Optimisation of Mammographic Examinations.

Dr Desiree O'Leary, PhD, MSc (RNI), Nat Dip Rad (Diag).

University College Dublin (Ireland).

ABSTRACT

Background: The study objective was to correlate compression depths to the bra sizes of patients to find an achievable, objective and standardised compression level for each bra size to assist radiographers regardless of experience level to achieve the lowest possible radiation dose with highest diagnostic image quality in X-ray mammography. Additionally, the study sought to propose mean glandular dose (MGD) diagnostic reference levels for the symptomatic breast service in Ireland.

Method: This large quantitative and qualitative study of symptomatic breast units geographically spread over the Republic of Ireland, collected image quality, compression and radiation dose data from 18 mammography units. The data was analysed using mathematical modelling and SPSS statistical tests including descriptives, ANOVA and multivariate regression analysis.

Results: Analysis is presented of 16 mammography units: 1010 patients and 4071 mammography images. Objective compression levels cannot be proposed due to higher than expected inadequate image quality rates of 6.2% and inconsistent compression forces; other factors may also impact on the compression levels attained which cannot be teased out by mathematical modelling of the current data set. Compression forces are low and these affect the image quality; a significant finding from this data is that greater compression force by 11-15N is needed to achieve a perfect image. Similarly MGDs received by perfect images are significantly lower than inadequate images. MGDs can be proposed as diagnostic reference levels for digital and analogue mammography units.

Conclusions: Greater training of radiographers performing mammography is required to standardise the undertaking of the mammographic projections with regard to achievable compression depth, application of compression force and MGDs delivered to the breasts of Irish women attending the symptomatic breast services. The Health Information Quality Authority must be explicit regarding radiographer training and enforce (in the 3-yearly reviews) and encourage bi-annual individual mammographer technique and image quality review. MGD is proposed at the 95th percentile for 55-65mm breast compression for full field digital mammography units at 2.4mGy and for film-screen units at the mean MGD in line with other European publications as 2.64mGy.