

EVALUATION OF THE RADIATION DOSE TO THE THYROID DURING MAMMOGRAPHY

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Mammography is the x-ray examination of the human breast, which is believed to be the most effective examination for detection of breast cancer in its early stages. Current guidelines recommend screening mammography every year for women, from the age of 40 years. The thyroid gland is recognized as a radiosensitive organ of concern which is in close proximity to the primary radiation beam in mammography thus being vulnerable to the scattered X-rays. Exposure to ionizing radiation like X-rays during diagnostic procedures carries a small but real risk of inducing stochastic effects such as cancer. The aim of this study was to measure the accumulated equivalent radiation dose to the skin overlying the thyroid during mammography and evaluate the relationships between the radiation dose and exposure parameters, projections obtained, thickness of the compressed breast and the distance between the compression plate and the skin overlying the thyroid.

This was an observational descriptive study, which was designed as a sample survey. The study was carried out in a private medical institute in Kandy using the mammography equipment, Bennette trex. A direct reading, high-sensitive Electronic Pocket Dosimeter (A PDM-117-MYDOSE mini-) was used to measure the radiation dose of the consenting patients. The accumulated equivalent radiation dose (AED) to the skin overlying the thyroid for each mammography projection, Cranio-Caudad (CC) and Medio-Lateral Oblique (MLO) was measured along with the identified variables. The data collection was carried out over a 3 month time period to obtain a convenience sample of 50 patients. Data analysis was done using SPSS software (version 15.0).

The results show that during a routine mammography examination a patient is subjected to a total equivalent radiation dose of 20.4290 μ Gy (range:16.3432 μ Gy – 24.5148 μ Gy) to the skin overlying the thyroid gland which was considerably lower than the findings of comparable studies. Inherent properties involved in the samples, mammography equipments used, accuracy and sensitivity of the used radiation measuring devices and many other subjective differences may have caused this difference. However, there is a significant difference in radiation dose to the thyroid during mammography with respect to MLO and CC projections which was comparable with a previous study. mAs, kVp, mammography projection and the thickness of the compressed breast are the identified factors that affect the AED. In view of the fact that measurable amounts of scatter radiation is incident upon the skin overlying the thyroid implying a radiation risk to the thyroid, it is prudent to carry out further studies in order to take steps towards reducing this unwarranted radiation exposure.