prescribed dose (V107) of PTV (p < 0.001), and significant gain in the homogeneity index of PTV (p < 0.001). The mean dose of the thyroid, submandibular gland, and carotid artery were all significantly lower for the FIF technique than wedge technique (p < 0.001), as was the maximum dose of the spinal cord (p < 0.001). The MU was lower for the FIF technique (p < 0.001).

Comparisons of DVGs presented the MU between the FIF technique and wedge technique (mean ± standard deviation):

<table>
<thead>
<tr>
<th>Tissue</th>
<th>FIF</th>
<th>Wedge</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTV V95 (%)</td>
<td>85.81 ± 0.10</td>
<td>85.95 ± 0.41</td>
<td>0.738</td>
</tr>
<tr>
<td>V107 (%)</td>
<td>3.06 ± 2.76</td>
<td>10.55 ± 13.07</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Dose (Gy)</td>
<td>32.45 ± 0.74</td>
<td>33.11 ± 0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MU (%)</td>
<td>84.87 ± 0.57</td>
<td>76.50 ± 10.76</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Results:

**Conclusions:** Compared with the wedge technique, the FIF technique improved dose homogeneity of the PTV, reduced the dose to normal structures, and was associated with fewer MUs in the treatment of patients with unilateral cervical malignant lymphoma.

**EP-1635**

**Comparison of IMRT, three-dimensional conformal and combined planning techniques in lung cancer radiotherapy**

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**Purpose/Objective:** External radiotherapy constitutes essential components of inoperable early and locally advanced lung cancer treatment. Dosages of non-tumor lung tissue located in our treatment volume, esophagus, heart and medullary spinalis (MS) must be adjusted carefully. Intensity-modulated radiotherapy (IMRT)’s place in treatment is controversial due to increasing lung volume which receives low dose in lung cancer radiotherapy. It is supposed that usage of combined radiotherapy technique would decrease lung toxicity, on the other hand, provide opportunity to lower MS and esophagus dosages. In our study, we aimed to compare the dosages that standard tissue and target volumes took in IMRT, three-dimensional radiotherapy (3D CRT) and combined radiotherapy (Anterior-Posterior/Posterior-Anterior +IMRT) planning with patients with lung cancer.

**Materials and Methods:** We planned our study to compare three different radiotherapy techniques used in planning of 13 lung cancer patients (1 in stage 1B, 1 in stage 2A, 1 in stage 2B, 7 in stage 3A, 3 in stage 3A) diagnosed in our clinic. We prepared an IMRT, 3D CRT and combined radiotherapy plan to give our target volume 60 Gy with 2 Gy/fraction day. We identified ipsilateral, contralateral and total lung, heart, esophagus and MS as volumes at risk. We calculated ipsilateral, contralateral, total lung volume (V15, V10, V20, V30, V40; mean lung dose (MLD), maximum dosages of MS and esophagus, volume of heart taking 60 Gy, dosage that 95% of intended target volume takes (PTV95), dosage of the volume which is gained by subtracting PTV volume from total body volume, and we compared the values we had found.

**Results:** It is assigned that PTV95 of 13 patients that we counted in our study were indifferent statistically. Ipsilateral V5, V30, V40 values in IMRT technique, were found lower than combined technique and 3D CRT technique (p<0.05). The lowest value was attained with combined plan technique for ipsilateral V20 value, and it is determined to be different than other two techniques (p<0.05). In contralateral V5, V10, V20 and V30 lung volumes, the lowest values were attained with combined technique (p<0.05). It is found that V5, V10 and V20 values are low in combined plan, V30 and V40 values are low in IMRT technique, and this decline is found to be statistically significant. No differences found in esophagus maximum dosage and heart V60 values. With MLD comparison, it is found that combined technique is superior to IMRT and conformal technique.

**Conclusions:** Dosage, that contralateral, total lung critic volumes and rest of the body volume take with combined plan technique in inoperable early stage and locally advanced lung cancer radiotherapy, decreases compared to IMRT and 3D CRT; dosages of organs at risk such as MS, heart, esophagus can be hold in tolerance limits. Outcomes of our study support the use of combined plan technique in inoperable and locally advanced lung cancer for diminishing side effects.

**EP-1636**

**Feasibility study of the use of SmartAdapt to evaluate the dosimetric impact of organ deformation in prostate case**

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**Purpose/Objective:** In radiotherapy, deformation of rectum and bladder due to intrinsic factors such as faecal content and bladder filling have an impact on the delivered doses to the prostate. Each of these pelvic organs is usually constraint to a lower tolerance dose to avoid undesired adverse side effects. This study evaluates the use of SmartAdapt to analyse the impact of inter-fraction organ deformation on the delivered treatment (74Gy given over 37 fractions).

**Materials and Methods:** 37 cone-beam computed tomography (CBCT) images from a patient who had underwent prostate image-guided radiotherapy (IGRT) were exported to SmartAdapt (Varian Medical Systems, Eclipse™, version 11). Deformable image registration (DIR) was performed using the planning CT (pCT) as the reference image source for dose calculation. A total of 37 individual plans were generated using the deformed CT images. Dose volume histograms (DVHs) from each plan were overlapped to provide a mean dose level.

**Results:** V50 of rectum in the deformed plans ranged from 32.2%-48.8% versus 34.1% in the pCT. Rectum D2cc in the pCT
was 74.2Gy and it ranged from 75.3Gy-77.2Gy in the deformed plans. V65 and V70 of bladder ranged from 7%-28.3% and 5.7%-24.3% versus 13.7% and 11.5% in the pCT respectively. Prostate D98 and D2 were ranged from 75Gy-75.8Gy and 77.2Gy-77.9Gy versus 74.2Gy and 76.2Gy in the pCT. Mean deformed volume of the prostate ranged is 40.6cm³ (35.5-44.4cm³) versus 40.4cm³ in the pCT. Mean centre of mass (COM) shifts of the prostate in the x-y and z directions were -0.02cm, -0.16cm and -0.02cm respectively. Mean mass (COM) shifts of the prostate in the x-y and z directions were increased from 18.9, 32.6, 62.4, 77.8, 94.3 and 100.7 % for 3.5, 3, 2.5, 2, 1.5 and 1 cm separation between targets, respectively, using dynamic jaw mode. It showed that the effectiveness of dose reduction decreased with the decrease in the distance between targets in SI direction. For fixed jaw mode, the corresponding minimum relative dose were increased from 81.9 to 100.8 % for 3.5 to 1 cm separation between targets, respectively.

**Results:** Measured dose distributions using films showed good agreements with those calculated by the TPS. The passing rates of Gamma analysis were higher than 90% for all plans. From Fig. 1, the minimum relative dose within the separation along the SI direction normalized with the prescribed dose were increased from 18.9, 32.6, 62.4, 77.8, 94.3 and 100.7 % for 3.5, 3, 2.5, 2, 1.5 and 1 cm separation between targets, respectively, using dynamic jaw mode. It showed that the effectiveness of dose reduction decreased with the decrease in the distance between targets in SI direction. For fixed jaw mode, the corresponding minimum relative dose were increased from 81.9 to 100.8 % for 3.5 to 1 cm separation between targets, respectively.

**Conclusions:** As rapid dose fall-off at the craniocaudal borders of targets can be achieved using dynamic jaw delivery technique, dose between targets can be reduced significantly compared with fixed jaw delivery. However, it decreased significantly with the decrease in the separation between targets in SI direction.

**EP-1638**

Evaluation of ovary dose using Tomotherapy for childbearing woman with breast cancer

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**Purpose/Objective:** The aim of this study is to evaluate unwanted scattered dose to ovary by scattering and leakage generated from treatment fields of Tomotherapy for childbearing woman with breast cancer.

**Materials and Methods:** The radiation treatments plans for left breast cancer were established using Tomotherapy planning system (Tomotherapy, Inc, USA). They were generated by using helical and direct Tomotherapy methods for comparison. The CT images for the planning were scanned with 2.5 mm slice thickness using anthropomorphic phantom (Alderson-Rando phantom, The Phantom Laboratory, USA). The measurement points for the ovary dose were determined at the points laterally 30 cm apart from mid-point of treatment field of the pelvis. The measurements were repeated five times and averaged using glass dosimeters (1.5 mm diameter and 12 mm of length) equipped with low-energy correction filter. The measures dose values were also converted to Organ Equivalent Dose (OED) by the plateau dose-response model.

**Results:** Scattered doses of ovary which were measured based on two methods of Tomo helical and Tomo direct