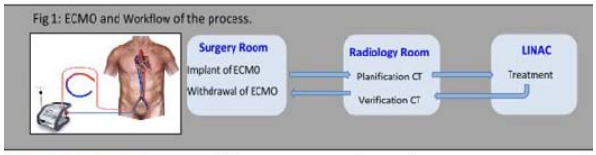
Results: The internal movements of the tumour during the treatment were in average around 1 mm L-R; 1,2 mm C-C; 1 mm A-P.



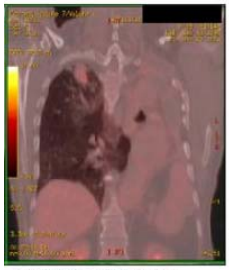


Fig 2: Nodule at Right Upper Lobe.

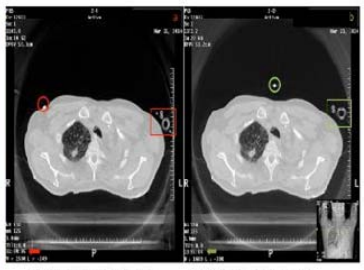


Fig 3a: CT Pre-Treatment. Fig3b:CT Post-Treatment.

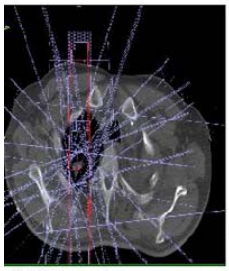


Fig 4: RT-Treatment :

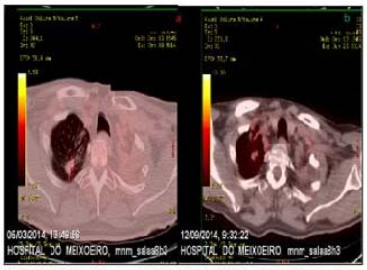


Fig 5a: PET-CT Pre-Treatment; Fig5b: PET-CT 6th Month Post-Treatment

Conclusions: ALART is a possible method of treatment for very selected patients which need a high qualified multi-disciplinary team. It is necessary more studies and a possible randomized clinical trial with pO_2 increase and/or light hyperthermia.

EP-1174

Local dose-effects of lung perfusion utilizing SPECT/CT after VMAT lung cancer radiotherapy

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Purpose/Objective: Radiation pneumonitis (RP) is clinically important toxicity in radical non-small cell lung cancer (NSCLC) radiotherapy (RT). Changes in lung perfusion can be discovered before the actual radiation injury develops into RP. In this study voxel based analysis for the radiation damage from the volumetric-arc therapy (VMAT) treatments was investigated by using the lung perfusion as a measure for radiation injury.

Materials and Methods: This study included six patients (age 67 ± 14 y) with histologically confirmed NSCLC. The patients were imaged with a SPECT/CT-scanner (Philips Precedence, Philips Healthcare) after Tc-99m labeled macroaggregated albumin injection of 118 ± 9 MBq. Patients were imaged in treatment position with a slice thickness of 2 mm. Scans were acquired before RT (pre-RT) and 3 months after RT (post-RT). Planning target volumes (348 ± 134 cm^3) and lungs were delineated on the CT images. In addition, the lungs were divided into three different areas based on the lung perfusion, the activities being 0-40%, 40-60% and 60-100% from the value of maximum perfusion counts. VMAT treatment plans were created in Monaco® treatment planning system using energy of 6 MV and Monte Carlo calculation algorithm. Lung doses were converted to 2Gy equivalents using LQ-model and α/ß ratio of 3Gy. Patients were treated using Elekta Infinity linear accelerator (Elekta AB, Sweden) to a prescription doses of 10×3Gy (n=2) or 30×2Gy (n=4) with daily CBCT matching. The decrease in the perfusion (pre-RT – post-RT) as a function of total dose delivered was recorded with a voxel size of 3×3×3 mm^3. Voxels closer than 9mm to the lung borders and negative perfusion reduction were excluded, thus the reperfusion of the lung tissue was excluded from the analysis.

Results: Mean lung dose (MLD) of the studied patients was on average 9.0 ± 4.6 Gy. Figure 1 shows an average dose-effect relation to lung perfusion after 3 months of RT. With high doses (> 30Gy) the relative reduction of the perfusion was greatest in the well perfused areas. Furthermore, there was a tendency that MLD, volume of the dose of 5Gy and 20Gy correlated with perfusion reduction (data not shown). However, the variation between individual patients was large and the number of patients was limited.

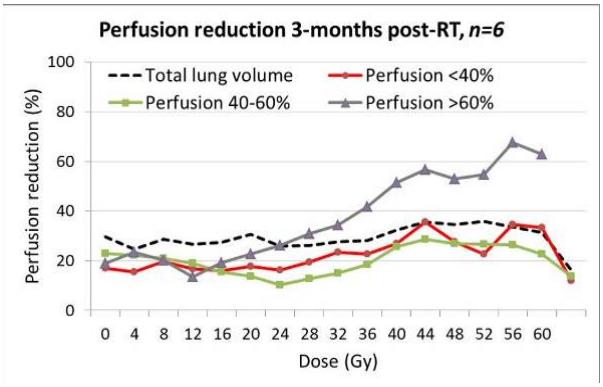

Figure 1. Changes in perfusion (3 months post-RT) for the total lung volume and three different perfusion volumes (<40%, 40-60%, >60%) as a function of total dose delivered.

Conclusions: The incorporation of SPECT/CT can take into account the variation of inhomogeneous lung perfusion of NSCLC patients. There was an increased perfusion defect noted in well perfused areas. Severe radiation injury in well perfused areas could thus increase the risk of RP. Additional data is needed to identify the predictors of lung injury caused by RT. Enrollment for further studies are ongoing.

EP-1175

Image-guided hypofractionated 3D-CRT in patients with inoperable advanced stage NSCLC

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Purpose/Objective: Hypofractionated radiotherapy (HypoRT) can potentially improve local control with a higher biological effect and shorter overall treatment time. Response, local