Conclusions: This original radiotherapy regimen delivering only a single stereotactic dose per week seems to be highly feasible with an interesting high rate of efficacy for patients with oligometastases from different solid tumors. Overall, the once weekly treatment is very compliant in advanced cancer stage especially for elderly and frail patients.

POSTER: CLINICAL TRACK: STEREOTACTIC RT

PO-0744  
re-EBRT for prostate cancer local relapse after radical, post-operative or salvage RT: toxicities and outcome
B. A. Jereczek-Fossa1, D. Zerini1, S. Ronzi1, C. Fodor1, S. Comi1, C. Ceccon1, M. A. Gerard1, A. Maucieri1, D. O. De Cobelli1, R. Orecchia1  
1European Institute of Oncology/University of Milan, Radiotherapy, Milano, Italy  
2European Institute of Oncology, Medical Physics, Milano, Italy  
3European Institute of Oncology/University of Milan, Urology, Milano, Italy  
4European Institute of Oncology/University of Milan/ CNAO, Radiotherapy, Milano, Italy

Purpose/Objective: To retrospectively evaluate external beam re-irradiation (re-EBRT), delivered to the prostate or prostatic bed for local recurrence after radical or post-operative/salvage radiotherapy.

Materials and Methods: 17 pts have been treated with re-EBRT at our Department between 2/2008 and 8/2012. Previously RT included radical RT 13 pts (12 pts with EBRT and 1 pt with brachytherapy, post-operative RT 2 pts) or salvage RT 1 pt. 1 pt not reported. All pts had local relapse in the prostate or prostatic bed with no distant metastases: biopsy was performed in all but 1 pts, and all the pts had total body computer tomography (CT) or 11C-choline positron emission tomography scan. One pt. was previously treated also with 3D-CRT for lymph node recurrence with complete remission. The mean age, iPSA and Gleason Score (GS) at diagnosis were 61 yrs (49-67), 15 ng/ml (4.57-67) and 6 (4-9), respectively.

The re-EBRT technique included 3D IGRT, stereotactic RT, IMRT, stereotactic RT + IMRT, Cyberknife respectively in 1,8,6,1,1 pts. The following schedules were employed: 25 Gy/5 fr (12 pts), 30 Gy/6 fr (4 pts) and 15 Gy/3 fr (1 pt). Four pts were included in a previous study. Concomitant hormonal therapy (HT) was administered in 7 pts. Toxicity and tumor response were evaluated using Radiation Therapy Oncology Group/European Organization for Research and Treatment of Cancer and Response Evaluation Criteria in Solid Tumors criteria. Biochemical and clinical response, using radiologic criteria, was also registered.

Results: Acute toxicity included: 3 G1, 1 G2 genitourinary events; 1 G1, 1 G2 gastrointestinal events. Late toxicities (> 6 months of f.u., data available in 9 pts): 5 pts with no toxicity; 2 G1 gastrointestinal and 1 G1 genitourinary events respectively. The mean interval between the primary treatment and the clinical local relapse was 64 months, and the mean follow-up after re-EBRT was 24 months (5-30). Two pts died for the prostate cancer progression at distant sites: the interval between re-EBRT and the death was 30 mo. for each. The remaining 15 patients are alive: 12 with no evidence of disease and 3 pt is alive with disease in clinical control with HT.

Conclusions: In our single institution preliminary experience re-EBRT of local relapse of the prostate cancer appears feasible and well tolerated. Local control was excellent (non local recurrence was registered within mean follow-up of 2 years) and 70% of patients alive with no evidence of disease. Longer follow-up and bigger patient series is warranted in order to confirm these promising early findings.

PO-0745  
FFF delivered SBRT in the treatment of lymph node oligometastases: feasibility and early clinical results
F. Alongi1, E. Clerici1, E. Villa1, C. Hifote1, A. Tozzi1, T. Comito1, P. Mancuso1, G. Reggiori1, S. Tomatis1, M. Scorzetti1  
1Istituto Clinico Humanitas, Radiotherapy and Radiosurgery, Rozzano (Milan), Italy

Purpose/Objective: To report the preliminary results of SBRT and FFF delivery in isolated lymph node oligometastatic patients.

Materials and Methods: Between October 2010 and March 2012, 34 patients were treated with SBRT for oligometastatic lymph node metastasis using Volumetric Modulated Arc Therapy (RapidArc on Truebeam platform). We retrospectively evaluated a total of 25 patients for isolated lymph node metastases in abdomen and/or pelvis treated with SBRT and FFF (28 treatments). Prescription doses were 45 Gy in 6 consecutive fractions of 7.5 Gy for all 28 treatments. The inclusion criteria were: age ≥18years, WHO performance status ≤ 2, histologically-proven of primary cancer disease, M1 stage with primary cancer site radically treated with complete response/resection or stable, no other site of disease in progression (aximum of 3 lymph node sites of disease to treat), diameter of lymph node Target less than 5 cm, Abdomen/pelvic site, no previous surgery or RT in the region to treat, obtained informed consent. Chemotherapy, when prescribed, was interrupted from 20 days before the simulation to the first evaluation after the end of SBRT treatment, as scheduled. Acute toxicity was recorded and scored according to CTCAE v.4. Local control evaluation was scored by means of CT scan and/or PET scan, according to PERCIST criteria.

Results: All 25 FFF SBRT patients completed the treatment. Acute gastrointestinal toxicity was minimal; one patient showed Grade 1 gastrointestinal toxicity. Three other patients presented Grade 2 toxicity. No Grade 3 or higher was recorded. All toxicities were recovered within one week. The preliminary clinical results at the median follow up of 195 days are: complete response in 12 cases, partial response in 11, stable disease in 5, with an overall response rate of 82%; no local progression was recorded.

Conclusions: Data of acute toxicity are excellent for patients treated with SBRT with FFF beams. Preliminary clinical results showed a high rate of local control in irradiated lesion. Further data and longer follow up are needed to assess late toxicity and definitive clinical outcomes.

PO-0746  
Consequential effects of ablative ionizing radiation on tumoral stromal fibroblasts from lung tumors
T. Hellevik1, I. Martinez-Zubiaurre2  
1University Hospital Northern Norway, Translational Cancer Research Group, Tromsø, Norway  
2Clinical Medicine, Translational Cancer Research Group, Tromsø, Norway

Purpose/Objective: Cancer-Associated Fibroblasts (CAFs) are major components of solid malignancies and play central roles on cancer sustainability. In the context of radiotherapy, collateral effects of ablative ionizing radiation (AIR) on stromal components of tumors remain understudied. In this work we have examined the impact of AIR on CAFs from human lung tumors.

Materials and Methods: CAFs prepared from resected human lung tumors were exposed to AIR (1x18Gy). Intrinsic radio-sensitivity was evaluated by checking viability and extent of DNA-damage responses at escalating radiation doses. Proliferation, migration and invasion rates were monitored in label-free assays by xCELLigence system. Inflammatory mediators, as well as regulators of angiogenesis and tumor growth were analysed by multiplex protein assay in conditioned medium (CM) from irradiated and control CAFs. Additionally the entire secretory protein profile was examined by mass spectrometry. In functional assays, the potential effects of CAFs released factors on the proliferative and migratory capacity of lung tumor cell (H520 and H442) and on endothelial cells (HUVEC) was also investigated.

Results: Our results show that CAFs survive ablative doses of radiation, but cells enter a senescent state associated with reduced proliferation and invasion. A lowered MMP-1 expression and the stabilization of focal contacts via integrins were responsible mechanisms behind the reduced cell motility. On the other hand, analyses of the secretory profile revealed a reduced expression of angiogenic factors like SDF-1a and TSP-2, and altered expression of tumor regulators such as BFGF, PDE5 and MIF upon radiation. No prominenetic differences were observed on the behaviour of tumour cells or endothelial cells exposed to irradiated and control CAFs.

Conclusions: AIR provoked a reduction in the proliferative and migratory abilities of CAFs, along with a transformation of their secretory profile. These radiation-induced chages on tumor resident fibroblasts could influence the behaviour of adjacent cells in the tumor tissue and hence influence therapeutic outcomes. Downstream consequences of the changes observed in this study merits further investigations.

PO-0747  
Analysis of radiation effects after stereotactic radiotherapy of brain metastases using MRI cine-loops
R. Wijnenraad1, P. Bos1, A. Verbeek- de Kanter1, G. Lycklama a Nijeholt2, J. van Santvoort3  
1Radiotherapy Centre West, Radiotherapy, Den Haag, The Netherlands

Purpose/Objective: To evaluate the feasibility of using stereotactic radiotherapy (SRT) for the treatment of brain metastases in clinical routine by using MRI cine-loops for volumetric planning and treatment delivery.

Materials and Methods: The study included 40 patients with a total of 71 metastatic lesions. All lesions were treated with stereotactic radiosurgery (SRS) using the Brainlab couch and the TrueBeam linac. The planning was based on MRI scans acquired during the treatment planning visit. The planning and treatment was performed using the Brainlab VarioCouch System with the TrueBeam linac. The dose was prescribed to the isocenter of the target volume.

Results: The study showed that the use of MRI cine-loops for volumetric planning and treatment delivery is feasible and can be used in clinical routine. The results also showed that the use of MRI cine-loops can improve the accuracy of the treatment planning and treatment delivery.

Conclusions: The use of MRI cine-loops for volumetric planning and treatment delivery is feasible and can be used in clinical routine. The results also showed that the use of MRI cine-loops can improve the accuracy of the treatment planning and treatment delivery.
Stereotactic body radiation therapy for liver tumors with or without rotational IART

PO-0749

Radiation-induced toxicity in patients receiving stereotactic body radiotherapy for lung tumors
B. Wen1, B. Parashar2, P. Singh3, R. Bassalow2, A. Sabsab5, K.S. Chao6
1The First Affiliated Hospital Sun Yat-sen University, Department of Radiation Oncology, Guangzhou, China
2New York-Presbyterian Hospital/Weill Cornell Medical College, Department of Radiation Oncology, New York, USA
3Medical Centre Haaglanden, Radiology, Den Haag, The Netherlands
4University College Hospital, Radiotherapy, London, United Kingdom
5Bart’s and the London NHS Trust, Radiotherapy, London, United Kingdom
6Institute Sainte-Catherine, Department of Radiation Therapy, Avignon, France

Purpose/Objective: To analyze the toxicity of hypofractionated lung SBRT according to QUANTEC recommendations.

Materials and Methods: From 2002 to 2010, 44 (25 male, 19 female) patients with small primary lung cancer or oligometastases were treated with several hypo-fractionation schemes of SBRT at our institution. All patients were immobilized using a stereotactic body frame, simulated with CT scan and treated with multiple static 6 MV beams. A total of 48 lesions were treated, among which 2 patients had 2 lesions and 1 patient had 3 lesions. The median follow-up was 12 months. We exported the composite dose volume histograms (DVHs) of gross target volume (GTV), planning target volume (PTV) and normal lung tissue (whole lung-GTV). For each patient, normal tissue complication probability (NTCP) was calculated using the normal lung DVH, and normalized total dose (NTD) volumehistograms were generated at 2Gy fractions with a/b = 3.7 Gy to account for different fractionations. Mean dose and V20 (Dvoleme receiving 20Gy) of GTV, PTV, and normal lung derived from DVH/NNTDH were correlated with clinical follow-up. Variable importance for projection (VIP) and correlation coefficient (R) were calculated for each variable using partial least squares regression (PLSR) and logistic regression (LR) to identify the prediction factors for normal tissue complications.

Results: There were 2 (4.2%) local failures, 4 (9.1%) grade 2 pneumonitis and 1 (2.3%) radiation-induced fibrosis. The <10% pneumonitis rate is in line with the QUANTEC report for lung SBRT. 5/14 (35.7%) of the lesions in right lower lobe developed complications, in comparison to 1/16 (6.3%) in right upper and middle lobe or 0/5 (0%) in left lower lobe and 1/11 (9.1%) in left upper lobe. The most influential VIP for predicting the complications were mean GTV dose (VIP =1.500, R=0.145) and GTV volume (VIP=1.451, R–0.140), followed by NTCP (VIP=1.106, R=0.107) although the calculated probability was much higher than the frequency of complications. LR was able to produce a reasonable NTCP curve for these three variables. The prediction factors used for conventional lung RT complications, i.e., V20, VNTD20, mean dose and mean NTD of normal lung had only moderate or low VIP (<0.894), were negatively correlated (R between -0.044 and -0.086) and could not be fit to a NTCP logistic curve.

Conclusions: Radiation induced complication for SBRT increases with the mean GTV dose and cannot be predicted with the known prediction factors for conventional lung RT. The cause for higher probability of complications for right lower lobe is unclear and needs further investigations. NTCP based on Poisson model might be applied to lung SBRT but requires different modeling parameters than that used for conventional lung RT.