Conclusions: Our study demonstrated that lymph node size is a strong independent prognostic factor for patients undergoing chemoradiotherapy for esophageal squamous cell carcinoma. The results indicate that revisions of the current staging system for esophageal cancer should include N staging based on lymph node size, as is currently practiced for head and neck cancer.

6530 POSTER

Dosimetric Comparison of Liver Tumour Radiotherapy in All Respiratory Phases and in One Phase Using 4DCT

D. Gabrys[1], R. Kulik[2], K. Trela[1], L. Michalecki[1], K. Slosarek[2]. [1]*Center of Oncology Maria Sklodowska-Curie Memorial, Department of Radiation Oncology, Gliwice, Poland;* [2]*Center of Oncology Maria Sklodowska-Curie Memorial, Department of Radiotherapy and Brachytherapy Planning, Gliwice, Poland*

Liver tumours exhibit significant intrafractional motions due to respiration therefore 4DCT as well as gated radiotherapy are introduced into treatment. We could delineate target volume on all respiratory phases and radiation is delivered during free breathing cycle. However the 4DCT technique synchronizes image acquisition with respiratory phase what allows us to delineate our target on the basis of one respiratory phase and deliver gated treatment choosing specific phase for irradiation. Up to now littlie is know about comparison of both techniques in terms of target and normal tissue dose distribution.
In the present paper we analyzed data of 20 patients treated for liver metastases, irradiated to the total dose 36 Gy in 3 fractions. We chose only tumours, which were clearly separated from the liver tissue. We used 4DCT to characterize tumour motion and create treatment volumes. For all patients we delineated two GTV, one based on all 10 respiratory phases (GTV 4D) and based on one phase (GTV GAT). To create PTV's we added the same 0.5 mm to GTVs. Two treatment plans were performed (4D and GAT) and dose volume distributions were analyzed in respect to target and normal tissue. Various tumour motions was included, motion along the superior–inferior direction was greatest mean 1.5 cm (range 1−3), to the side mean motion was 0.9 cm (0.6−1.3). GTVs volumes were larger in 4D than in GAT, mean 14.9 vs 27.6 cm3, also PTV 37 vs 61 were larger.
We achieved similar dose distribution in PTV4D mean 36.7 Gy SD $\pm$ 0.2 and minimum 34.9 Gy $\pm$ 0.3 for 4D plan, and PTVGAT for GAT plan mean 36.7 Gy SD $\pm$ 0.3 and minimum 34.9 Gy $\pm$ 0.3, but when we look at the dose distribution in PTV4D in the GAT plan, we found decrease in minimum dose to 12.3 Gy (2.2–24.3), and mean 33.9 Gy $\pm$ 2.3, what could be explain by differences in target volumes related to tumour movement. Radiotherapy delivered using GAT gave lower liver doses than using 4D with reduction of mean volume receiving 5 Gy by 9.3% SD $\pm$ 4.7, V10 Gy 6.7% SD $\pm$ 4.2, V20 Gy 4.8% SD $\pm$ 2.7 and reduction of mean kidney volume receiving 5 Gy by 12% SD $\pm$ 10, V10 Gy 7% SD $\pm$ 9, V20 Gy 2.8% SD $\pm$ 5.6. Moreover doses to the other normal tissues were also lower. We also found correlation between GTV volume reduction with GAT, GTV motion and doses to the normal tissues.
Gated radiotherapy allows us to decrease GTV and PTV volumes in comparison to volumes delineated on all respiratory phases. Decreased target volumes are responsible for improvement in dose distribution in normal tissue especially in the liver and kidney.

6531 POSTER

Impact of Planned Dose Distribution on Sites of Locoregional Failure for Oesophageal Cancer Patients After Exclusive Chemoradiotherapy

N. Vulquin[1], M. Gauthier[1], G. Truc[1], K. Casasnovas[1], E. Martin[1], A. Petitfils[1], J. Chamois[1], C. Khoury[1], P. Maingon[1], G. Crehange[1]. [1]*Georges-Francois Leclerc Cancer Centre, Radiation Oncology, Dijon, France*

Background: Nearly half of the patients (pts) with an oesophageal cancer (OC) have locoregional failure (LRf) after exclusive chemoradiation (eCRT). We aim to evaluate the patterns of LRf with respect to the initial dose distribution at time of planning CT (t0).
Material and Methods: Twenty three pts with an OC who failed locally and/or regionally in their follow-up were exclusively reviewed. All the pts have been initially treated in a curative intent with Platin-based eCRT. Among them, 19 patients had available imaging performed at time of failure (tf). Co-image registration of CT or PET-CT at tf and planning CT at t0 was made for image fusion considerations. Each nodal failure (Nf) and each local failure of the primary tumour (Lf) has been outlined, as well as each nodal station (NS) including Nf. The dose planned to the PTV at t0 was compared to the recalculated dose delivered to invaded NS at tf using a non-parametric Wilcoxon's test.
Results: Fifteen pts had a squamous cell cancer and 4 pts had an adenocarcinoma. Clinical T-stage at t0 was either T2 (4 pts) or T3 (15 pts). Five pts were clinically staged N0 and 14 pts had N1 disease. The median number of involved NS at t0 was 2 (0−4). The median Dmean planned to the PTV was 50 Gy [42.7 Gy-64 Gy]. In the follow-up period, 12 pts were in complete response, 3 pts in partial response, 3 pts had a progressive disease (1 pt unknown). The median delay between diagnosis and LRF was 12.6 months [4.27–48.46]. Nine pts had a Lf, 6 pts had a Nf, 4 pts had Lf with Nf and 6 pts had a concomitant distant failure. All Lf were located at the epicenter of the primary tumour. Nf occurred inside NS included in the CTV at t0 for 7 pts. Among them, 5 pts had additional recurrent NS outside the CTV (3 pts in 1 NS, 1 pt in 2 NS and 1 pt in 4 NS). Nonetheless, 3 pts had Nf in NS outside the CTV only.
The mean doses recalculated to the NS at tf were more likely to be lower than the planned dose delivered to the PTV at t0: Dmean = 34.7 Gy vs. 48.6 Gy ($p = 0.0015$), Dmax= 41.3 Gy vs. 48.9 Gy ($p = 0.013$), Dmin = 23.1 Gy vs. 38.6 Gy ($p = 0.031$), D95= 28.0 Gy vs. 44.8 Gy ($p = 0.003$).
Conclusions: Our preliminary results suggest that patients with Nf could suffer from geographic misses when performing elective nodal irradiation (ENI). Moreover, increasing the dose to the primary tumour above 50 Gy could decrease Lf rates.

6532 POSTER

Phase I/ II Study of Concurrent Chemoradiotherapy With Gemcitabine and S-1 for Unresectable Locally Advanced Pancreatic Adenocarcinoma

T. Ioka[1], N. Arimoto[1], R. Ashida[1], R. Takakura[1], S. Nakamura[2], K. Nishiyama[2], S. Tanaka[1]. [1]*Osaka Medical Center for Cancer and CVD, Hepatobiliary and Pancreatic Oncology, Osaka, Japan;* [2]*Osaka Medical Center for Cancer and CVD, Radiation Oncology, Osaka, Japan*

Purpose: The primary objective of this study is to assess the efficacy and toxicity of concurrent radiotherapy with a combination of Gemcitabine (GEM) and S-1 for unresectable locally advanced pancreatic cancer.
Patients and Method: Chemotherapy-naive patients with histologically or cytologically proven unresectable locally advanced pancreatic adenocarcinoma were enrolled to this trial. The patients received gemcitabine intravenously over 30 min on days 1 and 8 and S-1 orally b.i.d. from days 1 to 14. Cycles were repeated every 21 days until disease progression. Patients were scheduled to receive gemcitabine (mg/msq/week) and S-1 (mg/msq/day) at five dose levels: 600/50 (level 1), 600/60 (level 2), 800/60 (level 3), 800/70 (level 4) and 1000/70(level 5). Radiation therapy was delivered through four fields as a total dose of 50.4 Gy in 28 fractions over 5.5 weeks, and no prophylactic nodal irradiation was given. Dose-limiting toxicity (DLT) was defined as grade 4 thrombocytopenia, grade 4 neutropenia, or grade 3 non-hematologic toxicity. Every patients were evaluated for response with RECIST criteria by a radiologist.
Results: Fifteen patients were enrolled in phase I study between 05/12 and 07/05. The maximum-tolerated dose was level 2, Gem 600 mg/ S-1 60 mg. Six patients experienced DLT (four patients with anorexia and two patients with Gr4 neutropenia). Fifteen patients were added to phase II study, and finally twenty one patients treated with the recommended dose of phase I were enrolled to phase II part. Treatment was well tolerated. Response rate(RR) was 52% and one year survival rate was 76%.
Conclusion: The chemoradiation therapy with a combination of GEM and S-1 can be one of the most promising options for unresectable locally advanced pancreatic cancer.

6533 POSTER

Effective High Precision Radiotherapy in Advanced Cholangiocarcinoma/Klatskin Patients − a New Interdisciplinary Challenge

I. Ernst[1], C. Moustakis[2], F. Büther[3], J. Dullat[1], H. Eggert[1], F. Mounessi[1], S. Scobioala[1], N. Willich[1]. [1]*University of Münster, Radiotherapy and Radiooncology, Münster, Germany;* [2]*University of Münster, Radiotherapy and Radiooncology/Physics, Münster, Germany;* [3]*European Institute for Molecular Imaging, Physics, Münster, Germany*

Background: Owing to the fact that high precision radiotherapy like stereotactic body radiotherapy (SBRT) allows high dose radiation close to sensitive organs of risk phase 1 studies demonstrate good local tumour control rate in patients with advanced cholangiocarcinoma (CCC)/Klatskin tumours.
Aim of this study is to evaluate this therapy with regard to local control rate, toxicity, and overall survival in a larger cohort.
Material and Methods: 30 patients (p) with histological proven CCC/ Klatskin tumours, stage Bismuth III or IV, underwent SBRT. Planning target volume contained gross tumour volume, 2 mm set-up margin and movement margins based on 4 D list mode-detected PET/CT. All patients underwent SBRT with prescribed radiation dose to the 65% enclosing