

ABSTRACT

Quality Control (QC) and quality assurance procedures are essential to ensure that image quality and radiation dose in mammography examinations meet established standards. This study evaluates image quality and Mean Glandular Dose (MGD) on various target/filter combinations of a digital mammography system using Image Quality Standard Test (IQST) and American College of Radiology (ACR) phantoms. The experiments were performed using Molybdenum/Molybdenum (Mo/Mo) and Rhodium/Silver (Rh/Ag) target/filter combination at several X-ray tube voltages. Based on the IQST phantom images, the digital mammography system achieved a spatial resolution with MTF₅₀ values ranging from 1.93 to 1.97 lp/mm for both combinations, while the MTF₁₀ values ranged from 4.10–4.19 lp/mm for Mo/Mo and 4.16–4.23 lp/mm for Rh/Ag. For the ACR phantom, the highest number of visible objects was found using the Mo/Mo combination at a voltage of 28 kV. In contrast, with the Rh/Ag combination, the number of visible objects remained relatively similar across the 28–36 kV voltage range. The evaluation of MGD showed that higher X-ray tube voltages resulted in an increase in MGD values. At the same voltage, the MGD value was higher for the Mo/Mo combination than for the Rh/Ag combination. In conclusion, the results show that the image quality and MGD of the mammography machine are significantly influenced by the target/filter combination and the X-ray tube voltage.

Keyword: Mammography, Mean Glandular Dose (MGD), Modulation Transfer Function (MTF), Phantom IQST, Phantom ACR