Conclusions: SBRT of apically located lung lesions may cause severe neurological symptoms; $D_{\text{mean}}$ and large PTV being risk factors.

PO-0666
Evaluation of image guided radiotherapy (IGRT) in lung cancer. Is weekly cone beam CT (CBCT) enough?
J. Luna Tirado 1, M. Rincón Pérez 1, J.P. Marín Arango 1, S. Gómez-Tejedor Alonso 1, I. Prieto Muñoz 1, J. Olvera Vegas 1, C. Díaz Silvera 1, A.M. Pérez Casas 1
1IDC Salud.FJD, Radiotherapy, Madrid, Spain

Purpose/Objective: To determine if a weekly cone-beam CT (CBCT) is enough to evaluate the entire tumor inclusion and the reproducibility throughout the radiation course treatment in lung cancer.

Materials and Methods: Thirty-six lung cancer patients were treated with image-guided radiotherapy (IGRT) on an Elekta Synergy Beam Modulator linear accelerator. The GTV included the tumor and the positive nodes in PET-CT and pathologic analysis. The PTV was configured with the GTV and a margin of 0.7 cm – 1 cm in all directions. In our protocol of lung cancer treatment, prior to each radiotherapy fraction we make one cone-beam CT every day on the first five days of treatment using automated soft-tissue registration. The positional errors of the reference image in relation to the acquired image (given in terms of translation movements) were obtained. No rotations were permitted. The average of these translational movements in the three axes (x, y, z) was calculated. This average was applied from the sixth day of treatment until the end. In the other 7 patients (19.4%) we obtained a greater difference in either axes, and a CBCT more often than once a week was evaluated by the physician.

Conclusions: Our preliminary results showed that in most lung cancer patients treated with IGRT, once an average is calculated after the first five days of treatment, a weekly cone-beam CT is enough to evaluate the entire tumor inclusion and the reproducibility throughout the radiation treatment.
Cardiac serum biomarker results will not be available for this cohort of patients.

Cardiac MRI is performed on a Siemens 3.0 Tesla scanner. The imaging protocol includes short axis scans of the base, mid and apical positions of the left ventricle and 4-chamber scan, including standard cine scans for anatomy, mass and function.

The cardiac MRI images are registered with the radiotherapy planning CT scan and analysed for the radiotherapy dose to cardiac macrostructures and the left ventricle 17 segment model. The radiotherapy dose will be correlated with cardiac function, measured by cardiac MRI, ECG and cardiac biomarkers.

Results: To date 24 patients have been recruited, 7 were withdrawn due to issues with completion of cardiac MRI scan, and 5 have completed the study.

On treatment radiotherapy physics data has been analysed for 12 of these patients. Maximum radiotherapy dose was highest in the left (mean 4680cGy, 95CI (3711-5649) and right atria (mean 3885cGy, 95CI 2635-5135) compared to the left (mean 2625 cGy, 95CI 1567-3682) and right ventricles (mean 2448 cGy, 95CI 1678-3217) (p=0.005 and p=0.021 respectively).

Furthermore review of the dose to the left ventricular segments, identified areas which received radiation dose in excess of 35Gy.

Cardiac function, measured by cardiac MRI, was significantly affected during radiotherapy. There was a small but significant relative reduction in LVEF compared to baseline (-4.7%, p=0.040). In comparison, right sided cardiac function was more impaired, with a mean relative fall in RVEF of 21.6% (95CI 13.01-30.26, p < 0.0001).

Conclusions: Preliminary evidence suggests an acute effect on right heart function by thoracic radiotherapy in NSCLC. Further analyses will be performed as the data matures.

PO-0668 Stereotactic Body Radiation Therapy (SBRT) for lung metastatic patients with soft tissue sarcoma (STS)

P. Navarra1, A.M. Ascolese1, F. De Rose1, E. Clerici1, C. Franzese1, A. Tozzi1, C. Iftode1, T. Comito1, E. Villa1, S. Tomatis1, G.R. D’Asgostino1, G. Reggiori1, M. Scorsetti1
1Istituto Clinico Humanitas, Radiotherapy and Radiosurgery, Rozzano (Milan), Italy

Purpose/Objective: Patients with soft tissue sarcoma (STS) frequently develop pulmonary metastasis limiting their long-term survival. Lung metastases have historically been treated with surgical resection and/or chemotherapy. Few reports are available in the literature describing the value of stereotactic body radiation therapy (SBRT) as an alternative to surgical treatment. The aim of this study was to evaluate toxicity, rate of local control and survival in lung metastatic STS patients underwent SBRT.

Materials and Methods: From February 2008 to May 2014, 28 patients for 55 lung lesions were treated at our Institution. SBRT was performed in patients with good Performance Status (1-2 ECOG) and unsuitable for surgical resection, with controlled primary tumor and number of lung metastases ≤ 4. All patients were evaluated at multidisciplinary team including thoracic surgeon, medical oncologist and radiation oncologist. According to site and maximum diameter several radiation schedule were used: 30 Gy/1 fr, 60 Gy/3 fr, 60 Gy/8 fr and 48 Gy /4 fr. The plan was generated using Volumetric Modulated Arc Therapy (VMAT). Clinical outcome was evaluated by thoracic and abdominal CT scan before SBRT and than every 3 months. Toxicity was evaluated with CTCAE scale version 4.0.

Results: Leiomyosarcoma (36%), and synovial sarcoma (25%) were the most common histologies. Five patients (18%) initially presented with pulmonary metastasis, whereas 23 (82%) developed them at a median time of 51 months (range 11-311 months ) from the initial diagnosis. The median follow-up time from initial diagnosis was 65 months (range 5-39 months) and from SBRT was 21 months (range 2-80 months). No severe toxicity (grade III-IV) was recorded and no one patients required hospitalisation. The local control rate was 94% (54/55 lesions). At the last follow up 15/28 patients (54%) were alive and 13/28 (46%) died. All patients died for distant progression. The 1, 2 and 3 years Overall Survival was 88%, 57% and 46% respectively.

Conclusions: SBRT provides excellent local control of pulmonary metastasis from STS and a promising influence on survival. SBRT should be considered for all patients with PM and evaluated in a multidisciplinary team. Further investigation is warranted to identify patients that could received benefit from local treatment

PO-0669 External validation of a survival model for stage III NSCLC: focus on similarities or differences?

C. Oberije1, J. Deasy2, Y. Lievens3, J. Belderbos4, K. Vandecasteele5, W. Uytterlinde5, A. Rimner6, E.G.C. Troost1, P. Lambin1
1MAASTRO Clinic, Radiation Oncology, Maastricht, The Netherlands
2Memorial Sloan Kettering Cancer Center, Medical Physics, New York, USA
3University Hospital Ghent, Radiation Oncology, Ghent, Belgium
4NKI, Radiation Oncology, Amsterdam, The Netherlands
5NHI, Thoracic Oncology, Amsterdam, The Netherlands
6Memorial Sloan Kettering Cancer Center, Radiation Oncology, New York, USA

Purpose/Objective: Testing a model on external data indicates generalizability and is seen as a requirement before using a model in daily clinical practice. Although it is of utmost importance, reporting of model performance is generally limited to one number: the Area Under the Curve (AUC) for a dichotomous outcome or the C statistic for time-to-event outcome. However, by focusing on one performance measure, important information is neglected. A more extensive approach could raise new research questions, indicate underlying causes and mechanisms, and highlight differences in diagnostic, treatment or follow-up procedures, between countries and hospitals. We used three external datasets to test a previously developed prediction model for survival of stage III NSCLC in an innovative way.