

AbstractID: 12959 Title: Quantification of breast density using MRI and CT in postmortem breasts

Purpose: To compare breast density measurements from cone-beam CT and breast MRI using a fuzzy C-means clustering technique.

Methods and Materials: Twenty pairs of post-mortem breasts were scanned with MRI and cone-beam CT. The cone-beam CT system was constructed using a standard x-ray tube, a rotation stage, and a flat panel detector. The imaging technique for CT was 80 kVp, 0.16 mAs and 921 frames spanning 360 degrees. Each scan used a total of 147 mAs. MR images were acquired with an Aurora 1.5T dedicated breast MRI system. The MRI and CT data were processed with a fuzzy C-means clustering technique. Six clusters were used to categorize the image gray levels into 6 different categories. The operator specified which clusters corresponding glandular and adipose by comparing the "clustered" images and the raw images. The images were then segmented into glandular and adipose regions.

Results: Breast weight calculated using MRI (W_{MRI}) and CT (W_{CT}) image data were related to the measured weight (W_S) as $W_{MRI} = 0.89W_S + 50$ ($R^2=0.99$) and $W_{CT} = 0.99W_S - 14$ ($R^2=0.997$), respectively. Breast density computed from CT (D_{CT}) was related to densities computed from MRI (D_{MRI}) as $D_{MRI} = 0.96D_{CT} + 0.0009$ ($R^2 = 0.98$).

Conclusion: Breast density measurements using cone-beam CT and breast MRI were highly correlated.