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CLINICAL INVESTIGATION **Lung**

VARIATIONS IN TARGET VOLUME DEFINITION FOR POSTOPERATIVE RADIOTHERAPY IN STAGE III NON–SMALL-CELL LUNG CANCER: ANALYSIS OF AN INTERNATIONAL CONTOURING STUDY

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Purpose: Postoperative radiotherapy (PORT) in patients with completely resected non–small-cell lung cancer with mediastinal involvement is controversial because of the failure of earlier trials to demonstrate a survival benefit. Improved techniques may reduce toxicity, but the treatment fields used in routine practice have not been well studied. We studied routine target volumes used by international experts and evaluated the impact of a contouring protocol developed for a new prospective study, the Lung Adjuvant Radiotherapy Trial (Lung ART).

Methods and Materials: Seventeen thoracic radiation oncologists were invited to contour their routine clinical target volumes (CTV) for 2 representative patients using a validated CD-ROM–based contouring program. Subsequently, the Lung ART study protocol was provided, and both cases were contoured again. Variations in target volumes and their dosimetric impact were analyzed.

Results: Routine CTVs were received for each case from 10 clinicians, whereas six provided both routine and protocol CTVs for each case. Routine CTVs varied up to threefold between clinicians, but use of the Lung ART protocol significantly decreased variations. Routine CTVs in a postlobectomy patient resulted in V_{20} values ranging from 12.7% to 54.0%, and Lung ART protocol CTVs resulted in values of 20.6% to 29.2%. Similar results were seen for other toxicity parameters and in the postpneumectomy patient. With the exception of upper paratracheal nodes, protocol contouring improved coverage of the required nodal stations.

Conclusion: Even among experts, significant interclinician variations are observed in PORT fields. Inasmuch as contouring variations can confound the interpretation of PORT results, mandatory quality assurance procedures have been incorporated into the current Lung ART study. © **2010 Elsevier Inc.**

Non–small-cell lung cancer, Resection, Postoperative radiotherapy, Target volumes, Interobserver variability.

INTRODUCTION

The role of postoperative radiotherapy (PORT) in patients with completely resected non–small-cell lung cancer is still controversial. Despite increasing local control rates (1–3), a large meta-analysis has shown a detrimental impact of PORT on overall survival, particularly in patients with no mediastinal involvement (4). However, the meta-analysis has been criticized because the studies included may have led to higher morbidity and mortality rates resulting from the use of two-dimensional radiotherapy techniques, high doses and fraction sizes, and large-field radiotherapy that incorporated the entire mediastinum using suboptimal radiotherapy techniques and lacking modern verification procedures or trial quality assurance (QA) (5–7).

Recently, data from the Surveillance, Epidemiology, and End Results (SEER) database and an unplanned subgroup analysis of a Phase III trial suggested that PORT using more recent techniques may improve survival in patients with resected N2 disease (8, 9). This has renewed interest in evaluating PORT in this patient category. A new international Phase

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