

Purpose:

In Japan, mammography units are shifting from screen-film (S/F) mammography to digital (DR) mammography. However, no studies have investigated the actual radiation dose received by patients undergoing mammography using DR units. In order to assess the present situation, we conducted a survey of the actual radiation dose at 92 participating mammography facilities in 2010.

Methods:

The units used were F/S (5%), computed radiography (CR) (47%), and flat panel display (FPD) (48%). The incident air kerma was obtained from the irradiation conditions of each facility, and the average glandular dose (AGD) was calculated. Specifically, the AGD was calculated using a quality control phantom (model 156 phantom) and a polymethyl methacrylate (PMMA) phantom (10, 20, 30, 40, 50 and 60 mm thicknesses) equipped with automatic exposure control (AEC) systems. An ionization chamber dosimeter (Radcal Model 9015) with a parallel plate ionization chamber calibrated based on national standards was used. Aluminum plates (99.997 % purity) were used for half value layer assessment.

Results:

The AGD was not greater than 3 mGy in all cases and was taken to be the patient dose. Mean dose was 1.8 mGy, and coefficient of variation (CV) was not greater than 0.3. Approximately 75% of facilities used a dose of not greater than 2 mGy. The range of doses was approximately three-fold. Mean AGD was the lowest for F/S and highest for CR.

Conclusions:

There are about 10,000 radiologic technologists for mammography in Japan, and radiographic imaging at most facilities is performed by these technologists. As a result, there is little variation among facilities, and a minimum radiation dose is used.