Verification of IMRT treatment of prostate cancer
M. Ciudad Rivas¹, C. Padilla Vaz², A. Ribalta Poyatos²
¹ Clínica Puerta de Hierro, Radiofísica y protección Radiológica, Spain
² Clínica Puerta de Hierro, Radiofísica y protección Radiológica, Spain

Introduction. New treatment techniques based on intensity modulated (IMRT) improve the conformation of the dose distribution to the target volume, minimizing the absorbed dose in the organs at risk. Due to the complexity of these techniques, a pretreatment patient-specific quality control is necessary.

Purpose. To implement a quality control procedure to ensure the agreement between the planned and the delivered treatment.

Materials and methods. In our company, there are available 2 Varian Clinac 21EX accelerators and 1 Xio (Elekta) treatment planning system (TPS). To verify the absorbed dose, the treatment plan is calculated based on computed tomography (CT) images of the phantom I´mRT (Scanditronix-Wellhofer). After irradiating the treatment plan on the phantom, the measured dose at the isocenter is compared with the calculated dose from TPS using a 3D ionization camera PinPoint 0016 cc (PTW31016). A portal imaging device, EPID, (Portal Vision AS1000) is used to check the dose distribution. The treatment plan is calculated on the CT of the EPID and an integrated image of each beam is obtained. The correspondence between the pixel values and the dose is known by prior calibration of the EPID. Comparison between the measured dose distribution and the dose calculated from TPS is made with the software OmniPro I´mRT (IbaDosimetry).

Results. The discrepancy between the dose measured by ionization chamber and the calculated dose should be less than ±3% for the acceptance of the treatment. The dosimetric distributions were evaluated using gamma analysis. Treatments are only accepted with gamma test results (3%, 3 mm) <1 higher than 95%.

Conclusions. The procedure used for treatment verification has proved to be accurate, fast and simple. Moreover, EPID-based dosimetry allows immediate analysis of the results and presents the additional advantage of allowing separate evaluation of each beam’s dose distribution.

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Verification of positioning using a new immobilisation system for craniospinal paediatric treatment
B. Meira Montenegro¹, A. Alfaya Virzi¹, A. Lamas Lorenzo¹, L. Pereira Ferradas¹, M. Mera Iglesias¹, D. Aramburu Nuñez¹, M. Salgado Fernandez¹, M. Hernandez Herrera¹, V. Muñoz Garzon²
¹ Hospital do Meixoeiro, Radioterapia, Spain
² Hospital do Meixoeiro, Radiofísica, Spain

Introduction. Craniospinal irradiation for children with neural cancer diseases or carcinomas is a very important technique in paediatric radiotherapy. Treatment in prone position is more appropriate, although requires special immobilisation system adapted for children. The aim of our study is to present a clinical experience of one paediatric treatment using this new immobilisation system and verification of treatment positioning.

Objects. Positioning tracking and verification of union field dosimetric.

Methods. A 3 y.o. patient diagnosed with choroid plexus carcinoma of the left occipital, GRADE III, with complete exerisis, chemotherapy (CPT protocol SIOP 2009). Radiotherapy treatment: prescribed dose, 30.6 Gy, (1.8 Gy/f) with a boost to the PTV up to 54 Gy. Treatment was delivered in a Primus Linac with a spinal posterior beam and two lateral cranial beams, changing every 10 Gy the junction point of the beams to reduce overdoses, opening the spinal field 1 cm and closing cranial to adapt and matching them. A newly designed pediatric immobilizer adaptable for ages 2–15 years (by SIHO) was used to immobilize the patient. Gafchromic® films were used to verify the doses in the overlapping areas, using solid water. Treatment positioning was verify by Exact Trac® (Brainlab).

Results. Differences between measured doses by Gafchormic films and calculated doses by TPS Xio® in junction points were lower than 4%, which decreases to 1.3% of 10 Gy to change the field junction area. With Exac Trac® system movements of the patient are measured in inter-fractions and intra-fraction. The movements of the centre of the tree-ball device are lesser than 1 mm for intrafraction measurements, and lesser than 5 mm for interfraction measurements.

Conclusions. The new immobilisation system allows a reproducible positioning of the patient during the treatment. The combined use of this immobilisation system with the ExacTract monitoring system reduces the intrafraction positioning inaccuracy to 1 mm, as other much more expensive systems.

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Visible light in IGRT: AlingRT
S. Cantera Cabañas, L. Parreño Romeu, F. Perruca Salvador, V. Laguna Molina, R. Martínez San Juan, N. Hidalgo Llopis, P. Calatayud Cuesta
HGUV-ERESA, Oncología Radioterápica, Spain

Introduction and objective. A new system based in structured visible light has been installed in our service that allows to reconstruct the three dimensional patient surface. We want to show how it works and what possibilities offers for patient treatment.

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