Purpose or Objective: To synthesize and compare available evidence to compare the Long-Term clinical outcomes of proton therapy (PT) with those of carbon ion therapy (CIT) for stage I non-small cell lung cancer (NSCLC).

Material and Methods: Clinical trials were searched for in Cochrane Library, PubMed, EMBASE, Web of Science and Chinese Biomedical Literature Database through Dec 2014. Additional articles were identified from searching bibliographies of retrieved articles. Two reviewers independently selected studies and extract data. Outcomes were analyzed by random-effects model meta-analysis and reported as odds ratio (OR) with 95% confidence intervals (CI). The meta-analysis was conducted with STATA 12.0 software.

Results: Three retrospective studies were included, the meta analysis showed that there were no difference between proton therapy and carbon ion radiotherapy for stage I non-small cell lung cancer in the one year progression-free survival (PFS) was OR=1.13(95%CI:0.71,1.79), two years PFS was OR=1.25(95%CI:0.76,2.06), three years PFS was OR=1.02(95%CI:0.58,1.79), four years PFS was OR=0.73(95%CI:0.36,1.46), five years PFS was OR=0.50(95%CI:0.19,1.30), the one year overall survival (OS) was OR=1.01(95%CI:0.65,1.55), two years OS was OR=0.93(95%CI:0.59,1.46), three years OS was OR=0.94(95%CI:0.62,1.41) and four years OS was OR=0.65(95%CI:0.36,1.19), but there was difference in five years OS was OR=0.37(95%CI:0.16,0.90).

Conclusion: Our data suggest that the clinical outcomes of stage I NSCLC patients treated with PT and CIT may be similar. PT may improve 5-year OS compared with CIT. However, no firm conclusion concerning the difference in clinical outcomes between these two partial therapies can be made because of the limitations of retrospective studies; more homogeneous prospective data, large multicentric and randomized trials are needed to compare the efficacy of PT with CIT for stage I NSCLC.

EP-1232
Interim 18F-FDG-PET/CT for early outcome prediction during chemoradiotherapy of thorax malignancies


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Purpose or Objective: Lung and esophageal cancer are characterized by aggressiveness and comprehend the majority of thorax malignancies. In both pathologies, the possibility to stratify patients (pts), early during radiotherapy (RT) or chemoradiotherapy (CRT) with interim 18F-FDG-PET/CT (FDGint) is extremely appealing to optimize treatments. CRT-responding pts could benefit from further preoperative treatment, while non responding pts should discontinue CRT, to avoid toxicity, and not to delay surgery. Consequently, where and whether FDGint may offer predictive and prognostic potentials.

Material and Methods: A comprehensive review of the last decade literature was made, assembling studies on FDGint in pts affected by lung or esophageal malignancies. Six different searches were completed on PubMed using keywords combined by Boolean operators (and, or). Studies inherent to FDGint for adaptive RT (aRT) were also included. Restrictions were: papers in English; 3D hybrid PET/CT studies; original papers only. Cross-references of the studies selected were also manually checked to complete the literature pursuit.

Results: 1121 items in lung cancer and 193 in esophageal cancer were found. After the steps of process selection, 17 studies were extracted for lung cancer (5 related to change of FDG uptake, 9 correlation with response and prognosis, 3 aRT) reporting on 488 pts, and 8 studies for esophageal cancer (7 correlation with response and prognosis, 1 aRT) reporting on 318 pts. The main metabolic parameters correlated with outcomes, progression free survival, locoregional control, overall survival were the standardized uptake value, metabolic tumor volume, total lesion glycolysis and their variations. Lung studies did not give special emphasis to statistical analysis, while 6/8 esophageal studies reported the results of statistical ROC analysis (Figure). Among the 17 lung studies, 14 advocated the predictivity of FDGint, 3 showed the improvements by aRT. Among the 8 esophageal studies, 4 showed sustained predictivity, 3 did not find any correlation, 1 showed the feasibility of aRT.

Conclusion: Despite heterogeneity, the studies comprised in this review denoted FDGint as promising and challenging tracer for early assessment of outcomes during CRT. In lung cancer papers, all the authors sustain the predictivity, response and prognosis of FDGint. In esophageal cancer instead, its predictive and prognostic value cannot be
definitely established due to some controversial findings, the possible reasons of which demand further research with prospective and uniform protocols and analysis, great number of pts and adequate follow-up period.

EP-1233
Carbon ion radiotherapy for stage I non-small cell lung cancer: A Meta-analysis of 369 patients
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Purpose or Objective: To synthesize and compare available evidence considering the effectiveness of carbon-ion radiotherapy for stage I non-small cell lung cancer.

Material and Methods: To synthesize and compare available evidence considering the effectiveness of carbon-ion radiotherapy for stage I non-small cell lung cancer. Methods: A comprehensive search was conducted in the Cochrane Library, PubMed, EMBASE,Web of Science and Chinese Biomedical Literature Database (from inception to Feb 2015). Selection of studies, and extracting data were performed by two reviewers independently. Outcomes were analyzed by random-effects model meta-analysis and reported as odds ratio (OR) with 95% confidence intervals (CI). The meta-analysis was conducted with STATA 12.0 software.

Results: Eight trials(369 patients) were included, the meta analysis showed that the one year local control rate(LCR) was OR=0.89(95%CI:0.81,0.90), two years LCR was OR=0.81(95%CI:0.72,0.89), three years LCR was OR=0.64(95%CI:0.55,0.73), four years LCR was OR=0.23(95%CI:0.13,0.33) and five years LCR was OR=0.70(95%CI:0.67,0.73).The one year overall survival(OS) was OR=0.94(95%CI:0.88,0.99), two years OS was OR=0.85(95%CI:0.70,1.00), three years OS was OR=0.64(95%CI:0.50,0.78), four years OS was OR=0.29(95%CI:0.18,0.40) and five years OS was OR=0.34(95%CI:0.19,0.49).The one year progression-free survival(PFS) was OR=0.79(95%CI:0.69,0.89), two years PFS was OR=0.63(95%CI:0.52,0.75), three years PFS was OR=0.39(95%CI:0.28,0.51), four years PFS was OR=0.20(95%CI:0.10,0.29) and five years PFS was OR=0.08(95%CI:0.02,0.15). The recurrence was OR=0.46(95%CI:0.39,0.53) and distant metastasis was OR=0.20(95%CI:0.14,0.26).

Conclusion: Carbon beam radiotherapy, which is an excellent new modality in terms of a high local control and survival, may be a valid alternative to surgery for Stage I cancer, especially for elderly and inoperable patients.

EP-1234
VMAT based lung ablative radiotherapy: primary lesions and metastases
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Purpose or Objective: Stereotactic ablative radiotherapy is an emerging non-invasive technique for the treatment of lung lesions. Both primary lesions and metastases may benefit from this approach, even in patients with low respiratory reserve. This work describes and evaluates institutional experience of SABR in lung location.

Material and Methods: From May ‘12 to November ‘14, 82 lesions in 67 patients were irradiated. 57 lesion were primary lung tumors and 25 metastases. Immobilization systems used in each patient was abdominal compressor and vacuum cushion o head-and-shoulders mask. An ITV was defined using three CT scans in three different phases of the respiratory cycle or with 4D RPM-Varian® system. The ITV was obtained by uniformly 5 mm ITV expanding. BED prescription was always over 100 Gy10 in 3-8 fractions following a risk-adapted protocol. 8 patient treatments were performed on a Clinac iXTM and 74 treatments on a TruebeamTM with high definition MLC. Volumetric modulated arc therapy (RapidArcTM) was mostly used, and image-guided RT was performed with cone-beam CT (CBCT). Intra-fraction movement was controlled by post-treatment CBCT and infrared ExacTrac.

Results: Median age was 75y.o. (44-89). The median GTV/PTV size was 3.2/17.15cm3 (0.2-129.9/5.90-263.90). Intra-fraction movement in all cases was less than 5mm according to post-treatment CBCT. At a median follow-up of 71(30) months, overall I local control was 92.7%, 89.5% for primary lesions and 100% for metastases. Mean overall survival was 18 months for primary lesion (14.7-21.33 [95%]). No toxicities over G3 have been collected.

Conclusion: VMAT based ablative radiotherapy achieves excellent control rates in both primary lesions and metastases. Overall survival also depends on specific characteristics of the patient.

EP-1235
Necrosis / Fistulae occurring in temporal association with chest irradiation
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Purpose or Objective: Receiving Radio(chemo)therapy (R(C)T) for pulmonary tumors some patients have or develop necrosis or fistulae (N/F) within the area of the treated tumor. Partially such N/F result in fatal complications like mediastinitis or pneumonia whereas other affected patients achieve good local control rates with long term survival after R(C)T. By retrospectively analyzing such cases we are aiming at identifying factors that might have an impact on the course of disease and should pre-therapeutically be considered in future.

Material and Methods: Retrospective analysis of patients coming up with N/F in temporal association with chest RT applied at the University Medical Center Freiburg from 2006 to 2013. Clinical and radiation parameters have been evaluated, acute and late toxicity, complications, clinical and imaging follow up have been assessed and will be analyzed with respect to local control and overall survival.

Results: We identified 40 patients irradiated for pulmonary malignancies (mainly centrally located NSCLC, UICC IIIB/IV; 16 female, 24 male; median age 64 years; 15 squamous cell-, 15 adenocarcinoma, 10 other) who developed N/F in temporal association with chest RT. Intention of treatment was curative in 31 and palliative in 9 patients. 25 patients received R(C)T, 15 received RT alone with a median total dose of 54 Gy (14-72Gy). 26 patients revealed a necrotic primary tumor, 6 additionally necrotic lymph node metastases (LNM), 8 necrotic LNM, exclusively. In 34 lesions necrosis was found previous to RT, in 3 cases it occurred during, in 3 cases after RT.14 patients showed fistulae, all fistulae with esophageal or mediastinal involvement emerged after RT. For 16 patients G3, for 6 G4 toxicities have been reported, one patient died in consequence of an esophago-tracheal fistula. All patients with N/F-connection to the esophagus revealed toxicitiesG3, whereas some patients with centrally necrotic tumor and fistula without esophageal involvement revealed excellent long term follow ups. Median survival was 12.6 months (median FU 6.9 months). All patients with esophago-tracheal fistula died before reaching the median. Histology and location of the necrotic lesions didn’t show any significant impact on survival.

Conclusion: R(C)T of pulmonary malignancies for patients with N/F can be associated with high toxicity. One essential factor with impact on the clinical course seems to be the...