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Original Article

Persistent Dysphagia after Head and Neck Radiotherapy: A Common and Under-reported Complication with Significant Effect on Non-cancer-related Mortality

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Abstract

Aims: Dysphagia is a well-recognised acute complication after radiotherapy. However, knowledge about the long-term prevalence and effect remains limited. The aims of this study were to determine the prevalence, severity, morbidity, time course and reporting patterns of dysphagia symptoms after head and neck radiotherapy.

Materials and methods: An observational cross-sectional study was conducted in a large consecutive series of head and neck cancer patients. All patients in the St George Hospital Cancer Care database who had received head and neck radiotherapy with curative intent 0.5–8 years previously and recorded as being alive were surveyed using the Sydney Swallow Questionnaire (SSQ). Case notes were reviewed to determine the level of awareness of swallowing dysfunction in all patients, as well as the causes of mortality in the 83 deceased patients.

Results: The mean follow-up at the time of survey was 3 years after radiotherapy (range 0.5–8 years). Of the 116 patients surveyed by questionnaire, the response rate was 72% (83). Impaired swallowing (SSQ score $>$ 234) was reported by 59% of patients. Dysphagia severity was not predicted by tumour site or stage, nor by the time since therapy, age, gender or adjuvant chemotherapy. Review of the hospital medical records and cancer database revealed that cancer accounted for 55% of deaths and aspiration pneumonia was responsible for 19% of non-cancer-related deaths. Of those with abnormal SSQ scores, only 47% reported dysphagia during follow-up clinic visits.

Conclusions: Persistent dysphagia is a prevalent, under-recognised and under-reported long-term complication of head and neck radiotherapy which currently cannot be predicted on the basis of patient, tumour or treatment characteristics. Aspiration pneumonia is an important contributor to non-cancer-related mortality in these patients. These data highlight the need for closer monitoring of swallow dysfunction and its sequelae in this population.

Key words: Dysphagia; head and neck; mortality; prevalence; radiotherapy

Introduction

Head and neck cancer, accounting for 3.5% of all cancers in Australia, is the sixth most common malignancy, with 2500 new cases diagnosed annually [1,2]. The overall 5 year survival is high (70%) for localised disease, but poor (25%) for locally advanced disease [3]. Treatment for head and neck cancer has evolved over the last decade to include an organ-preserving approach with external beam radiotherapy (often with concomitant chemotherapy) in place of surgical resection. A major advantage of the non-surgical approach is a higher likelihood of preservation of speech and swallowing function in pharyngeal and laryngeal tumours [4,5]. Clinical trials show comparable survival rates for chemoradiation and surgery [5,6]. Hence, chemoradiation is now the treatment of choice for many head and neck cancers. Unfortunately organ preservation does not always translate into a better functional result in terms of swallowing [7,8]. Collateral damage to salivary

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glands, nerve and muscles of fundamental importance to the oropharyngeal swallow is inevitable and accounts for most of the long-term side-effects of radiotherapy [8]. Dysphagia is potentially one of the most serious and disabling complications associated with head and neck radiotherapy, resulting in impaired nutrition, aspiration pneumonia and impaired quality of life [7,9]. Acute and largely reversible swallowing dysfunction after radiotherapy, occurring in 50% of patients, is well recognised [10–12]. In a study of 934 patients, 22% required tube feeding for acute toxicity and this was not predictive of feeding tube placement for late toxicity [12]. Most of the reports of the impact of radiotherapy on swallow function have only described short-term effects (≤1 year) [8,13]. This has a number of shortcomings: (i) acute radiotherapy reactions affect cell populations with a high cell turnover (e.g. mucosal membranes, skin), resulting in inflammation and ulceration, which although usually reversible, may confound assessment results; (ii) these early effects may not be predictive of long-term dysfunction [14], (iii) the late and more important effects on nerve and muscle often only become apparent after several years. Knowledge about long-term effects (>5 years) is limited to several small cohort studies [15–17] and a case report [18]. Fundamental to the field of head and neck radiotherapy is the lack of data regarding the magnitude of long-term dysphagia-related complications and the time course of radiation-related neuromuscular dysfunction.

The primary aim of this long-term follow-up study was to determine the prevalence and severity of persistent dysphagia after head and neck radiotherapy and whether dysphagia severity could be predicted by tumour and treatment-related variables (site, stage, adjuvant chemotherapy) or by the time since treatment. In addition we assessed dysphagia-related mortality and the level of awareness and reporting of dysphagia in routine clinical follow-up of these patients.

Materials and Methods

Study Population and Data Retrieval

The study was approved by St Vincent's Hospital Human Research Ethics Committee (reference 10/197). We reviewed the St George Hospital Cancer Care patient database for all patients ($n = 226$) who had been treated for head and neck cancer with radiotherapy or chemoradiotherapy 0.5–8 years before the study (i.e. between 2004 and 2011). Patients were deemed ineligible if they had undergone adjuvant surgery (not including neck dissection), palliative radiotherapy (14) or repeat schedule of head and neck radiotherapy (five) (Figure 1).

Inclusion Criteria

The tumour locations included were: tonsil, floor of mouth, nasopharynx, oropharynx, hypopharynx, larynx, tongue, lip, pyriform sinus, palate, buccal mucosa, maxilla, mandible, epiglottis and parotid.

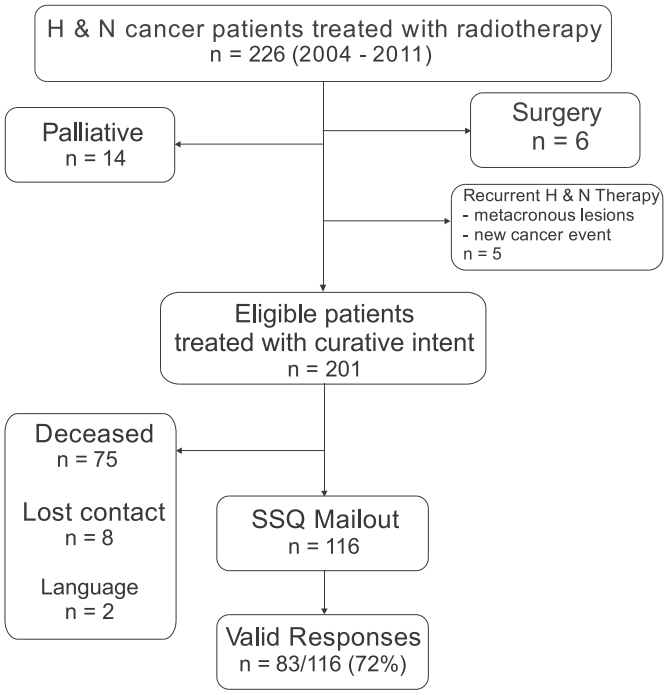

Fig 1. Response rates of head and neck cancer patients treated with radiotherapy to a survey using the Sydney Swallow Questionnaire (SSQ).

Exclusion Criteria

- Skin cancers of the head and neck.
- Subsequent local cancer recurrence at the time of survey.
- Surgical resection affecting pharyngeal muscles involved in swallowing (excluding sternoclei domastoid).
- Coexistent neurological disorders known to potentially cause oropharyngeal dysfunction (e.g. Parkinson's, stroke, inflammatory myopathy, amyotrophic lateral sclerosis (ALS)).
- Coexistent benign structural lesions known to cause cervical dysphagia (e.g. cervical web, pharyngeal diverticulum).
- Coexistent oesophageal pathology causing dysphagia.
- Subsequent metachronous or new cancer events requiring further head and neck radiotherapy.

The resultant records were reviewed to identify patients who were deceased. The Sydney Swallow Questionnaire (SSQ) was mailed out to all the remaining patients. Non-responders were followed up by telephone calls. Dysphagia was deemed present in those with an SSQ score >234 (see below).

Each patient's medical record was reviewed for reports on swallowing capability or necessity to modify diet. The initial 6 months after treatment were not included to avoid acute side-effects of radiotherapy. Deceased patients' records were searched to determine how frequently aspiration was the cause of death. Aspiration was deemed to be the cause of death if it was recorded on the death certificate