

Comparison of Radiation Dosage and Image Quality: Digital Breast Tomosynthesis vs. Full-Field Digital Mammography

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Abstract : Purpose: With increasing concern of individual radiation exposure doses, studies analyzing radiation dosage in breast imaging modalities are required. Aim of this study is to compare radiation dosage and image quality between digital breast tomosynthesis (DBT) and full-field digital mammography (FFDM). Methods and Materials: 303 patients (mean age 52.1 years) who studied DBT and FFDM were retrospectively reviewed. Radiation dosage data were obtained by radiation dosage scoring and monitoring program: Radimetrics (Bayer HealthCare, Whippany, NJ). Entrance dose and mean glandular doses in each breast were obtained in both imaging modalities. To compare the image quality of DBT with two-dimensional synthesized mammogram (2DSM) and FFDM, 5-point scoring of lesion clarity was assessed and the better modality between the two was selected. Interobserver performance was compared with kappa values and diagnostic accuracy was compared using McNemar test. The parameters of radiation dosages (entrance dose, mean glandular dose) and image quality were compared between two modalities by using paired t-test and Wilcoxon rank sum test. Results: For entrance dose and mean glandular doses for each breasts, DBT had lower values compared with FFDM (p-value < 0.0001). Diagnostic accuracy did not have statistical difference, but lesion clarity score was higher in DBT with 2DSM and DBT was chosen as a better modality compared with FFDM. Conclusion: DBT showed lower radiation entrance dose and also lower mean glandular doses to both breasts compared with FFDM. Also, DBT with 2DSM had better image quality than FFDM with similar diagnostic accuracy, suggesting that DBT may have a potential to be performed as an alternative to FFDM.

Keywords : radiation dose, DBT, digital mammography, image quality

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