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Breast dose in Mammography

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Mammography is an x-ray imaging technique used for the early detection of breast pathology. In screening mammography, two x-ray images of each breast are routinely acquired. Since irradiation of the breast tissues itself is carcinogenic, the objective of this study was to determine mean glandular dose (MGD), which is defined as the mean absorbed dose to the glandular tissues of the breast and to check whether MGD values comply with the guidance levels recommended by International Atomic Energy Agency Basic Safety Standards Series 115.

Quality Control (QC) tests were performed to check the accuracy and reproducibility of important parameters of 7 government sector and 3 private sector mammography x-ray machines operating in Sri Lanka. Entrance surface doses (ESD) were measured using a standard breast phantom and LiF(Tl) thermo luminescence dosimeters. Exposure factors of the machines were selected by the radiographer operating the mammography machine according to her routine procedures. MGD values were calculated using the ESD values and they were compared with the guidance levels. .

All mammography machines passed all QC tests. Grids were not used in five machines and their MGD values were less than the corresponding guidance level of 1 mGy. Grids were used in other five machines and MGD values of three of them were less than the guidance level of 3 mGy. MGD values of the other two machines using grids were greater than 3 mGy and they did not comply with the guidance levels. This shows that even properly operating mammography machines give unacceptably higher breast doses when higher mAs values are used. The two non-complying machines were not equipped with automatic exposure controls and they were operated in private hospitals by unqualified persons. Some radiographers also had no idea about the MGD values given by their machines and they had not been trained on mammography procedures. This study reveals that the breast doses can be maintained complying with the guidance levels by using mammography machines equipped with automatic exposure controls, doing quality assurance tests periodically and by employing qualified, trained radiographers on mammography.

Keywords: mammography, breast dose, mean glandular dose