expectantly protected by the PRV volume with D1cc dose difference compared to PCT - 6.0% and 3.9% at +/- 1 degree respectively. SC dose difference increases to -17.9% and 10.3% at +/-3 degrees respectively, with directional dependence evident. Such directional dependence and protective influence of the PRV was evident for other OAR, too (Figure 1b).

Conclusions: Choice and combination of automatch functions is clinically relevant to the quantification of both translational and rotational displacements. Simulated rotations had a greater dosimetric impact on OAR dose received compared to PTV dose distribution. Isocenter placement may have a significant contribution to this finding as distal volumes (such as brain stem and spinal cord) were noted to receive greater variation. These findings should be considered when prospectively developing a rotational management strategy for this cohort of patients.

PD-0577
Motion and margins for pelvic nodes for different IGRT strategies in high-risk prostate cancer
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Purpose/Objective: Inclusion of pelvic lymph nodes (LN) in the clinical target volume for high-risk prostate cancer might be beneficial. Detailed knowledge about the mobility of these nodes and the margins that should be applied are, however, currently lacking. The objectives of this study are to quantify movement of prostate and LN, to determine their correlations, and define adequate margins for two often used image guided radiotherapy (IGRT) strategies.

Materials and Methods: For 19 patients a planning CT scan and on average 11 repeat CT scans, evenly distributed over the radiotherapy course, were analyzed. One observer delineated, on all planning CT scans, masks around the prostate and left and right seminal vesicles (SV) and four masks, at two levels, left and right, around the internal iliac and external iliac arteries. After an automatic registration (translation and rotation) of repeat CT scans on planning CT for each mask, motion was quantified in the center of mass of each structure. Registrations were checked visually and failed registrations (~5%) were manually corrected. Mean and standard deviations for all regions were calculated per patient and for the whole group, systematic (S) and random (r) errors were derived. The motion statistics of all structures assuming two different correction protocols, based on bony anatomy and based on the prostate, were compared. Spearman correlations of the movements of all structures were determined.

Results: Random and systematic errors for each region separately are plotted (Fig.). Outliers in the LN regions due to extreme bladder filling or gas in the small bowel (0.3% of the total number of registrations, motion 5-12 mm) were excluded. When correcting on prostate position, random and systematic errors of the LN are relatively large in superior-inferior (SI) and anterior-posterior (AP) direction (~2 mm SD). The SV error is then relatively small (~1.5 mm SD). When using a correction strategy on bony anatomy, the LN errors were smaller (~1 mm SD), while prostate and SV errors were larger (~2 mm SD). The AP and SI movements of all neighboring structures were moderately correlated (0.25 < R < 0.45) when correcting on bony anatomy. To establish proper safety margins, a simulation of the correlated motion was performed. For the bone protocol, adequate LN margins are 2, 3, 2 mm (LR, SI, AP), while for the prostate protocol they are 2, 5, 5 mm, not taking delineation uncertainty into account.

Conclusions: Motion of lymph node regions was successfully evaluated using repeat CT data. An IGRT protocol on bony anatomy requires the smallest LN margins, but larger prostate and SV margins. Setup correction on the prostate requires large LN margins, so both correction strategies are suboptimal. A combination of a bony setup procedure with adaptive RT to reduce prostate and SV uncertainties might be a good alternative.

PD-0578
Feasibility of expiration breath hold for irradiation of abdominal lesions
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Purpose/Objective: Irradiation of tumors and metastases in the abdomen, often comes with large CTV-PTV margins and therefore overlap with OARs adjacent to the lesion due to respiratory motion. Breath hold, both in inspiration and expiration can help to reduce respiratory motion. Even though the stability of a breath hold strongly depends on the ability of the patient, expiration is generally considered to be more reproducible than inspiration. Our purpose was to design a feasible and adequate treatment in Expiration Breath Hold (EBH) for patients with abdominal lesions.

Materials and Methods: Three patients with metastases in the abdomen were trained to perform a voluntary EBH, in advance of CT scanning. At the time of CT scanning, additional to the regular 4D CT procedure for abdominal lesions, three EBH 3D CT scans were acquired (16 slice GE Discovery 590RT). Breathing motion was monitored using the Real-time Position Management System (RPM, Varian Medical Systems, Palo Alto CA). An in-house developed visual feedback system was available to show the RPM signal to the patient.

The treatment plan consisted of 2 partial arcs (Rapid Arc, Varian) on one of the EBH 3D CT scans. At the linac, the RPM signal during the EBH 3D CT scan used for planning was used as a reference. Two patients were treated in 8 fractions, one was treated in 12 fractions.

Setup at the linac consisted of a PTV-match on a EBH cone-beam CT (CBCT) before the first arc, and this procedure was repeated before the start of the second arc. During beam-on, the reproducibility of the diaphragm and fiducial markers could be verified using 2D kV imaging (Triggered Imaging, Varian Medical Systems, Palo Alto CA). In this study, reproducibility of EBH was derived from the 3D EBH scans and the two setup CBCT’s per fraction.

Results: All three patients were able to repeatedly hold their breath in expiration for 10 to 20 seconds. The reproducibility of the EBH at CT scanning is manually measured as the deviation of the position of the lesion and the diaphragm between three consecutive breath hold, and amounted on average 2mm (max 4mm). Time between these scans was less than 8 minutes.

In 16 of the total of 28 fractions, a shift was performed based on the second CBCT scan, with an average of 2 mm over all translational directions, with a maximum of 6 mm in one direction. Time between these CBCT scans was on average 14 minutes.

Conclusions: The three patients were able to perform an EBH long enough to acquire a 3D CT scan in 1 breath hold. The CBCT scan was acquired in 2 to 3 breath holds, and each of the two treatment arcs could be delivered in 2 or 3 breath holds.

Reproducibility of EBH at the linac could not be quantified separate from intrafractional motion and interobserver variation. The integral measure of EBH reproducibility was less than 6mm for these three patients, which is in line with our standard CTV to PTV margin of 10mm. Nevertheless, these data show that intrafraction verification cannot be omitted.

PD-0579
Professional profile of the RTT by the level of competence in Portugal and its relationship with ESTRO Core Curriculum

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Purpose/Objective: The continuous development and innovations in Radiation Oncology requires well trained and specialized practitioners. Among the multidisciplinary team, the Radiation Therapist (RTT) requires adequate knowledge and skills, to develop clearer and well defined roles, professionalism and clinical competences within the field of practice. The Core Curriculum (CC) defines the essential requirements that a qualified RTT must reach to be able to work as an autonomous and responsible member of the multidisciplinary team, and to promote best practices for a clinical effective and safe Radiotherapy. The purpose of this study was to describe the RTT professional profile by the level of competencies in Portugal and understand its relationship with European recommendations of ESTRO RTT CC.

Materials and Methods: The study was planned as exploratory-descriptive and cross-sectional which included a sample of 25% (71) among ~295 Portuguese RTTs working in the national territory. The data was accessed via web-based online survey which was distributed during May 2014. The questionnaire incorporated closed and open-ended questions, divided in four main sections: demographic (1), academic education (2), clinical skills (3) and competence level based on the 3rd CC (4). The evaluation of clinical competences based on CC, was based on a Likert scale from (fully disagree 1) to fully agree (5), on which the ‘not applicable’ (NA) was considered as a ‘no competence level’ or never acquired during academic education or clinical practice.

Results: From the collected questionnaires, 100% of RTT accomplish the minimum educational requirement, BSc (hons) of 4 years dedicated programme in Radiotherapy, which allow work in the national territory. Although RTTs performing specific clinical competences described in the 3rd CC have been scored, on average, above ~4, described on figure 1a, it was seen that a lower proportion of RTTs showed score above 2, mainly for treatment planning (40%) and brachytherapy (9%) (Figure 1b), which were linked with the RTT roles rate at departments of 18% and 4% respectively (fig. not provided).

Figure1.(a) represents the average scores defined clinical competences and (b) the percentage of responses with score above 2.

Conclusions: Despite dedicated programs only for Radiotherapy medical discipline provided by national higher education institutes, competences acquired and performed by portuguese RTTs are mostly depend on departmental organization, role and level of responsibility within each institution.

According to questionnaire results, post-graduation programs are seen as a time consuming and non-profitable due to the