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Scientific Article

Quantitative clinical outcomes of therapy for head and neck lymphedema

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Abstract

Purpose: Head and neck surgery and radiation cause tissue fibrosis that leads to functional limitations and lymphedema. The objective of this study was to determine whether lymphedema therapy after surgery and radiation for head and neck cancer decreases neck circumference, increases cervical range of motion, and improves pain scores.

Methods and materials: A retrospective review of all patients with squamous cell carcinoma of the oral cavity, oropharynx, or larynx who were treated with high-dose radiation therapy at a single center between 2011 and 2012 was performed. Patients received definitive or postoperative radiation for squamous cell carcinoma of the oral cavity, oropharynx, or larynx. Patients were referred to a single, certified, lymphedema therapist with specialty training in head and neck cancer after completion of radiation treatment and healing of acute toxicity (typically 1-3 months). Patients underwent at least 3 months of manual lymphatic decongestion and skilled fibrotic techniques. Circumferential neck measurements and cervical range of motion were measured clinically at 1, 3, 6, 9, and 12 months after completion of radiation therapy. Pain scores were also recorded.

Results: Thirty-four consecutive patients were eligible and underwent a median of 6 months of lymphedema therapy (Range, 3-12 months). Clinically measured total neck circumference decreased in all patients with 1 month of treatment. Cervical rotation increased by 30.2% on the left and 27.9% on the right at 1 month and continued to improve up to 44.6% and 55.3%, respectively, at 12 months. Patients undergoing therapy had improved pain scores from 4.3 at baseline to 2.0 after 1 month.

Conclusions: Lymphedema therapy is associated with objective improvements in range of motion, neck circumference, and pain scores in the majority of patients.

Conflicts of interest: The authors have no conflicts of interest to disclose.

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Introduction

Aggressive multimodality treatment has improved survival in patients with head and neck cancer but at the cost of increased treatment-related complications.[1,2] The number of long-term survivors after treatment for head and neck cancer is expected to increase with improved cure rates in the era of human papilloma virus-related oropharynx cancers.[3,4] More investigations are necessary to find ways to reduce the impact of acute and long-term complications in these cancer survivors. A recent study showed that 75% of patients with head and neck cancer had some form of lymphedema ≥3 months after completion of treatment.[5] Llymphedema presence that persists in the early post-treatment period can lead to impaired swallowing, neck fibrosis, pain, decreased range of motion, negative body image, and social isolation.[6-9] Improved management of lymphedema during the early months after treatment provides an opportunity to enhance the quality of life in head and neck cancer survivors.

The mechanism of lymphedema after treatment is believed to be the disruption of lymphatic drainage by surgery and/or radiation therapy (RT).[10] When lymphatic structures in the head and neck are damaged, lymphatic fluid accumulates in the interstitial space and activates an inflammatory response, which results in fibrosis and worsening of the lymphatic function.[11-13] Both internal and external structures are affected, which compromises function and quality of life.[14,15] Lymphedema therapy performed post-treatment by a trained, lymphedema, occupational therapist may reduce complications that arise from chronic lymphedema.[16] Early studies of lymphedema therapy report a reduced symptom burden.[16-18] In the present study, we evaluate the quantitative effect of lymphedema therapy in patients with head and neck cancer using clinical data.

Methods and materials

Patient population

A retrospective review of all patients with squamous cell carcinoma of the oral cavity, oropharynx, or larynx who were treated with high dose RT at a single medical center between 2011 and 2012 was performed. Eligible patients received either definitive or postoperative radiation that targeted the primary site and drained lymphatics with or without chemotherapy. Patients with recurrent or persistent disease were excluded as well as patients with active radiation dermatitis, recurrent stroke or transient ischemic attack, or renal insufficiency. Patient characteristics including weight, smoking status, subjective pain score using the Wong-Baker FACES pain rating scale, duration of percutaneous endoscopic gastrostomy (PEG) tube use, and use of lymphedema therapy were collected.

Clinical assessment of lymphedema

Thirty-four patients were referred to a single, certified, lymphedema therapist with specialty training in head and neck cancer by the radiation oncologist after completion of radiation treatment and healing of acute toxicity (typically 1-3 months). Patients were referred early in their course of recovery because they were deemed high risk. Although formal baseline MD Anderson or Foldi lymphedema assessments were not recorded, these patients typically have MD Anderson 1a (soft nonpitting edema) or 1b (reversible pitting edema) lymphedema.[19] Patients underwent at least 3 months of manual lymphatic decongestion and skilled fibrotic techniques (Range, 3-12 months; median: 6 months).

Complete decongestive therapy was done by a single, hospital-based, occupational therapist/Lymphology Association of North America-certified lymphatic therapist with specialty training in treatment for head and neck lymphedema. The complete decongestive therapy program includes manual lymphatic decongestion per anterior and posterior pathways (dependent on the presentation of the head and neck congested areas), head and neck compression, skin care education, neck range of motion, and skilled techniques to decrease fibrosis, decrease pain, and increase range of motion. Manual lymphatic decongestion for the patient was conducted by using anterior and posterior sequences. The completion of therapy was determined either by durable long-term improvement confirmed by the lymphedema therapist or by patient choice and compliance.

Patients who underwent lymphedema therapy were assessed at the beginning and end of treatment as well as at various monthly intervals. Superior, middle, and inferior circumferential neck measurements were taken using the MD Anderson Cancer Center Head and Neck Tape Measurement Protocol. Cervical range of motion was measured using a goniometer as the number of degrees the patient was able to rotate to the left and right from midline. Changes were calculated from the beginning to the last date of treatment. Pain scores using a visual analogue scale of 0 to 10 were assessed as part of routine clinical management and obtained from patients' charts. The institutional review board approved the retrospective review of the results.

Statistical analysis

Patient characteristics and outcome measures were summarized by mean and standard deviation (SD) or quartiles for continuous variables and by frequency count and percent for categorical variables. For outcome measures of total circumference and cervical motion (left and right), percent changes were computed for each follow-up time point using the baseline (approximately 1 month post-RT) measures as denominators. Outcome measures of total circumference, cervical motion (left and right), and pain scores (Range, 0-10) were analyzed by mixed-effects models with weight