Figure: Boxplot of the bladder volumes for each patient. In the five lipiodol patients we found that the COM of the lipiodol depended on the bladder volume and the location of the lipiodol in the bladder. Based on this correlation we developed a model to predict the position of the lipiodol using the bladder volume. We calculated a margin based on the actual position of the lipiodol, and subsequently we calculated a margin based on the difference between the actual and the predicted position. Table.

<table>
<thead>
<tr>
<th>Actual position</th>
<th>COM/lipiodol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual position</td>
</tr>
<tr>
<td></td>
<td>LR</td>
</tr>
<tr>
<td>mean of means</td>
<td>1.2</td>
</tr>
<tr>
<td>mean stddev</td>
<td>0.4</td>
</tr>
<tr>
<td>Margin</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Conclusion: As confirmed in the literature the full bladder protocol does not result in a stable bladder filling, and the displacement in cranial-anterior direction was the largest. Taking the predicted location of the tumour volume into account in preparing the treatment plans of the day, a considerable reduction in margin is achieved. Therefore, we need daily on-line adaptive treatment to adequately treat the bladder.

PO-1013

Adaptive radiotherapy in prostate cancer patients: concepts for Individualized Radiotherapy (iRT)

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Purpose or Objective: To evaluate interfraction volume changes and dose variations of organs at risk (OAR) and to develop individualized radiotherapy (iRT) concepts with movement compensation. This work analyzes the potential benefit of adaptive planning in patients with prostate carcinoma.

Material and Methods: We analyzed 16 patients with prostate cancer treated with helical IMRT and daily image guidance. Eight patients received radiation after prostatectomy with a total dose of 68 Gy in 34 fractions (group A), and eight a definitive irradiation with a total dose of 76.5 Gy in 34 fractions (group B). OAR rectum and bladder were delineated on daily Megavoltage (MV)CTs. With the Planned Adaptive software by Tomotherapy® (Accuray Inc., Sunnyvale, CA) we performed dose recalculations on the single fractions CTs and compared the summation dose with the original planned dose. Dose variations were analyzed by means of Dmedian, Dmean, Dmax, Dmin, V30, V40, V60, V70, V75, as well as the OAR volume.

Results: Our evaluation is still ongoing. During treatment, rectum volume ranged from 62.223% (A: 62.157%, B: 63.223%) of its initial volume; bladder from 22.375% (A: 30.311%, B: 22.375%). The mean of the Dmean in the rectum was 30.7 Gy and 37.2 Gy in group A and B, respectively; and for the bladder 26.4 Gy and 40.8 Gy. The dose statistics for the rectum was as follows: V30 22.9-20.2%, V40 14.2-20.5%, V60 0.1-46.9%, only for group A: V70 1.0-22.3% and V75 0.7-2.2%. The statistics for the bladder are: V30 15.6-100.0%, V40 10.9-100.0%, V60 3.8-89.8%, only for group A: V70 1.6-28.0%, V75 0.5-19.4%.

Conclusion: For patients with prostate cancer, relevant variations in volume of OAR, such as rectum and bladder, can be observed. Hence, corresponding dose variations occur. Adaptive replanning approaches have the potential to reduce the dose to OAR. However, which concept, e.g. “plan of the day” or fast online recalculation, will be the suitable solution for routine patient treatment needs to be assessed in further evaluations.

PO-1014

Long time follow-up experience after IMRT for anal cancer: clinical outcomes and late toxicities

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Purpose or Objective: To assess outcomes of patients with anal canal cancer treated with Intensity-Modulated Radiation Therapy (IMRT) after a long time follow-up.

Material and Methods: From July 2007 to September 2015, 233 patients were treated by IMRT for anal squamous cell carcinoma. In 2009, Volumetric Modulated Arc Therapy RapidArc (VMAT RA) rapidly became our usual way of radiation for this cancer. Radiotherapy consisted in delivering 45 Gy in 1.8 Gy daily-fractions, 5 days a week, to the primary tumor and the risk area including pelvic and inguinal nodes (PTV1). A second plan of 14.4-20 Gy was administered to the primary tumor (PTV2) in 1.8-2 Gy daily-fractions, also 5 days a week (Image 1), or by pulsed-dose rate interstitial brachytherapy for some T1 and T2. PTV1 and PTV2 were treated continuously without gap and without Simultaneously Integrated Boost (SIB). Concurrent chemotherapy based on 5FU-mitomycin (MMC) or cisplatin was added for locally advanced tumors. Toxicities were evaluated according to the Common Toxicity Criteria for Adverse Events 4.0 scale. The survival estimates and their associated C195% were calculated using the Kaplan-Meier method. We present here the first 166 patients’ outcomes.

Results: Median follow-up was 46.7 months C195% [41.2-51.6]. 124 women (75%) and 42 men (25%) were analysed. Median age was 61 years (range, 36-92). Tumors were classified as stages I, II, III and IV in 13%, 25%, 57% and 4% of the cohort, respectively. 13 patients were immunocompromised, 10 of those were HIV-positive (6%). Radiochemotherapy (RCT) or radiotherapy alone (RT) was delivered in 132 (80%) and 34 (20%) patients, respectively: 104 (79%) MMC, 25 (19%) cisplatin and 3 (2%) other regimens. 21 patients (13%) had the PTV2 treated by brachytherapy. 162 patients (97.6%) were complete responders. 36 patients (21.7%) had a relapse - 20 local (56%) among which were 3 synchronous metastatic failures, 4 locoregional (11%) and 12 metastatic without any local failure (33%). 33 patients (20%) had a colostomy following radiotherapy : 17 (46%) for local relapse, 12 (32%) for radiation toxicity, 3 (8%) for an incomplete response, 1 (2.7%) for tumor complications during RCT. Concerning late toxicities: no grade 4 was observed; grade 3 were diarrhea (1 patient), proctitis (11), vaginal stricture (5), hematuria (1), fecal incontinence (4), chronic radionecrosis (2 patients); 28 cases of grade 2 occurred among those clinical categories. About the hematologic late toxicity, there wasn’t any significative difference between the blood count prior to treatment and the recent one (p=0.23). The 3-year overall survival rate was 85.5% CI95% [78.7-90.3], cancer-specific survival 89.0% CI95% [82.5-93.1], disease-free survival 74.6% CI95% [67-80.8].