

AbstractID: 5095 Title: Can the use of respiratory gating reduce radiation dose to heart in whole left breast irradiation treatment? – A preliminary study

**Purpose:** To investigate the potential benefit of using respiratory gating technique to reduce radiation doses to patient's heart in whole left breast irradiation treatment.

**Method and Materials:** Conventional helical CT scan and retrospective 4D CT scans were acquired for 5 left sided breast patients. The 4DCT scans were sorted into 10 phases per respiratory cycle. Treatment plans, which consisted of two wedged tangential fields, were designed based on the helical CT scan. The PTV coverage, heart and lung doses in this plan were used as references for comparison. 10 separate optimal plans were generated from the 10 different phases obtained from the 4DCT images. All beam parameters, except for beam energy and wedges, were adjusted so that the PTV coverage in these plans was similar to or better than that in the corresponding reference plan. The heart and lung doses were then computed from these plans and compared to the corresponding doses in the reference plan.

**Results:** The present results show that one patient would benefit from gated treatment at any given phase in terms of heart dose reduction. For four other patients respiratory gating would reduce dose to the heart. Gating at a given phase would reduce mean dose to the heart by 24%, 17%, 8% for 3 patients; for another patient a 17% reduction in maximum dose to the heart was found while the impact to the mean dose was insignificant.

**Conclusion:** The use of respiratory gating in the irradiation of whole left breast treatment has the potential to reduce dose to the heart.