Hypofractionated radiotherapy schedule on prostate cancer: Daily timing
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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.


Results. 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
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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 Radiochromic 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
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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 physical/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
reference. SIMULATION: Contouring of organs at risk: Rectum: from rectosigmoid junction to the anal sphincter, bladder: all, penil bulb, small intestine, femora: from head to below the minor trochanter. Merger with volumetric MRI: apex and lateral limits. Contouring treatment volumes: GTV: low risk prostate, GTV: prostate T3b more vesicles, CTV1 or CTVPROS: GTV 0.5 cm if risk of EEC, CTV2 or CTVVES: seminal vesicles: 1 cm proximal if intermediate risk, 2 cm if high risk; CTV3 or CTVGL: pelvic regional nodes. Overlap: volume rectal into the pTV1.

Conclusion. Proper imaging and strict simulation protocol compliance, including contouring for volumes and organs at risk, is a necessary step to achieve the desired quality of IMRT in treatment of prostate cancer.

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On-line verification: Comparison of two imaging systems
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Introduction. Orthogonal electronic portal imaging (EPI) is commonly used to identify and correct inter and intrafraction variability. Image guided radiation therapy (IGRT) is used to correct the intrafraction variability. Objective. To compare two systems of verification for daily patient's treatment.

Method study. Comparative, quantitative, observational and descriptive. SAMPLE: 30 EPI and 30 IGRT pre-treatment for 10 patients (THORAX) and 10 patients (PELVIS) undergoing IGRT from April 2012 to September 2012. Linear Accelerator (LINAC) Sinergy-Elekta. Values are obtained from (X=0, Y=0, Z=0) planification CT. Reference X, Y, Z values have been obtained in LINAC with IGRT and EPI.3D movements are calculated in relation to reference value. Each value measured is in centimeters. Statistic method Fisher–Snedecor with 95% confidence interval.

Results pelvis. IGRT range 0.36–0.96 cm. Average: 0.642 cm. DT 0.199 cm. CI 0.25–1.03 cm. EPI range 0.3–1.02 cm. Average: 0.551 cm. DT 0.198 cm. CI 0.16–0.93 cm. Dependent average comparison: F de Fisher–Snedecor de 1.71 CI 0.24–4.02. No average lack of equality is rejected. THORAX: IGRT range 0.3–0.96 cm. Average: 0.642 cm. DT 0.199 cm. CI 0.25–1.03 cm. EPI range 0.3–1.02 cm. Average: 0.551 cm. DT 0.198 cm. CI 0.16–0.93 cm. Dependent average comparison: F de Fisher–Snedecor de 1.71 CI 0.24–4.02. No average lack of equality is rejected. No significant differences between EPI and XVI variability references. Preliminary data.

Conclusion. In our study we do not find significant differences between both verification systems. Although because of the small samples a bias may exist so further studies with higher samples are recommended.

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Patients’ evaluation of the radiation oncology department
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Objectives. The aim of this work is to know the patients’ level of satisfaction regarding the Radiation Oncology Department of our Centre, with the aim of improving our service.

Material and methods. A satisfaction survey has been handed out to a total of 69 patients (46% men and 54% women) receiving radiotherapy treatment at the time of writing this work. In every question, patients were asked to answer with Good, Bad or Don’t know. The questionnaire contains different sections, some considering aspects of the Radiation Oncology Department and others regarding the Radiotherapy Technicians.

Results. The results concerning the Radiation Oncology Department are the following: (1) Radiation Oncology Department signposting: 65% Good, 33.77% Bad. (2) Waiting room: 71.02% Good, 28.93% Bad. (3) Treatment room (linear accelerator): 95.67% Good, 4.3% Bad. Regarding the Radiotherapy Technician staff: (1) Simulation CT Technician: 90.60% Good, 9.40% Bad. (2) Treatment Technician: 84.38% Good, 15.62% Bad. (3) In case of machine failure: 61.30% Good, 12.97% Bad, 25.60% Don’t know. (4) Overall impression: 100% Good. 5. Suggestions: all patients suggest punctuality should be improved. In a global assessment, an 81% of the patients is satisfied and a 15% expresses dissatisfaction.

Conclusions. Most patients have shown a high level of satisfaction concerning the Radiation Oncology Department and its personnel. A considerable percentage of patients expressed dissatisfaction with the waiting time or lack of punctuality.

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