October 2010 and December 2012 were identified from electronic records. The inclusion criteria were: oropharynx primary, squamous cell carcinoma pathology, stage III or stage IV, non-surgical treatment with curative intent, delivery of concurrent chemotherapy, use of IMRT, radiotherapy target included the bilateral neck, no prior therapeutic surgery, disease free on follow up for at least 2 years from last day of radiotherapy treatment. Patients were excluded if treatment was for recurrence, prior neck dissection, or if therapeutic enteral feeding was commenced prior to treatment.

During this period of time the policy at St. James's Institute of Oncology regarding a prophylactic or reactive approach to enteral nutritional support was to consider either a prophylactic gastrostomy or reactive NG tube approach based upon clinician ± patient preference. Gastrostomy tubes were either RIG or PEG tubes depending upon disease factors and local practice.

Patients included in the study who had completed treatment over two years previously were sent an explanatory letter inviting them to complete and return an enclosed copy of the MDADI questionnaire [25]. In the event of a non-response a follow up letter and a further copy of the questionnaire was sent after an interval of one month. The MDADI is a validated self-administered questionnaire designed for patients with head and neck cancer [25]. The questionnaire comprises 20 questions which are scored using a 5-point scale ranging from 'strongly agree' to 'strongly disagree', and is subdivided into global, emotional, functional and physical subscales. For each subscale the scores are summed and the mean score multiplied by 20 to provide a score in the range of 0–100. A higher score indicates superior swallowing quality of life and level of functioning.

Pre-treatment dietary data categorising oral intake into five categories (nil by mouth, sips, pureed, soft, normal) was prospectively collected during pre-treatment nursing and dietetic assessments as part of routine clinical care. These data were extracted by review of electronic and paper records.

Treatment details

Induction chemotherapy

Induction chemotherapy was used based upon clinician preference, patient and tumour factors; in general induction chemotherapy was considered for patients with bulky disease. Standard induction chemotherapy (ICT) consisted of either TPF (docetaxel 75 mg/m^2 day 1, cisplatin 75 mg/m^2 day 1 and 5-fluorouracil (5FU) 750 mg/m^2 days 2–5 three weekly) for selected fit patients [26], or PF (cisplatin 80 mg/m^2 day 1 and 5-fluorouracil (5FU) 800 mg/m^2 days 2–5, three weekly) [27].

Concurrent chemotherapy

Patients <70 years old were considered for concurrent chemotherapy. Standard concurrent chemotherapy was cisplatin 100 mg/m^2 days 1 and 29. Carboplatin AUC 4 was substituted for cisplatin if creatinine clearance was <55 ml/min.

Radiation treatment

Patients were treated supine with a 5 point thermoplastic mask. Planning CT scans were acquired with intravenous contrast with 2 mm slices. The planning CT dataset was transferred to the treatment planning system (Monaco®, Electa). A compartmental approach to target volume delineation was adopted as previously described [28]. Gross tumour volume (GTV) was outlined as primary tumour and clinically and/or radiologically involved lymph nodes. A primary tumour clinical target volume (CTV) was created to include at least GTV+10 mm and the anatomical compartment, modified to anatomical boundaries to exclude air and/or bone without evidence of invasion. The high dose nodal CTV was constructed to include the whole involved nodal level. Nodal levels which did not include a radiologically abnormal lymph node were treated at an intermediate or lower dose level according to clinician preference. The lymph node target routinely included levels 1b-V in the node positive neck; nodal levels in a node negative neck were selectively irradiated depending upon tumour site and disease extent according to published recommendations [29]. Retropharyngeal lymph nodes were routinely included in the target volume in cases with positive level II lymph nodes and involvement of the pharyngeal wall. The planning target volume (PTV) was created by auto-expansion of the CTV by 4 mm. Standard radical dose was 70 Gy in 35 fractions to high dose planning target volume (PTV), 63 Gy in 35 fractions to the intermediate risk PTV, and 57 Gy in 35 fractions to the elective PTV. Organ at risk (OAR) constraints were spinal canal maximum 48 Gy, brainstem maximum 54 Gy, larynx mean <45 Gy (excluding parts of larynx within PTV), contralateral parotid mean <26 Gy. Treatment was delivered with a 5–7 angle step and shoot IMRT technique.