200. Testing a new positioning system for external beam radiotherapy

C. Oliviero [a], V. D'Avino [b], M. Conson [c], R. Pacelli [c], N. Franza [d], S. Clemente [a]

Purpose

The aim of this work was to investigate the feasibility of using a new positioning system (Manufacturer TOTIM – Totally Immobile) for patients' set-up.

Methods

The device consists of a sealed cushion with external cover in microfiber polyester containing a bag filled with two separate reagents mixed by hands during usage. These reagents develop an exothermic reaction producing polyurethane foam, which can be modelled around the patient's body. The beam's attenuation was investigated using a Varian TrueBeam STx linear accelerator, equipped with 120HD MLC for different photon beams energies. We tested two different cushions: the TOTIM T30002 Jolly and the TOTIM T30006 Limb model. The measurements were performed using a water equivalent phantom, with a IBA Dosimetry Farmer ionization chamber Type FC65-P positioned at isocenter, SSD=95cm and gantry angle at 180 degrees, the field size was defined at $10 \times 10 cm^2$. Measurements were performed also with the Delta4 Phantom+ (ScandiDos, Uppsala, Sweden) in two different set-ups: with and without TOTIM T30006 Limb cushion to evaluate the attenuation in a quality assurance (QA) specific patient. The temperature values during the exothermic process at 60s intervals were monitored too.

Results

During the exothermic reaction, an observed maximum of temperature (around 50° at 300s) comes before the solidification process, after that the temperature starts to decrease asymptotically (Fig. 1). The attenuation factor for both cushions was about 1%. The median dose deviation between measured and calculated dose using Delta4 Phantom+ was about 1.3%.

Conclusion

The easy use and the stability of solidification, the low absorption value make TOTIM devices an useful system of patient's immobilization.