

AbstractID: 8366 Title: Estimation of organ doses in total body irradiation

Purpose: To estimate the lung and other critical organ doses of the patients in total body irradiation before bone marrow transplant which is a general protocol for curing leukemia. **Method and Materials:** Total body irradiation was performed using the photo beam produced by the linear accelerator in the conditions of 415 cm source-to-surface distance (SSD), 40×40 cm² field size and 15 MV beam energy in parallel opposed irradiation in this work. A Rando phantom, a diode detector and thermoluminescent dosimeter (TLD) chips were selected to perform the dose investigation. The diode detector has small volume, and can provide real-time reading and high accuracy. TLD chips were placed inside the Rando phantom to get the dose distributions along the longitude of the phantom and the critical organs suggested by the ICRP-60 report. In the meantime, a diode detector and TLD chips were also placed at the entrance surface point to evaluate the dose conversion factors for the critical organs to the entrance surface dose (ESD). **Results:** The doses of upper mediastinum lung in the Rando phantom are about 20 % higher than the prescribed doses at the center in field. The doses of thyroids, gonad glands and eyes are lower than prescribed doses. The organ-dose conversion factors for the critical organs to the entrance surface dose were evaluated. **Conclusion:** The increased doses of lung should be considered in clinical practice. The organ-dose conversion factors established in this work can be used to estimate the critical organ doses, by means of measuring only the entrance surface dose of the patient in clinical irradiation. The diode detector is accurate and convenient to be used in the evaluation of real-time ESD of the patient in the clinical total body irradiation.