

Measuring relief of dysphagia in locally advanced esophageal carcinoma patients submitted to high-dose-rate brachytherapy

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ABSTRACT

BACKGROUND AND PURPOSE: Esophageal neoplasm has a poor prognosis, and palliative care remains an important goal of treatment. The purpose of this study was to assess the ability of high-dose-rate brachytherapy (HDRB) to improve dysphagia in 115 patients treated at our institution.

METHODS AND MATERIALS: Patients previously submitted to external beam radiotherapy that at least, 1 month after, presented with residual disease and persistent dysphagia, were given HDRB as palliative treatment. Patients with tumors extending to the level of cardia and those with cervical esophageal lesions were also eligible. HDRB consisted of three fractions of 500 cGy given weekly. Dysphagia was assessed using a food texture-based scale classified according to the type of food patients were able to swallow (absent, solid, pasty, or liquid). At the end of treatment, a single-category shift in dysphagia classification was scored as +1 (e.g., liquid to pasty) or –1 (e.g., solid to pasty), and a dual-category shift was scored as +2 (e.g., liquid to solid) or –2 (e.g., absent to pasty).

RESULTS: Most patients (51.1%) had improvement of dysphagia, and 55.3% of this group experienced one-point improvement. Procedural complications included stricture (38.2%), bleeding (7%), and fistula (8.7%). In the present study, 13 patients with cervical esophageal lesions underwent HDRB without fistula formation.

CONCLUSIONS: Esophageal HDRB effectively reduces dysphagia. Tumor location was not related to development of complications. © 2015 American Brachytherapy Society. Published by Elsevier Inc. All rights reserved.

Keywords:

Esophageal neoplasm; High-dose-rate brachytherapy; Dysphagia; Cervical esophagus; Palliative care

Introduction

Locally advanced esophageal cancer carries a poor prognosis, and only 30–40% of patients are suitable for curative therapy (1). In such situations, palliative care to maintain optimal quality of life remains an important goal of treatment. Several palliative treatments have been used in an effort to improve dysphagia. Treatment options include surgical laser treatment (2), stent placement (3), photodynamic therapy (4), bypass surgery (5), chemotherapy

(CHT) (6–9), external beam radiation therapy (EBRT) (8–12), and brachytherapy (13–21). However, many of these procedures have significant shortcomings: laser therapy requires repeated treatment sessions because of the continuous growth of the primary tumor; metal stents are expensive, can migrate, and be blocked by food, the tumor itself, or fibrous structures; and EBRT is often too intensive for patients in poor medical condition (22, 23).

High-dose-rate brachytherapy (HDRB) is an attractive palliative treatment that delivers, in a short time, a relatively high dose of irradiation to the affected area while sparing the surrounding healthy tissues. In this article, we report our experience with the use of palliative HDRB for locally advanced esophageal cancer patients, measuring the relief of dysphagia based on a food texture scale.

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Methods and materials

This retrospective study included 115 patients with advanced esophageal cancer who underwent radiotherapy between August 2001 and July 2011 at the Department of Radiation Oncology of the National Cancer Institute, Rio de Janeiro, Brazil. The study protocol was approved by the institutional review board and conducted according to the ethical standards of the Declaration of Helsinki.

Initial diagnostic evaluation included endoscopy, esophagography, chest X-ray, CT, and liver function testing. Diagnoses were confirmed by biopsy. Esophageal lesion location was defined according to the American Joint Committee on Cancer, Seventh Edition (24): cervical esophagus, 15–<20 cm from the incisors (upper esophageal sphincter to sternal notch); upper thoracic, 20–25 cm from the incisors (sternal notch to azygous vein); middle thoracic, 25–<30 cm from the incisors (azygous vein to inferior pulmonary vein); and lower thoracic, 30–40 cm (inferior pulmonary vein to esophagogastric junction).

Patients, who were previously submitted to EBRT with or without CHT and, at least, 1 month after, presented with residual disease and persistent dysphagia, were given HDRB as palliative treatment. Patients with tumors extending to the level of the cardia and those with cervical esophageal lesions were also included.

The exclusion criteria were a priori esophageal fistula or stenosis, which could not be bypassed. Twenty-two patients without post-treatment dysphagia classifications and 1 patient without pretreatment dysphagia classifications were excluded solely from the dysphagia analysis. Therefore, analyses outside the dysphagia scores involved 115 patients, whereas the dysphagia score analyses involved 92 patients.

The procedure was performed under general anesthesia or deep sedation. Catheter insertion and fixation were performed through a flexible endoscopy tube, with guide-wire dilation of the stricture if necessary to allow tube insertion. Tumor was measured by endoscopy, and proximal and distal margins were marked by a surgical clip. Frontal and lateral radiographs of the patient in the treatment position were obtained and digitalized in the BrachyVision planning system (Varian Medical Systems, Palo Alto, CA) after inactive dummy sources had been inserted into the catheters. Dwell positions and times were adjusted to optimize the dose distribution, and the catheter was connected to a Gammamed afterloading device (Varian Medical Systems). Three 500 cGy doses of radiation per fraction were prescribed at 10 mm from the source axis of the applicator (Fig. 1).

The average length of lesions treated with HDRB was 6 (4–9) cm, and the mean catheter active length was 10 (8–13) cm.

HDRB was performed using a total of 330 insertions with iridium-192, which has a half-life of 74.02 days and a 10-Ci rate of yield. The treated volume was determined by the extent of the disease, as measured by upper digestive endoscopy, with 2-cm proximal and distal margins based on previous published reports (17, 25–27). The mean duration of the procedure was 23 (18–28) min, including the radiography image acquisition.

Endoscopies were carried out 1 month after treatment, as a routine, or more frequently, when patients' symptoms worsened to evaluate treatment response.

We classified dysphagia according to the type of food patients were able to swallow as absent (0), solid (1), pasty

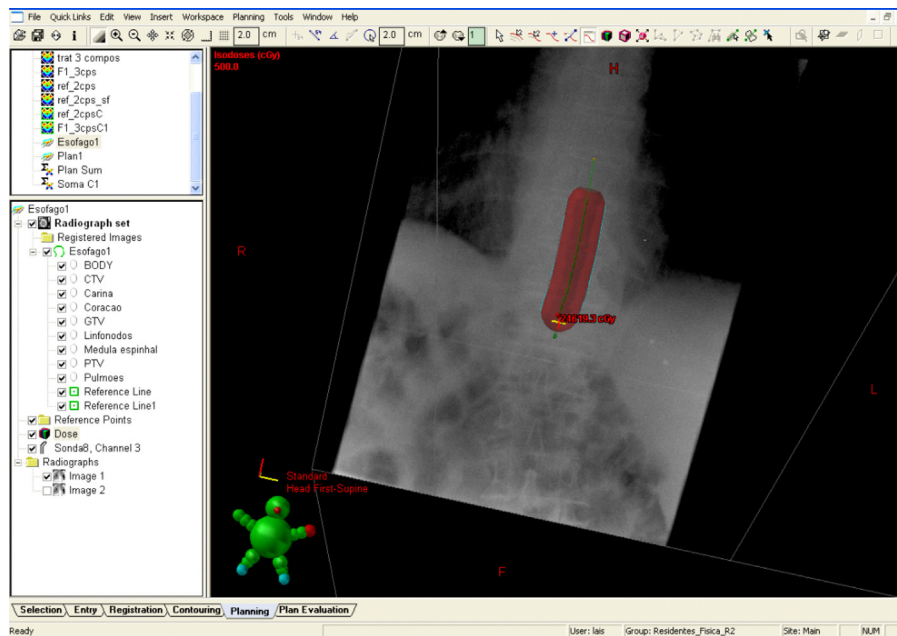


Fig. 1. Isodose curves in a 52-year-old male patient with lower third esophageal cancer. He was treated to 500 cGy in a total of three fractions per week.

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