

AbstractID:9506Title: Dual energy contrast-enhanced breast computed tomography: a phantom study

**Purpose:** To investigate lesion enhancement with iodinated contrast material using dual energy breast computed tomography (CT).

**Method and Materials:** The dual energy cone-beam breast CT system consisted of a flat-panel detector and an x-ray tube installed on an optical bench. The x-ray tube voltage and x-ray beam filtration were switched at 30 Hz between 50 kVp (2.0-mm Al filter) and 120 kVp (2.0-mm Al + 0.8-mm Ag filtration). A cylindrical breast phantom was constructed from polymethylmethacrylate (PMMA) and filled with oil and shredded PMMA. Five known concentrations of iodine (0.5, 1, 2, 4, 8 mgI/ml) were embedded in the phantom. The images were reconstructed with a Feldkamp filtered-back-projection algorithm. Dual energy subtraction was used to eliminate the contrast of oil and PMMA to enhance iodine signals.

**Results:** The low energy scan could not distinguish PMMA and iodine concentrations of 0.5 and 1 mgI/ml. The high energy image could not distinguish PMMA and iodine concentration of 8 mgI/ml. After subtracting the PMMA, all five concentrations of iodine could be clearly visualized on the dual energy CT image. The dual energy iodine signal ( $CT_{DE}$ ) and the iodine concentration ( $C_i$ ) were related by  $CT_{DE} = 70C_i + 4.23$  ( $R=0.998$  and  $SEE=15.26$ ).

**Conclusion:** Dual energy contrast-enhanced breast CT can potentially improve lesion .