

AbstractID: 6539 Title: Estimating the volume of dense breast tissue using a dual energy technique in digital mammography

Purpose: To investigate a method of estimating the volume of dense breast tissue using a dual energy technique in digital mammography.

Method and Materials: Breast was modeled as adipose tissue + dense tissue. For a fixed thickness, Monte Carlo method was used to calculate ratios of the total logarithm attenuation at 17.5 keV to that at 20.2 keV for a breast of 100% adipose tissue (R_a), a breast of 100% dense tissue (R_d), and a breast with a few 100% dense tissue blocks embedded in a 100% adipose background (R). The thickness of embedded dense tissue blocks was then computed from the values of R_a , R_d , R and the total breast thickness. The effects of scatter and polychromatic beam were analyzed and the possibility of applying the method to the imaging systems with Mo/Mo and Rh/Rh target/filter was explored.

Results: For thin breast phantoms and mono energetic beams, the estimated dense tissue thicknesses were within 10% of the true values.

Conclusion: The volume of the dense breast tissue may be estimated based on 2-D digital mammograms using the dual target/filter FFDM systems after the effects of scatter and polychromatic beams are properly corrected.