

### Conclusion

There is variability in definition of Lung OAR volumes. Clinically significant differences in lung DVH parameters are seen depending on the volume being subtracted. A robust definition of lung OAR volumes, applicable to both 3DCT and 4DCT simulation is needed. We suggest using "Lungs (average) - ITV" for 4DCT and "Lungs - GTV" for 3DCT simulation for Lung DVH calculation. Ideally these definitions should be used in clinical trial protocols to clarify the association between lung DVHs and toxicities and aid in translation of trial results into clinical practice.

### PO-0770 Clinical Outcomes of Concurrent Chemoradiation vs RT alone in Elderly Patients with Stage III NSCLC

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### Purpose or Objective

In elderly patients with stage III Non-Small Cell Lung Cancer (NSCLC), there are no solid conclusions about which treatment modality is better for concurrent chemoradiotherapy (CCRT) or radiotherapy (RT) alone, considering combined comorbidity or poor treatment tolerance. This study evaluated clinical outcomes between CCRT and RT alone in patients  $\geq 70$ -year old in a single institution clinical practice

### Material and Methods

A total of 94 patients with unresectable stage III NSCLC treated with at Seoul National University Bundang Hospital between 2004 and 2016 were reviewed. We analyzed 82 patients with curative intent to compare the tolerance ( $\geq$  EQD2 54Gy and no unplanned break of RT more than 5days or no hospitalization due to severe toxicities) by chi-square test and overall survival (OS), locoregional recurrence (LRR) and distant metastasis (DM) between two treatments using Kaplan-Meier method. Also, we evaluated patients who had died within 4 months after RT and causes of deaths. Furthermore, we performed subgroup analyses of factors which affect OS and 4-month survival in each treatment group by stepwise cox regression model.

### Results

Median follow-up time was 20.1 months. Patients received CCRT (65.9%) and RT alone (34.1%), and induction chemotherapy was done in 68.5% and 50.0%, respectively. Treatment tolerance was significantly worse in CCRT (87.0%) compared to RT alone (100.0%) (P=0.046). Median survival was 21.1 months and 18.1 months for CCRT and RT alone group, which was not statistically significant. LRR

and DM also showed no significantly difference between two treatment modalities. Though there was no statistical significance, deaths within 4 months after RT (4-month death) were higher in CCRT than RT alone group. Most of 4-month deaths in CCRT were related to non-cancer related mortality, such as pneumonia. In toxicity analysis, acute esophagitis of grade 2 or higher occurred more frequently in CCRT than in RT alone (P=0.017). On multivariate analysis, OS was significantly associated with Charlson comorbidity index (CCI) of 5 or greater (HR 2.00, 95% CI 1.10-3.61, P=0.022) and weight loss of 5% or more after treatment (HR 2.46, 95% CI 1.33-4.54, P=0.004). The factors affecting 4-month survival were also CCI score  $\geq 5$  (HR 6.46, 95% CI 2.18-19.21, P=0.001) and treatment modality (HR 0.26, 95% CI 0.07-0.98, P=0.047). Furthermore, in patients with CCI score 5 or greater, RT alone showed significantly better survival than CCRT at 4 months of follow up (P=0.038).

### Conclusion

We found that there were no significant differences in OS, LRR and DM between CCRT and RT alone, rather poorer tolerance and higher incidence of acute esophagitis grade 2 or higher in CCRT group. In case of the elderly patients with CCI score 5 or more, RT alone seems to be favorable with low possibility of early death after the treatment, mostly due to non-cancer related mortality.

### PO-0771 Cardiac event after radical radiotherapy for lung cancer - initial results from a multi-centre study

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### Purpose or Objective

Lung cancer is the leading cause of cancer mortality worldwide. Radical radiotherapy plays a pivotal role in the management of early and locally advanced disease. Recent studies suggest adverse cardiac events post treatment may worsen survival outcome for patients. This study aims to identify risk factors which predispose patients to cardiac events post radiotherapy and we present the initial results from the initial 107 patients.

### Material and Methods

All patients who received radical dose of radiotherapy for lung cancer between 01/01/2010 to 30/12/2016 in Leeds and Manchester are to be included. 1709 patients have been identified. From these cohorts patients were excluded if they had multiple courses of radiotherapy to the chest. Individual patient clinical information was retrieved from the hospitals electronic patient record (EPR). Patient and cancer demographics have been collected. Pre-existing cardiac conditions, Charlson's Comorbidity index and Qrisk 3 scores were calculated. Post radiotherapy cardiac events were recorded, survival times were calculated.

### Results

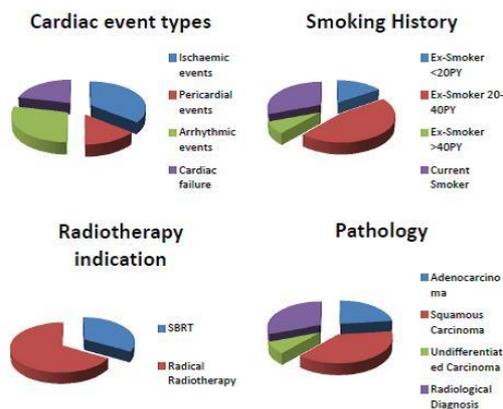
107 patients have been analysed so far. Median follow up is 26 months. Patient, tumour and radiotherapy characteristics are summarised in table 1. In the patients studied 30% had pre-existing cardiac conditions and 13% of patients experienced a cardiac events following radiotherapy (83% of these patients had pre-existing cardiac conditions). The median time from treatment to cardiac event was 13 months post radiotherapy. Patient characteristics of those who experienced cardiac toxicity are summarized in charts 2.

Table 1

Sex	Male	58(54%)
	Female	49(46%)
Age at RT treatment	Median =73	Range(45-90)
PS	0	6(5%)
	1	55(51%)
	2	43(40%)
	3	3(4%)
Smoking Status	Never smoked	2(2%)
	Ex-Smoker <10 PY	0(0%)
	Ex-smoker <20 PY	20(18%)
	Ex-Smoker 20-40PY	31(29%)
	Ex-Smoker >40 PY	17(16%)
	Current Smoker	37(35%)
Charlson Score	Median = 6 (2% estimated 10 year survival)	Range(3-10)
Qrisk3 Score	Median = 22.7% (%risk of stroke/MI in next 10 years)	Range(5.8-40.7)
Known pre-existing cardiac condition	= 32(30%)	Previous MI = 8 IHD = 12 Heart Failure = 1 Arrhythmia = 6 Valve defect = 2
RT indication	Adjuvant RT	10
	SBRT	48
	Concurrent ChemoRT	15
	Sequential ChemoRT	5
	Radical RT	26
	Radical RT for local recurrence	3
Pathology	Adeno	24
	Squam	29
	Adenosquam	0
	Undifferentiated NSCLC	4
	Small Cell	6
	Large Cell	3
	Radiological diagnosis	41

Charts 2

Patients who had cardiac toxicity following radiotherapy



### Conclusion

A substantial proportion of patients had a cardiac event following radical radiotherapy for lung cancer. A large proportion of these patients had pre-existing cardiac conditions. Cardiac events occur much sooner after lung cancer radiotherapy than post-radiotherapy for breast cancer or lymphoma. Further work is on-going to expand

the patient numbers, examine risk factors and correlate cardiac events/survival with radiotherapy dosimetry.

### PO-0772 Role of Prophylactic Cranial Irradiation in Extensive Disease Small Cell Lung Cancer

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### Purpose or Objective

The role of prophylactic cranial irradiation (PCI) remains controversial in extensive disease small cell lung cancer (ED-SCLC). This study is performed to identify the risk factors of symptomatic brain metastasis and to evaluate the impact of PCI on brain metastasis-free survival (BMFS) and overall survival (OS) according to the risk of symptomatic brain metastasis in ED-SCLC.

### Material and Methods

From 2006 to 2017, a total of 190 patients diagnosed with ED-SCLC who underwent FDG-PET and brain MRI prior to treatment were enrolled in this retrospective study. Among these patients, 53 (27.9%) received PCI and 137 (72.1%) did not. Prognostic index predicting a high risk of symptomatic brain metastasis was calculated in the observation group (137/190) on Cox regression model and the prognostic index was generated by summing significant factors weighted by hazard ratio of each. The role of PCI in each risk group was analyzed by using Kaplan-Meier survival analysis.

### Results

Median follow-up time was 10.6 months. 1-year and 2-year symptomatic BMFS and OS were 86.9%, 52.5% and 49.8%, 12.7%, respectively. Multivariate Cox regression analysis showed that 4 risk factors were associated with high risk of symptomatic brain metastasis: presence of extrathoracic metastases ( $P=0.005$ ), FDG-PET uptake in bone marrow (BM) or spleen ( $P < 0.001$ ), progressive disease (PD) after chemotherapy ( $P=0.010$ ), and high hemoglobin (Hb) level ( $P=0.006$ ). The prognostic index significantly divided patients into two subgroups of high and low-risk of symptomatic brain metastasis ( $P < 0.001$ ). PCI significantly improved BMFS in high-risk patients ( $P=0.002$ , 1-year rate 95.5% vs. 61.8%), but not in low-risk patients ( $P=0.522$ , 1-year rate 100.0% vs. 91.9%). However, PCI did not improve OS in patients at a high risk for symptomatic brain metastasis ( $P=0.736$ , 1-year rate 45.0% vs. 50.0%).

### Conclusion

Four prognostic factors are associated with a high risk of symptomatic brain metastasis in ED-SCLC: presence of extrathoracic metastases, FDG-PET uptake in BM or spleen, PD after chemotherapy, and high Hb level. PCI is beneficial for patients at a high risk of symptomatic brain metastasis in terms of BMFS, but not OS. Therefore, selective use of PCI in ED-SCLC according to risk stratification is recommended.

### PO-0773 CBCT is not valid for response evaluation after chemoradiotherapy for locally advanced NSCLC

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