using coplanar beams with 6 MV photons and the treatment was performed with DHX LINAC, VARIAN System. Pretreatment kV CBCT images were obtained at 1, 2 and 3 day of irradiations set-up corrections were made before treatment if the translational setup error was greater than 3 mm in any direction. Subsequently a weekly kV CBCT was repeated for whole duration of treatment.

Results: A total of 360 CBCT scans were acquired and analyzed. The systemic errors results 1.26 mm (SD ± 0.177) in RL direction, 1.25 mm (SD ± 0.187) in SI direction and 1.8 mm (SD ± 0.255 in AP direction. The range of deviations were 0-9 in RL directions, 0-5 mm in SI direction and 0-10 mm in AP direction. The frequencies of setup errors > 3 mm in RL direction was 3.9 %, in SI 8 % and AP directions 15.5 %, respectively. Analyzing the CBCT before set-up corrections the frequencies of set-up error > 3 mm were 17.8 %, 10.6 % and 5.6 % in AP, SI and RL respectively. After set-up errors corrections (corrections via couch shifts or patient repositioning) these rates were reduced to 13,3%, 7.2 and 2.2 % in PA, SI and RL direction, respectively.

Conclusion: The results of our study confirmed that image guidance with kV CBCT represents an effective tool for measuring set-up accuracy in the treatment of H&N cancer patients. This study suggested that kV CBCT once a week is adequate to overcome the problem of set-up errors in head and neck cancer treated with IMRT technique.

Poster Viewing: 6: Clinical: Lung, palliation, sarcoma, haematology

PV-0275

IMRT for non-small cell lung cancer: a decade of experience at the Ghent University Hospital.

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Purpose or Objective: In 1998, our institute developed a class-solution for intensity-modulated radiotherapy (IMRT) for lung cancer. Clinical implementation of IMRT gradually started as of 2002. This retrospective study reports on toxicity and overall survival (OS) of non-small cell lung cancer (NSCLC) patients treated with curative intent using the described IMRT set-up.

Material and Methods: Between 2002 and 2013, a total of 434 patients with a thoracic malignancy have been treated with IMRT in the Radiation Oncology department of the Ghent University Hospital. Those with NSCLC and receiving a total dose of≥60Gy with fraction size <3Gy, a total 223, were retrospectively reviewed and formed the basis of this analysis. Clinical endpoints of OS and acute and late pulmonary and esophageal toxicity grade ≥3 were analyzed in relation to chemotherapy (concomitant vs. sequential chemoradiotherapy (CRT) vs. no chemotherapy) and use of standardized dose-volume evaluation criteria. Analysis was performed in SPSS using Kaplan-Meier curves for survival and Chi-square analysis for toxicity.

Results: Median follow-up time is 18 months (range 2-125). The table reports patient, tumor and treatment characteristics. OS was scored for all patients as date of death (N=140) or, if missing, as date of last consultation in our hospital (N=83). Acute and late toxicity data were available for 219 and 95 patients respectively. Median OS for the entire population was 25 months, 5 year OS 24%. OS was significantly better for patients treated with concomitant CRT than for those undergoing the sequential approach (median OS 30 months vs. 23; 5 years OS 32% vs. 12%) (p<0,05). Acute grade ≥3 pulmonary toxicity occurred in 7,8% of the patients, without significant difference between concurrent and sequential CRT. Acute grade≥3 esophageal toxicity occurred in 5,5% of patients overall; and was significantly worse (p<0,01) in patients treated with concomitant CRT compared to sequential CRT: 10,4% vs. 4,3% respectively. Late grade≥3 pulmonary and esophageal toxicity was observed in 3,3% and 0% respectively; late grade 2 toxicity in 13,2% and 1,4% of the cases respectively. Although there was a trend towards reduced esophageal toxicity, the use of standardized dose-volume evaluation criteria (N=38) did not influence pulmonary (p=0.60) nor esophageal (p=0.08) toxicity significantly.

Conclusion: In spite of the low 5-year OS in patients undergoing sequential CRT, the entire NSCLC population treated with IMRT in our institution obtained OS in line with that reported in the literature. IMRT further confirms the potential for reduced toxicity as observed in other single-center experiences. Regardless of the lack of documented significant impact, we are convinced that the use of standardized dose-volume evaluation criteria has contributed to this positive outcome and is a precondition to exploit the full potential of IMRT in NSCLC.

Table: Patient, tumour and treatment characteristics (n = 223)

	Parameter	Absolute Number	Percentage (%)
Gender	Male	188	84,3
	Female	35	15.7
KPS	60	2	0,9
	70	11	4,9
	80	61	27,4
	90	108	48,4
	100	10	4,5
	Missing	31	13,9
Histology	adenocarcinoma	74	33,2
	adenosquamous	9	4,0
	"non-small cell"	42	18,8
	squamous cell carcinoma	97	43.6
	none	1	0,4
Stage	IA	1	0,4
	IB	2	0,9
	IIA	5	2,2
	IIB	10	4,5
	IIIA	114	51,2
	IIIB	88	39,5
	unknown	3	1,3
Chemotherapy	none	37	16,6
	sequential	119	53,4
	concomittant	67	30,0
Standardised dose-volume evaluation	yes	185	83,0
	no	38	17,0
	Median	Range	
Fraction Size (Gy)	2	2 – 2,7	
Total Dose (Gy)	70	60 – 80,15	
# of fractions	35	26 – 37	

PV-0276

Adaptive radiotherapy: rate of "marginal" failure after "replanning" in combined treatment of NSCLC

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Purpose or Objective: Respiratory movement and anatomical changes of the lesion during radiotherapy are the main causes of target missing and/or irradiation of healthy lung tissue. The organ motion control and the correct identification of target volume (TV) contribute to manage these issues; however, the open question is if the adaptation of TV during treatment leads to an increased incidence of recurrences in the area of target reduction. The aim of this study is to evaluate patients' pattern of failure distinguishing “marginal”, in field and out of field recurrences.

Material and Methods: In this prospective study, since 2010, locally advanced NSCLC patients treated with radiochemotherapy (RCT) underwent a weekly chest-CT simulation during therapy. In case of tumor's shrinkage, a new TV was delineated and then a new treatment plan outlined ("replanning"). At the end of treatment, patients were sent to follow-up. The patterns of failure were classified as: in field (persistence or recurrence in TV post-"replanning"), "marginal" (recurrence in the area of initial TV excluded from the post-"replanning" TV) and out of field (recurrence outside of initial TV). We also evaluated distant failure.

Results: Two hundred seventeen NSCLC patients were treated in our center. In fifty cases there was a volume reduction, so a "replanning" was outlined. Patients' characteristics were: mean age 69.6 years (range 38-92), squamous histology 56%, 32% adenocarcinoma, other 12%, stage IIIA 58% and IIIB 42%. The median total dose delivered was 65.7 Gy with standard fractionation. Median CTV at CT simulation and at "replanning" was 125.2 cc and 74.7 cc, respectively, with a median reduction of 43.1%. The "replanning" has been performed at a median dose of 45 Gy. At first follow up, 48 patients were evaluated. Response, according to RECIST criteria, was as follow: 2 complete responses (4.1%), 33 partial responses (68.8%) and 13 stable disease (27.1%). Grade 3 toxicities (CTCAE_4.0) were: acute esophageal in 4% of cases, pulmonary 6% (1 case acute and 2 chronic). With a median follow-up of 20.5 months, there have been 15 local (31%) and 22 distant (46%) failures. The observed local failures were: in field in 20.8% of cases, "marginal" in 6.1% and out of field in 4.1%. The median time to local failure, progression free survival and overall survival were 8.5, 8.3 and 30.5 months, respectively. The median onset of "marginal", in field, out of field and distant failures was 12, 9.2, 7.1 and 7.8 months, respectively.

Conclusion: Our results show that "replanning" during RCT has an acceptable local failure rate comparable to literature data; in particular, given the low incidence of "marginal" failures combined with the low rate of acute toxicity, the strategy appears promising, bringing to a method of dose escalation aimed at reducing in field failures.

PV-0277

SBRT with concurrent chemoradiation in stage III NSCLC: first results of the phase I Hybrid trial

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Purpose or Objective: To assess the feasibility and safety of combined stereotactic body radiotherapy (SBRT) of the primary tumor (PT) and concurrent chemoradiation (CCRT) in stage III NSCLC, the Hybrid study (single center phase I: NCT01933568) was initiated. Primary endpoint is the mean lung dose (MLD) associated with 15% chance on radiation pneumonitis (RP)≥ G3 and dyspnea ≥ G3. Secondary endpoints are toxicity and disease control. This is the first report of adverse events observed.

Material and Methods: Eligible patients had stage III or inoperable stage II NSCLC with a peripheral PT < 5 cm. Patient received CCRT: 24x2.75 Gy or 24x2.42 on the pathological lymph nodes (LN) with daily low dose cisplatinum 6 mg/m2 with an overall treatment time of 32 days. SBRT was delivered in 3 fractions of 14-18 Gy in the 2nd week concurrent with CCRT. If the fractionated LN treatment plan contributed to the PT dose, the total SBRT dose was corrected for accordingly. The MLD was escalated with 2 Gy increments using the Time-to-Event Continuous Reassessment Method (TITE-CRM) statistical design driven by dose limiting toxicity (RP or dyspnea≥ G3; CTCAE v4) within 12 months post treatment. The range of acceptable SBRT fraction doses allowed accruing patients in different MLD dose bins.

Results: From March 2013- October 2015 12 patients gave informed consent for the trial. One patient was excluded after the 1st week of treatment due to a baseline shift of the PT towards the mediastinum, causing unacceptable dose to the mediastinal organs at risk (OAR) if treated with SBRT. Median follow up (FU) was 8 months (range 0-26), median age was 63 years (range 61-75), 73% was male, 73% had adenocarcinoma, 18% squamous cell carcinoma, 9% large cell NOS. 73% had T1 tumors, 9% T2, 18% T3 (2 tumors), 18% N1, 73% N2 and 9% N3. Ten patients received CCRT, 1 patient radiotherapy only due to co-morbidities. No locoregional recurrences have been observed. Two patients developed distant metastases, one of which died 12 months post treatment due to leptomeningeal metastases. Median SBRT dose was 53 Gy (range 43-54 Gy) and median LN dose was 2.75 Gy. Median MLD (α/ß=3 Gy) was 11.9 Gy (range 5.2-18 Gy). In 2 patients SBRT dose was decreased: in 1 patient due to allocation in a lower MLD risk group than the treatment plan MLD, in 1 patient because of normal tissue constraints of the mediastinal OAR. During treatment 4 patient developed dysphagia G2, 2 fatigue G2, 1 thrombocytopenia G2, 1 anorexia G2 and 1 patient hemoptysis G2 . Radiation pneumonitis G2 occurred in 1 patient at 2.5 months FU with an MLD of 12.4 Gy. One patient developed chest wall pain G2 due to a rib fracture at 32 months FU. There were no G3-5 toxicities.

Conclusion: A Hybrid treatment of SBRT of the primary tumor combined with concurrent chemoradiation is feasible. This phase I trial is currently accruing and no unexpected toxicity has been observed thus far.

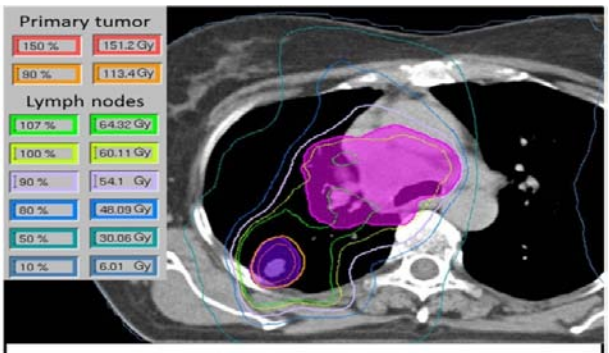

Figure 1: Axial slice with total planned biological dose ($^{\alpha}/_{\beta} = 10\ Gy$) of the hybrid treatment combining 3x18 Gy on the primary tumor (PTV, purple color wash) and 24x2.42 Gy on the lymph nodes (PTV pink color wash).

PV-0278

Volume concepts in routine radiotherapy for localized Hodgkin lymphoma: results of a national survey

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Purpose or Objective: Background The definition of target volumes in radiotherapy for Hodgkin lymphoma quickly evolved during the last decades, with the comings of Involved-field radiotherapy (IF), then the Involved Node (IN)1, and more recently the concept of Involved-site (IS)2. The latter two concepts are based on the observation that recurrences mainly concern the adenopathies present at diagnosis when radiotherapy is not performed and on the need to reduce the irradiated volumes to limit the radiation-induced late morbidity. If the H103 and RAPID4 trials confirmed the interest of radiotherapy in localized disease, the standard technique is still debated. The studies currently led by the LYSA illustrate this confusion since one (BREACH) made IN its standard technique, while the other (BRAPP2) requires IF-radiotherapy.
To assess routine radiotherapy practices in the treatment of localized Hodgkin lymphoma.

Material and Methods: At the initiative of multicentric and multidisciplinary working group involving radiation oncologists, hematologists, and nuclear medicine physicians,