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## Dosimetric benefits of intensity-modulated radiotherapy combined with the deep-inspiration breath-hold technique in patients with mediastinal Hodgkin's lymphoma.

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### PURPOSE:

To assess the additional benefits of using the deep-inspiration breath-hold (DIBH) technique with intensity-modulated radiotherapy (IMRT) in terms of the protection of organs at risk for patients with mediastinal Hodgkin's disease.

### METHODS AND MATERIALS:

Patients with early-stage Hodgkin's lymphoma with mediastinal involvement were entered into the study. Two simulation computed tomography scans were performed for each patient: one using the free-breathing (FB) technique and the other using the DIBH technique with a dedicated spirometer. The clinical target volume, planning target volume (PTV), and organs at risk were determined on both computed tomography scans according to the guidelines of the European Organization for Research and Treatment of Cancer. In both cases, 30 Gy in 15 fractions was prescribed. The dosimetric parameters retrieved for the statistical analysis were PTV coverage, mean heart dose, mean coronary artery dose, mean lung dose, and lung V20.

### RESULTS:

There were no significant differences in PTV coverage between the two techniques (FB vs. DIBH). The mean doses delivered to the coronary arteries, heart, and lungs were significantly reduced by 15% to 20% using DIBH compared with FB, and the lung V20 was reduced by almost one third. The dose reduction to organs at risk was greater for masses in the upper part of the mediastinum. IMRT with DIBH was partially implemented in 1 patient. This combination will be extended to other patients in the near future.

### CONCLUSIONS:

Radiation exposure of the coronary arteries, heart, and lungs in patients with mediastinal Hodgkin's lymphoma was greatly reduced using DIBH with IMRT. The greatest benefit was obtained for tumors in the upper part of the mediastinum. The possibility of a wider use in clinical practice is currently under investigation in our department.