Hypofractionated radiotherapy schedule on prostate cancer: Daily timing

C. Torreblanca Gámez[1], M. Pizarro Ariza[2], M. Gutirrez Ruiz[2], R. Poza de Celis[1], M. Veiras Lens[1], A. Alia Ramos[1]
[1] *Hospital Universitario de Álava, Radioterapia, Spain*
[2] *Hospital Universitario de Alava Txagorritxu, Radioterapia, Spain*

Introduction. We began to use hypofractionated radiotherapy schedule in combination with image guided radiation therapy (IGRT) on localized prostate cancer on June of 2012. Daily on-line verification is required when using IGRT to treat the prostate gland, especially when using it to increase the precision and accuracy in radiation delivery on hypofractionated schedules. Daily pre-treatment localization of the prostate gland was performed with Cone Beam CT (CBCT), which allows to locate the PTV under the linear accelerator just before the irradiation, by direct visualization (3D mode soft tissue).
Objective. To measure timing from CBCT start to radiotherapy delivery on a daily basis.
Method. A descriptive, observational, quantitative cross method. Sample: 500 CBCT pre-treatment on 25 patients. Total dose 60 Gy in 20 daily fractions of 3 Gy. Lineal accelerator (LINAC) Sinergy Elekta. Beam Energy: 15 MV. Data gathered from June 2012 to January 2013. Analysis of data using frequency measures and measures of central tendency. Confidence level: 95%. Excel Program.
Results. Preliminary data. Average patient positioning and CBCT timing: 7 min and 20 s Average treatment timing: 6 min and 10 s Average total fraction timing: 13 min and 30 s.
Conclusion. Because of there are no references in the related bibliography, we suggest to carry on further studies in order to set a reference baseline. Despite the increased time it takes to perform a daily CBCT, we consider this absolutely necessary given the benefit shown on the hypofractionated schedule: LINAC usage optimization, increases safety and patient comfort.

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IMRT radiosurgery technique: Treatment verification

C. Padilla Vaz, A. Ribalta Poyatos, A. Lloret Gudiña
Clínica Puerta de Hierro, Servicio de Radiofísica y Proteccion Radiológica, Spain

Introduction. The complexity of current IMRT cranial radiosurgery treatments requires that the calculations performed with the planning system must be verified with experimental data from Novalis Brainlab Linac.
Objectives. Assess the geometric and dosimetric viability of a treatment plan. Experimentally verify the agreement between the imparted dose by the linac and the calculated dose by the planning system.
Materials and methods. Novalis Brainlab accelerator. IMRT (Iba Dosimetry) with film allocation. −15 cm × 15 cm EBT2 Radiocromic film. Lucy 3D QA Phantom (Standard Image) Pinpoint 3D Chamber (PTW Freiburg) with electrometer. Omnipro Software. Two methods are employed: Phantom dose distribution verification. The IMRT Iba Dosimetry phantom is loaded with EBT2 Radiochromic film. The phantom center is aligned with the laser reticule in such a way that the radiochromic film is placed in a coronal plane that contains the isocenter. Image processing and analysis is done within Omnipro Software. Absorbed dose at a specific point verification. The Lucy 3D QA Phantom is loaded with the Pinpoint 3D Chamber. The phantom center is aligned with the laser reticule in such a way that the chamber center point matches the isocenter. In both cases the phantoms are irradiated with the patient's treatment fields.
Results. The gamma index-based analysis performed on relative dosimetry results shows a good agreement between the EBT2 film dose distribution and the planning system's calculated dose plane. The absorbed dose dosimetry results also show a good match between measurements and the planning system calculated dose. A field-by-field match is performed for the chamber-measured point dose and a total field sum match is done in the case of the radiochromic film.
Conclusions. These two methods provide a reliable, effective solution for verification of treatment plan calculations. Both methods are also fast and easy to implement, and complement each other.

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IMRT simulation protocol in prostate cancer

A. Blanco Ledo[1], P. Gallego Trigo[2], Y. Morales de La Fuente[2]
[1] *Hospital do Meixoeiro, Oncologia Radioterapia, Spain*
[2] *Hospital do Meixoeiro, Oncologia Radioterapica, Spain*

Introduction. IMRT is a special technique which administers high doses to tumors while avoiding overdosing of organs at risk.
Objective. Detailed description of the steps in the simulation of a IMRT prostate.
Methodology. Own experience with IM and Set up margin during treatment; International and National guidelines and consensus medical Technical/Physics Following protocol CIRCUIT: First visit, Endorectal ultrasound: gold markers, RMN (volumetric), ct-simulation (7-10 days after gold markers placement), Planning, Assessment and plan approval, Quality control physic/dosimetric (DRR from CT images: AP and lateral), Treatment: Clinical Quality Assurance. ct SIMULATION: Fasting for 6 h before, Cleaning Enema TC previous night and morning, Attend one hour before appointment of patient to drink oral contrast (500 ml), Full bladder and rectum empty, Contrast IV, Supine, Triangle in legs, Acquisition: Protocol (pelvis) from L4 to below the minor trochanter. Prostate and vesicles each 2 mm, 5 mm each remaining pelvis, Tattoos: 3 iso and 1 sagittal