

## Swallowing after non-surgical treatment (radiation therapy / radiochemotherapy protocol) of laryngeal cancer

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### Keywords:

deglutition disorders  
laryngeal neoplasms,  
radiotherapy,  
combined modality  
therapy.

### Abstract

Radiation therapy and radiochemotherapy protocols can cause swallowing difficulties.

**Aim:** To evaluate swallowing in patients undergoing radiation therapy and radiochemotherapy protocol only for the treatment of laryngeal tumors.

**Methods:** A prospective study of 20 patients, with a mean age of 62 years, at the end of oncological therapy. Six patients (30%) underwent radiation therapy, and 14 patients (70%) underwent combined therapy. The mean time between treatment and an evaluation of swallowing was 8.5 months. Videofluoroscopy was done to assess the preparatory, oral and pharyngeal phases of swallowing.

**Results:** All patients had only an oral diet. Normal swallowing was present in only 25% of patients. The swallowing videofluoroscopic examination identified the following changes: bolus formation (85%), bolus ejection (60%), oral cavity stasis (55%), changes in the onset of the pharyngeal phase (100%), decreased laryngeal elevation (65%), and hypopharyngeal stasis (80%). Laryngeal penetration was observed in 25% of the cases; 40% presented tracheal aspiration. The grade of penetration/aspiration was mild in 60% of cases. Aspiration was silent in 35% of patients. Although 75% of patients had dysphagia, only 25% complained of swallowing difficulties.

**Conclusion:** Patients with laryngeal cancer that underwent radiation therapy/combined treatment can present changes in all swallowing phases, or may be asymptomatic.

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Paper submitted to the BJORL-SGP (Publishing Management System – Brazilian Journal of Otorhinolaryngology) on February 22, 2010; and accepted on May 18, 2010. cod. 6940

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## INTRODUCTION

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Treatment for initial or advanced head and neck tumors may include radiotherapy alone or associated with surgery and chemotherapy.<sup>1</sup> The main purpose of non-surgical oncologic therapy is to preserve breathing, swallowing and communication functions.<sup>2,3</sup>

A current debate is the impact of this type of therapy on laryngeal function and quality of life, since treatment may cause malnutrition, dehydration, weight loss, pain, dysphonia, dysphagia and ototoxicity.<sup>4</sup> Radiotherapy alone may cause several dysfunctions in different degrees, such as: xerostomy, odynophagia, weight loss, and a need for alternative feeding routes.<sup>5</sup>

Disordered swallowing affects feeding efficiency and safety; regardless of severity, the quality of life and several lifestyle aspects may be compromised.<sup>6</sup>

Late functional results were analyzed based on videofluoroscopy swallow studies of 31 subjects after the end of combined radiotherapy and chemotherapy. None of these patients had been treated with swallowing therapy at the time of evaluation. Diagnoses were made of the preparatory, oral, and pharyngeal phases of swallowing. Swallowing was considered functional in 35.5% of patients; mild to moderate dysphagia was found in 54.8% of the sample, and severe dysphagia was encountered in 9.6% of patients.<sup>7</sup>

The impact of chemoradiotherapy on swallowing, nutrition and quality of life of 59 patients was assessed. Of these, 23 patients underwent a videofluoroscopy swallow study 3.5 months after the end of chemoradiotherapy. Tracheal aspiration was found in 78% of these patients, 35% of which were silent.<sup>8</sup>

Another study assessed the severity of aspiration in 63 patients after radiotherapy and chemotherapy and found that 59% had aspiration, of which 33% were severe cases. These authors also noted a 9.5% death rate in patients that presented pneumonia.<sup>9</sup>

Still another paper evaluated 26 patients after intensity-modulated chemoradiation therapy at three moments: immediately after, three months after, and 12 months after the treatment. The authors found decreased tongue retraction, uncoordinated swallowing, decreased laryngeal elevation and closure, inversion of the epiglottis, increased pharyngeal transit time, and silent aspiration.<sup>10</sup>

Some studies have found significant worsening of some videofluorographic swallow study parameters three and 12 months after the end of therapy.<sup>11,12</sup>

An understanding of the functional results of swallowing is necessary. Thus, the purpose of this study was to characterize swallowing in patients with laryngeal tumors treated with radiotherapy only or combined with chemotherapy by using videofluoroscopic swallow studies.

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## MATERIAL AND METHOD

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A prospective study was made of 20 patients with laryngeal tumors who had been treated with radiotherapy alone or combined with chemotherapy at a Head & Neck Unit of an institution. Patients were enrolled based on the following inclusion criteria: patients having undergone radiotherapy only or combined with chemotherapy for the treatment of laryngeal tumors; at least a two-month interval after the end of oncologic therapy; signing a free informed consent form to participate. The exclusion criteria were: active disease; having had head and neck surgery; a history of neurological conditions. These factors could themselves alter swallowing. All patients underwent a videofluoroscopic swallow study.

A Philips, Chalanger® N 800 HF model radiology equipment was used to characterize swallowing. The exam consisted of analyzing the swallowing process from the lateral and anterior-posterior views while the patient swallowed 20 ml of liquid, 20 ml of a semi-liquid product, 15 ml of a semi-solid product, and part of a cookie. The events of the preparatory and oral phases were assessed: formation of the bolus, mobility of phonoarticulatory organs, ejection of the bolus, stasis in the oral cavity; contact between the tongue and the palate; identifying the site of the beginning of the pharyngeal phase of swallowing; and the pharyngeal phase (elevation of the larynx, stasis in the oropharynx and in the hypopharynx). The tests were based on the penetration and aspiration scale proposed by Rosenbek et al.<sup>13</sup> (Table 1) and classified according to the severity of dysphagia scale proposed by O'Neil et al.<sup>14</sup> (Table 2). The tests were shown three times and evaluated by consensus between three speech therapists with at least three years experience in interpreting videofluoroscopic swallow studies of treated oncologic patients. The statistical analysis consisted of a frequency distribution and central tendency and variability measures for numerical values.

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## RESULTS

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The study sample comprised 20 patients with a mean age of 62 years, all of which had undergone treatment for laryngeal tumors. Six of these (30%) were treated with radiotherapy alone, and 14 patients (70%) were treated with chemoradiotherapy. The mean time between medical treatment and the phonoaudiological assessment was 8.5 months. Initial tumors (T1 and T2) were found in 55% of patients, and advanced (T3 and T4) tumors were present in 45% of cases; 75% were classified as N0. The time elapsed between the end of oncologic treatment and testing for this study ranged from 2 to 60 months (Table 3).

Table 4 shows the classification of dysphagia results.

All patients had exclusively oral diets at the time of the swallow study. Table 5 presents the findings of the videofluoroscopic swallow studies, showing that 80% of

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