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Average Glandular Dose in Digital Breast Tomosynthesis: A Comparison between Machine Displayed Values and Calculated Values

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Mammography is a specialized medical imaging technique that uses low-energy X-rays to diagnose and screen the human breast. Average glandular dose (AGD) estimates the average dose absorbed by the glandular tissues of a breast during a mammographic examination. Nowadays, the glandular tissues are considered the breast tissue type which is at high risk for radiation during a mammographic examination. Therefore, the AGD is widely recommended and accepted by several bodies including International Commission on Radiological Protection (ICRP) as the most suitable dosimetric quantity to determine the risk of carcinogenesis induced by radiation. Digital breast tomosynthesis (DBT) is a modern technology that can help radiologists to improve their ability to detect breast cancer**.** AGD displayed by the mammography system and AGD calculated by the method suggested by Dance *et al.* in 2011 for women, were compared in the present study. The study was performed on 140 patients who underwent DBT examination. The AGD, compression breast thickness (CBT), half-value layer (HVL), kVp, mAs, and target/filter combination were obtained from the machine, and AGD for each radiograph taken for each patient was calculated using the equation proposed by Dance *et al.* 2011. The data were analysed using statistical tests such as the Shapiro-Wilk test, Spearman's test, and Sign test with $P<0.05$ indicating a level of significance. The results showed that the displayed median AGDs were 1.34 mGy and 1.33 mGy for right and left breasts respectively and calculated median AGDs were 1.28 mGy and 1.24 mGy for right and left breasts respectively. In conclusion, the displayed AGD is statistically significantly higher than the calculated AGD of both breasts ($p<0.05$). The result of the present study highlights the importance of validating AGD values in radiation dosimetry of DBT examinations.

Keywords: *mammography, digital breast tomosynthesis, average glandular dose*