

patients: 80 males, 62 females, median age 64 (35-83), stage 3A (83 pts) or 3B (59 pts). Patients received 2 cycles of C AUC=5 IV on day 1 and G 1000mg/m² IV on days 1 and 8 every 3 weeks x 2, followed on day 50 by CRT, 60Gy/30 over 6 weeks, concomitantly with P 50mg/m² IV and G 100mg/m² IV on days 1 and 8 every three weeks x 2 cycles.

Results: The median overall survival was 23 months. With a median follow-up of 54 months, the 3, 4 and 5 year overall survival was 37% (38 pts remaining), 27% (21 pts), and 23% (15 pts) respectively. The median and 5 year progression-free survival rates were 11 months and 21% respectively. Rates of acute grade \geq 3 hematological, esophageal and respiratory toxicity were, respectively, 20%, 8% and 7%. Forty-eight patients received further lines of chemotherapy.

Conclusions: The results of the present analysis based on 142 stage 3 NSCLC patients treated with this novel induction chemotherapy approach affirm its favourable toxicity profile without apparent compromise in clinical outcomes. Indeed, although the development of this regimen was motivated by delays to prompt commencement of CRT, the observed outcomes do compare favourably with those associated with immediate concurrent CRT regimens.

EP-1164

Infrastructure to integrate translational research into clinical decision making for patients with lung cancer
J. Moreno Conde¹, J.L. Lopez Guerra², A. Moreno Conde², C.L. Parra Calderon¹, A. Martinez Garcia¹, F. Nuñez Benjumea¹, M.J. Ortiz Gordillo²

¹University Hospital Virgen del Rocío, Group of Technological Innovation, Sevilla, Spain

²University Hospital Virgen del Rocío, Radiation oncology, Sevilla, Spain

Purpose/Objective: Decision Support Systems, based on statistical prediction models, have the potential to change the way medicine is being practiced, but their application is currently hampered by the astonishing lack of impact studies. The main goal of this project aims to develop a scalable infrastructure to integrate translational research into the clinical decision making process in lung cancer.

Materials and Methods: To develop this infrastructure, it was decided to use an integration based on free software tools. Among them, the management system for clinical trials, OpenClinica, provides mechanisms for the definition of electronic records and collection of cancer information relevant to research studies, as well as offers techniques for managing and maintaining the data. Additionally, for achieving a clinical decision support, we incorporated tools that provide mechanisms for data mining processes. The architecture also integrates a software for biomedical informatics research: i2b2. Information from different data sources such as the information recorded from the electronic health records of OpenClinica was stored centrally in a data warehouse. Finally, a tool integrates the mechanisms for analysis and data mining. Two different approaches are used for this task: RapidMiner to implement the algorithms of data mining and data analysis; and the business rule definition in JBoss Guvnor for process modeling in relation to the oncology clinical guide. With these two tools clinicians can receive recommendations based on both clinical data and decisional algorithms defined by international treatment guidelines.

Results: The recruitment from January 1, 2013 until September 1, 2014 comprises the clinical data from 163 lung cancer patients treated with radio(chemo)therapy. Genetic data come from another operating system and includes genotypes at 3 single nucleotide polymorphisms of the HSPB1 gene which has been found to be associated survival after using the data mining tool. Finally, the dosimetric data are exported from radiotherapy treatment planning systems. Currently, we are integrating the information mentioned before with the clinical decision support algorithms based on international treatment guidelines.

Conclusions: The development of infrastructures based on the integration of systems able to interoperate between each other will favor the agile integration between the classical research and the clinical practice, allowing the customization of treatments.

EP-1165

Technical advantages of dynamic tumor tracking in lung stereotactic body radiation therapy using a gimbaled linac
S. Koh¹, Y. Machitori¹, S. Kito¹, K. Nihei¹, Y. Shibata¹, S. Kageyama¹, K. Karasawa¹

¹Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital, Radiation Oncology, Tokyo, Japan

Purpose/Objective: In patients treated with lung stereotactic body radiation therapy (SBRT), dynamic tumor tracking technique (DTT) can potentially improve accuracy of treatment and allow reduction of dose to the surrounding organs at risk (OARs). In Vero4DRT, the DTT can be performed by using its unique gimbaled linac system. The purpose of this study is to assess the technical advantages of DTT in lung SBRT when compared to treatment without DTT (static SBRT planning) on the Vero4DRT platform.

Materials and Methods: Thirteen patients from our institution treated with lung SBRT with DTT by Vero4DRT between March 2013 and September 2014 were included in this study. All patients underwent the same planning process detailed below. For each patient, an SBRT plan without DTT was created using the same CT images and compared with the actual treatment plan. Prior to CT simulation, fiducial markers were inserted around the tumor via bronchoscopy. During CT simulation, a planning CT was first obtained in the expiratory phase using a respiratory gating system, followed by a 4D-CT scan. GTV was then delineated on the planning CT. For DTT SBRT, ITV was defined as GTV plus uncertainty of distances from the center of the GTV to the center of the fiducial markers calculated in all phases of 4D-CT. PTV (tPTV) was created by adding an individualized margin to account for uncertainties of 4D respiratory model and other mechanical errors. For static SBRT, ITV was the summation of GTV positions in all phases of 4D-CT, and the PTV (sPTV) was defined as ITV plus 5mm margin for set-up errors. The prescription dose was 50 Gy in 4 fractions (D95 prescription) to both tPTV and sPTV. To assess the technical advantage of DTT SBRT, the PTV volumes and V20 of the lung for both sets of plans were compared.

Results: The median tumor diameter and respiratory motion in all patients was 30mm (12-48mm) and 17mm (4-31mm) respectively. The mean volumes of tPTV and sPTV were 32.6ml and 49.8ml respectively, corresponding to an average reduction of 28.7 \pm 8.0% (p = 0.0003) in the tPTV compared

to sPTV. The mean V20 values was 7.8% for dynamic tracking SBRT (tv20) and 8.1% for static SBRT (sv20), corresponding to an average reduction of $11.2 \pm 5.9\%$ ($p = 0.016$) in the tv20 compared to sv20.

Conclusions: This study demonstrates that lung SBRT with DTT reduces treatment volumes and dose to normal lung tissue. Further clinical outcome data are required to validate these findings.

EP-1166

Lipopolysaccharide-binding protein in biodosimetry during radiotherapy for lung cancer

J. Chalubinska-Fendler¹, W. Fendler², J. Luniewska-Bury³, E. Polakowska², K. Wyka², J. Fijuth¹

¹Medical University of Lodz, Radiotherapy Department, Lodz, Poland

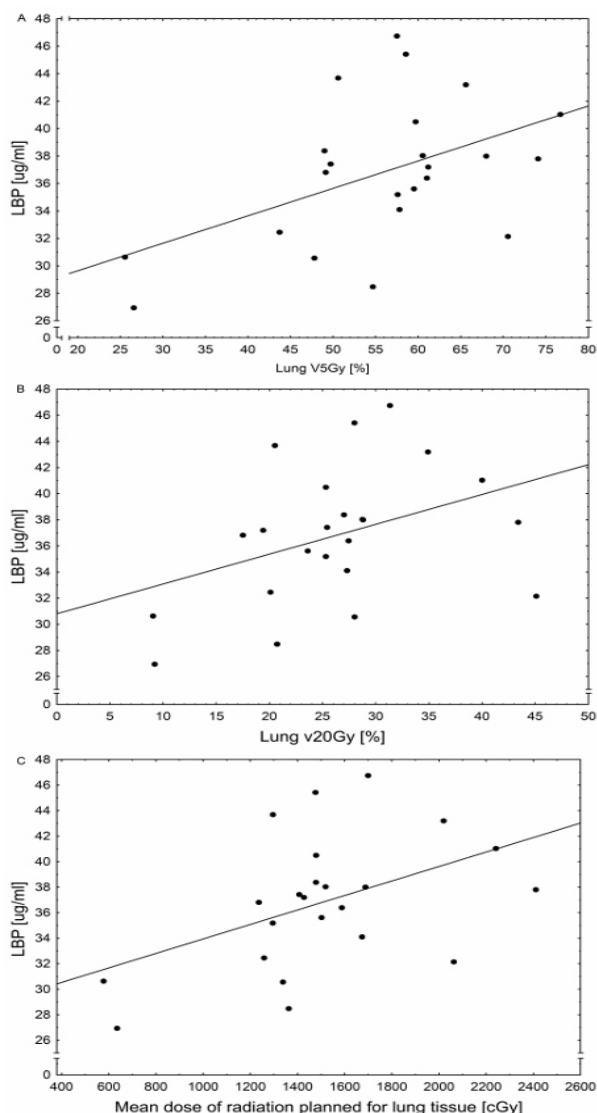
²Medical University of Lodz, Department of Pediatrics Oncology Hematology and Diabetology., Lodz, Poland

³Regional Oncological Centre Lodz, Brachytherapy Department, Lodz, Poland

Purpose/Objective: Radiotoxicity during radiotherapy of lung cancer may be misdiagnosed as pneumonia or respiratory tract infections which prevents the patients from getting optimal treatment. We evaluated changes of three inflammation-associated cytokines in patients undergoing radiotherapy for non-small cell lung cancer (NSCLC) to establish changes of their levels and evaluate which of the markers: Interleukin 6 (IL-6), Tumour necrosis factor-alpha (TNF-a) or Lipopolysaccharide-binding protein (LBP) are specifically affected by radiation dose received by the pulmonary and mediastinal structures rather than infection.

Materials and Methods: In this pilot phase of the project we evaluated 29 patients treated for NSCLC by means of 2.0Gy/daily schemes with total target doses in the range of 60-74Gy. Cytokines were measured before start of treatment, on the day of reaching the total dose of 20Gy and at 40Gy. An age-matched control group of 8 individuals was used to establish differences in baseline cytokine levels. Data from the 40Gy time-point were correlated with histogram parameters of the radiotherapy protocol. ELISA kits were used for cytokine quantification (IL-6 and TNF-a by R&D, USA and LBP by Abnova, Taiwan). Arithmetical means were used for LBP, while geometrical means were used to represent results of IL-6 and TNF-a due to non-normal distribution of values.

Results: Average age of the group was 64.61 ± 6.57 years, majority of patients were male (18 vs 11). The group with NSCLC showed higher than controls baseline levels of IL-6 (5.11 ± 2.52 vs 2.18 ± 2.19 ; $p=0.02$) and marginally higher TNF-a (17.94 ± 1.16 vs 16.30 ± 1.17 ; $p=0.12$). No such differences were seen in LBP levels (35.86 ± 8.45 vs 32.69 ± 9.38 ; $p=0.36$). Levels of all three cytokines remained unchanged during treatment: IL-6 5.11 ± 2.52 ; 4.59 ± 1.86 and 6.15 ± 4.00 ($p=0.25$); TNF-a 17.94 ± 1.16 ; 17.56 ± 1.18 and 19.88 ± 1.74 ($p=0.47$); LBP 35.87 ± 8.45 ; 35.72 ± 7.58 and 35.82 ± 7.06 ($p=0.36$). However, at the 40Gy timepoint, positive, significant correlations were noted for LBP and lung volume subjected to 5Gy ($r=0.52$, $p=0.01$), 20Gy ($r=0.41$, $p=0.049$) and mean radiation dose planned for lung tissue ($r=0.49$, $p=0.02$, Figure 1). Neither IL-6 nor TNF-a showed such associations, hinting at the specificity of LBP reaction to lung irradiation.



Conclusions: LBP levels correlate with radiation exposure of pulmonary tissue regardless of infectious causes and can be used for further studies on radiotoxicity in NSCLC patients.

EP-1167

FDG-PET response in the normal lung for lung cancer patients receiving fractionated radiotherapy and erlotinib

A. Abravan¹, I. Knudtsen¹, H. Eide², O. Brustugun², A.

Helland², E. Malinen¹

¹University of Oslo, Department of Physics, Oslo, Norway

²Oslo University Hospital, Department of Oncology, Oslo, Norway

Purpose/Objective: Patients with lung cancer undergoing radiotherapy (RT) are at risk of lung-related toxicity such as radiation pneumonitis (RP). It has been reported that RP occurs after initiation of radiotherapy for a wide range of doses in the normal lung tissue. In addition to RT, the effect of targeted therapy such as erlotinib on normal lung needs to be considered. Medical imaging may be employed for detection of normal tissue effects from RT and erlotinib. This