

AbstractID: 6685 Title: Fractionated stereotactic body radiation therapy (SBRT) of lung tumors - 4DCT simulation with an AcQSim CT and Varian's RPM system

**Purpose:** To demonstrate that 4DCT can be acquired for lung patients using a single slice CT simulator and Varian's RPM system. The 4DCT can be used for the determination of ITV. Fractionated SBRT was accomplished using Varian's Ex21 linac equipped with OBI/CBCT system.

**Materials and methods:** Varian's RPM system was connected to a single slice AcQSim CT for 4D simulation of lung patients. Before scans, the couch height was set such that the side horizontal laser was approximately at the middle level of the target. A spiral scan was acquired first for conventional simulation and the patient was tattooed without raising or lowering the couch. After that, the RPM system was turned on and four sets of gated axial scans were acquired at four different phases: 0, 25, 50 and 75%. The gated scans covered a 12cm scan range, 6cm from each side of the central axis.

**Results:** Six patients were simulated with this technique. Because the couch height was kept the same for the spiral and gated CT scans, image fusion between spiral and each gated set can be made using the shared DICOM coordinates and therefore very accurate. GTV in the spiral as well as in each gated CT was contoured and merged together to obtain the ITV. PTV was ITV plus 3mm margins expansion. Treatment planning was performed in Eclipse (4 fractions of 12Gy/fraction). Generally 5-6 beams were placed (every ~30 degree) around the target for an IMRT plan and good dose conformity was achieved from the plan. Before each treatment, CBCT was acquired and 3D image fusion based on the local ITV/PTV volumes was made.

**Conclusion:** A technique for the determination of ITV using gated CT sets at multiple phases was developed for fractionated SBRT for lung tumors using Ex21 linac equipped with the OBI/CBCT system.