Purpose or Objective: To evaluate safety and feasibility of SIB-IMRT with VMAT combined with chemotherapy as exclusive treatment in patients with anal cancer. Early response is a secondary endpoint.

Material and Methods: From November 2010 to June 2015, 16 consecutive patients with histological diagnosis of anal squamous cells carcinoma underwent to chemoradiation in our center. Patients’ characteristics are described in Table 1. Radiation schedule consisted of 52.58 GY in 2-Gy daily fractions to High Risk Volume (HR), 49.95-54 G Y to Intermediate Risk Volume (IR) and 45-48 Gy to Low Risk Volume. Daily dose fraction was around 1.65 and 1.75 for LR and IR respectively. One patient received a radiation boost up to 66 Gy after 60 days from the end of chemoradiation due to a poor objective response. HR, IR and LR delineation was performed according to AIRO guidelines published in 2012 and reviewed in 2014. Organs at Risk (OAR) were: bladder, bilateral femoral heads and small bowel. All treatment plans were obtained with VMAT technique. SIB was calculate by Oncentrica Inverse Planning System. In the first patients was performed a split course radiation schedule to reduce toxicity risk. Target objectives were minimum coverage by 95% isodos and maximum dose of 107% within the volume. OARs’ constraints were those suggested by AIRO guidelines (femoral heads: V5<10%; small bowel V45<195cc; bladder: V60<50%). Median follow-up was 13 months (3-55). Concomitant chemotherapy is described in table 1.

Table 1: Description of patients characteristics and concomitant chemotherapy schedules.

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Age</th>
<th>Range 45-83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>M</td>
<td>12</td>
</tr>
<tr>
<td>Stage (TNM)</td>
<td>T1</td>
<td>I; 5</td>
</tr>
<tr>
<td></td>
<td>IIA</td>
<td>IIA; 4</td>
</tr>
<tr>
<td></td>
<td>IIB</td>
<td>IIB; 2</td>
</tr>
<tr>
<td>Concomitant</td>
<td>Metyomycin/S FU-4</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>Metyomycin/Ketoba 6</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>CDDP/S FU-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SFU; 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mender; 2</td>
<td></td>
</tr>
</tbody>
</table>

Acute Toxicity, according to RTOG criteria, was weekly recorded during radiotherapy course and monthly in the first three months of follow-up.

Results: Target coverage and organ at risk sparing were optimal in all plans (fig1).

Figure 1: Example of treatment plans. Prescription doses were 54 Gy to HR, 49.95-54 Gy to IR and 45-48 Gy to LR. Treatment was delivered in 27 fractions.

During chemoradiation none of patients developed G3 Gastrointestinal toxicity (6 G1; 7 G2) and Genitourinary side effects were extremely rare (1 G1; 1 G2). Skin toxicity was the most important adverse event registered (8 G2; 4 G3). All chemotherapy schedule were well tolerated such the
incidence of hematologic toxicity was low (1 G1; 1G2). Early response evaluated by instrumental re-staging after 3 months from the end of treatment was encouraging, since 8 patients achieved complete response and 8 a partial response. Among the 6 patients with at least 2 years of follow up, 3 patient developed a progression disease (1 local relapse an 2 distant metastasis) and 1 patient died of disease after 3 years from treatment. The patient who underwent to radiation boost after chemoradiation developed anal stenosis which required a permanent colostomy.

Conclusion: SIB with VMAT combined with chemotherapy is quite feasible in anal cancer treatment. It easily allows different doses delivering to target at different risk of disease involvement. Split course schedule has not be more used because of acceptable acute toxicity profile, which was confirmed in conventional fractionation. A larger patient number and a longer follow-up are required to confirm our data.

EP-1308
Effect of prone and supine positions on setup and organ-at-risk sparing using VMAT for rectal cancer
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Purpose or Objective: Radiation treatment for rectal cancer is usually given in the prone position on a belly board with the aim to move the small bowel away from the treatment volume. In practice, this position is sometimes difficult to set up reproducibly and is poorly tolerated for some patients. With the increasing conformity and accuracy of using VMAT and cone beam CT (CBCT), we asked if there was any dosimetric advantage of treating rectal patients prone—it may be that patients can be better treated in the supine orientation. The two aims of this study are 1) to investigate setup reproducibility of rectal cancer patients treated in the prone and supine positions, and 2) to compare dose-volume histogram (DVH) metrics for the bladder and small bowel for both treatment positions.

Material and Methods: Eighteen consecutive patients with rectal cancer who received neoadjuvant chemoradiation were selected for this study. 9 were treated supine and 9 in the prone position. Patients were prescribed a total dose of 50.4 Gy in 1.8 Gy daily fractions according to institutional protocol and planned with a VMAT posterior arc. To determine setup reproducibility, weekly CBCTs were acquired and matched to bone. The CBCT-determined rotational and translational shifts were recorded. Clinically relevant dose-volume histogram values were generated for the small bowel and bladder.

Results: The CBCT-determined rotational setup error ranges for the prone position in pitch, roll, and yaw were [-3.6°, 4.7°], [-4.2°, 3.2°], and [-1.4°, 1.1°] respectively. For the supine position the corresponding ranges were [-4.8°, 2.0°], [-2.4°, 1.3°], and [-1.0°, 3.2°]. 7 patients exhibited >±3° rotational errors in the prone versus only 2 in the supine position, indicating better setup reproducibility in the prone position. Translational errors were generally <±1 cm in all directions for both positions. The small bowel V45 and mean dose for prone were 7.3±9.9% and 16±9.6 Gy (± values represent standard deviations) respectively; for supine the values were 6.8±7.6% and 19.6±6.4 Gy. The bladder V30 and mean dose for prone were 64±14.3% and 36.8±4.1 Gy respectively; for supine, these values were 68.7±18.5% and 37.3±4.1Gy.

Conclusion: There may be increased rotational instability in the prone position, but no apparent dosimetric advantage for small bowel sparing was observed. Rectal cancer patients who undergo neoadjuvant radiation using VMAT and CBCT may not need to be treated prone on a belly board.

EP-1309
Predictive value of FDG-PET in rectal cancer: correlation with tumour characteristics and response
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Purpose or Objective: The present study analyses the correlation of pre-treatment (18)F-fluorodeoxyglucose Positron Emission Tomography/Computed Tomography (FDG-PET/CT) standardized uptake value (SUV) and total lesion glycolysis (TLG) with tumour characteristics and clinical response in a series of rectal cancer patients treated with neoadjuvant chemo-radiotherapy.

Material and Methods: Fifty-six patients were included in the present analysis. Pre-treatment PET maximum SUV (SUVmax), mean SUV and TLG of primary tumour were calculated for each patient. The total dose of pelvic radiotherapy was 45-50.4 Gy, 1.8 Gy/fraction. Chemotherapy was delivered with capecitabina or 5-fluorouracil. Six to eight weeks after RT-CT, 44 patients (78.6%) had anterior rectal resection and 12 patients (21.4%) had abdominal pelvic resection (Miles). Tumor Regression Grade (TRG) (Mandard, 1994) was defined on surgical specimen. Complete regression (TRG1) was observed in 10/56 (17.9%). The correlation between PET/CT results and histopathological data and tumour response was analyzed.

Results: At the level of the primary tumour, SUVmax ranged from 4.17 and 54.06 (mean 22.46, median 18.96), SUV mean ranged from 6.22 and 32.64 (mean 13.42, median 11.09) and TLG ranged from 7.96 and 3158.23 (mean 350.21, median 183.55). SUVmax (p=0.05) and TLG (p=0.002) significantly correlated with T-stage. Median SUVmax was significantly higher (p = 0.05) for lesions with partial response (PR, 46/56, 82.1%) than for lesions with complete response (CR, 34/54, 17.9%). Median TLG was significantly higher (p=0.034) for lesions with partial response (PR, 45/54, 83.3%) than for lesions with complete response (CR, 9/54, 16.7%). SUVmax was not significantly correlated with T-stage (p=0.074). Median SUVmax was higher for lesions with partial response (PR, 45/54, 83.3%) than for lesions with complete response (CR, 9/54, 16.7%) but without statistical significance (p =0.18).

Conclusion: Our data suggest that pre-treatment FDG-PET/CT SUVmax and TLG are strongly associated with tumour primary tumour stage. Furthermore they correlate with prediction of tumour response after neoadjuvant treatment.

EP-1310
PV of FDG-PET SUV in rectal cancer pts: correlation with tumor characteristics/response to neoadj RT

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Purpose or Objective: The present study analyses the correlation of pre-treatment (18)F-fluorodeoxyglucose