

**Purpose:**

To propose a new technique, noncoplanar intensity-modulated radiation therapy (Nonco\_IMRT), for young female patients with mediastinal lymphoma, and to evaluate its dosimetric features.

**Methods:**

We used to adopt a coplanar IMRT technique (Co\_IMRT) to treat patients with mediastinal lymphoma. Typically it has 7 equal-spaced beams starting from gantry angle of  $206^{\circ}$ . Large volume of lungs were irradiated, and also bilateral breasts if the patient were female. Recently, we switched to apply Nonco\_IMRT technique which use 2 noncoplanr beams in sagital plane (couch angle  $90^{\circ}$ , collimator angle  $90^{\circ}$ , gantry angle  $330^{\circ}$  and  $30^{\circ}$ ) replace the 2 beams of Co\_IMRT that irradiate breasts and lungs directly. Nonco\_IMRT was compared against Co\_IMRT through a planning comparison study of 15 young female patients. PTV coverage and OAR dose parameters were analyzed.

**Results:**

For all patients, the PTV coverage, heart V30 and spinal cord dose were approximately equal between two techniques ( $P>0.05$ ). But the mean dose and low dose region of bilateral breasts and lungs significantly decreased in noncoplanar IMRT ( $P<0.05$ ). The reduction of the breast V2.5 and lung V5 was 33.1% and 9.28%, respectively.

**Conclusions:**

Compared to conventional Co\_IMRT, Nonco\_IMRT significantly reduces dose to breasts and lungs, and consequently reduces the possibility of breast second cancer and pulmonary toxicity. Besides young female patients, Nonco\_IMRT can benefit other mediastinal lymphoma patients as well.