

Comparison of Breast Surface Doses for Full-Field Digital Mammography and Digital Breast Tomosynthesis Using Breast Phantoms

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Abstract : Background: Full field digital mammography (FFDM) is widely used in diagnosis of breast cancer. Digital breast tomosynthesis (DBT) has recently been introduced into the clinic and is being used for screening for breast cancer in the general population. Hence, the radiation dose delivered to the patients involved in an imaging protocol is of utmost concern. Aim: To compare the surface radiation dose (ESD) of digital breast tomosynthesis (DBT) and full-field digital mammography (FFDM) by using breast phantoms. Method: We analyzed the average entrance surface dose (ESD) of FFDM and DBT by using breast phantoms. Optically Stimulated luminescent Dosimeters (OSLD) were placed in a tissue-equivalent Breast phantom at difference sites of interest. Absorbed dose measurements were obtained after digital breast tomosynthesis (DBT) and full-field digital mammography (FFDM) exposures. Results: An automatic exposure control (AEC) is proposed for surface dose measurement during DBT and FFDM. The mean ESD values for DBT and FFDM were 6.37 mGy and 3.51mGy, respectively. Using of OSLD measured for surface dose during DBT and FFDM. There were 19.87 mGy and 11.36 mGy, respectively. The surface exposure dose of DBT could possibly be increased by two times with FFDM. Conclusion: The radiation dose from DBT was higher than that of FFDM and the difference in dose between AEC and OSLD measurements at phantom surface.

Keywords : full-field digital mammography, digital breast tomosynthesis, optically stimulated luminescent dosimeters, surface dose

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