Purpose/Objective: Concurrent chemoradiotherapy (CCRT) is the standard treatment for locally advanced stage III non-small cell lung cancer (NSCLC) in patients with a good performance and minimal weight loss. The aim of this study was to define subgroups with different survival and to identify the correlation to the radiation-related toxicities.

Materials and Methods: We retrospectively reviewed 381 locally advanced stage III NSCLC patients with CCRT between 2004 and 2011. Three-dimensional conformal radiotherapy was given once daily and combined with weekly chemotherapy. We evaluated the age, gender, stage, initial white blood cell count, hemoglobin level, forced expiratory volume in 1 second (FEV1), diffusion lung capacity for carbon monoxide (DLCO), gross tumor volume (GTV), extent of nodal involvement as the prognostic factors.

Results: By multivariate Cox modeling, age (>75 years, \( p = 0.011 \)), DLCO (<80%, \( p = 0.011 \)), GTV (≥100 cm\(^3\)), \( p^2 \) had more severe ≥ grade 3 radiation esophagitis. The interruption rate of radiotherapy was significantly different between the prognostic subgroups; group I, II, III and IV had incidences of 8.8%, 15.4%, 22.7%, and 30.6%, respectively (\( p = 0.017 \)).

Conclusions: The severe treatment toxicity and interruption of radiotherapy was more frequently seen in patients with multiple adverse prognostic factors. To maintain the survival benefit from CCRT, we need the strategies to reduce the treatment-related toxicities. The controversial issue on the impact of subcarinal lymph node involvement seems to be worthy of investigation in subsequent prospective, randomized trials.
PO-0657
A prospective trial evaluating continuous positive airway pressure on tumor and organ motion and dose during SBRT
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Purpose/Objective: Continuous Positive Airway Pressure (CPAP) has long been used in patients with obstructive sleep apnea to maintain airway patency. There are no reports describing CPAP use with radiation therapy. We performed a prospective clinical trial to determine if CPAP reduces tumor motion, expands lung volume and improves dosimetric parameters in patients receiving lung SBRT.

Materials and Methods: IRB approval was given in December 2013. Inclusion criteria included adult patients with primary or secondary lung tumors referred for SBRT. Following informed consent and training, subjects underwent 4D simulation twice: without CPAP (free-breathing) and with CPAP. Treatment was planned using Eclipse (Varian). The ITV was expanded 5mm to create PTV. Volumetric and dosimetric parameters with and without CPAP were compared using Student's paired two-tailed t-test. CPAP was utilized during treatment if judged beneficial. Daily cone beam CT's were taken.

Results: Twelve patients were enrolled, one subject withdrew due to mask discomfort, 11 were planned and 10 were treated to 12 different lesions. Mean dose (Eq2Gy): 85 Gy (range: 32Gy-126Gy). One patient was treated with a SBRT boost and received 33Gy (Eq2Gy). CPAP increased mean lung volume by 26.4% (CI 95%, 20-32.8, p

Conclusions: CPAP used during lung SBRT was safe, well tolerated, and provided clinical and dosimetric benefit in almost all patients. Compared to free breathing, CPAP increased total lung volume, decreased ITV and PTV, and almost all patients. Compared to free breathing, CPAP increased mean lung volume by 26.4% (CI 95%, 20-32.8, p

PO-0658
Quality assurance programme for the isotoxic intensity modulated radiotherapy feasibility study
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Purpose/Objective: Isotoxic IMRT is a multicentre feasibility study recruiting patients with stage III non small cell lung cancer, not suitable for concurrent chemo-radiotherapy. Patients recruited will be treated with individualised doses of radiation based on pre-specified normal tissue doses. Radiotherapy will be delivered twice-daily over a maximum period of 4.5 weeks using IMRT and the radiation dose will be increased until one or more of the OAR tolerance or the maximum dose of 79.2Gy is reached.

As part of the quality assurance programme (QA) a comparison of the conformity of organ at risk (OAR) outlining and planning technique has been undertaken.

Materials and Methods: Centres were asked to complete an outlining benchmark case (assessing OAR outlining) and a planning benchmark case (assessing treatment planning technique).

The outlining results presented are from 5 centres (A to E) as the outlines from the sixth centre (F) were used as the gold standard (GS) outlines for the exercise. DICE similarity coefficient (DSC) was defined as

(2 * UNION of Vol_GS and Vol_centre) / (Vol_GS + Vol_centre).

DSC values range from 0 to 1, with 1 denoting complete conformity to the gold standard and levels above 0.6 considered good for this case.

Results: Outlining benchmark case - Figure 1 shows DSC for centres A to E for the OAR outlining.

Planning benchmark case- 4 out of the 6 centres were able to achieve the maximum dose/number of fractions. The most common limitation to dose escalation was dose to the 1cc mediastinal envelope.

Figure 1

Conclusions: Results show good conformity of OAR outlining from centres A-E compared to gold standard outlines, except for brachial plexus. PTV coverage for all centres was compliant with the limits set by the trial protocol.

Pre-trial QA is an essential part of the trial QA process as it will reduce the risk of deviation from protocol.

PO-0659
2D dose-surface data does not improve predictive performance of NTCP model for esophageal toxicity
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