ASSESSMENT OF THE MAMMOGRAPHIC IMAGE QUALITY USING A TEST OBJECT

A PROJECT REPORT PRESENTED

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ABSTRACT

Mammography is the X-ray examination of the breast. Screening for breast cancer by means of mammography has been shown to be effective in reducing breast cancer morality in several studies. Mammography can identify changes in breast tissue long before they can be detected by other means. The purpose of mammographic screening is to identify those changes which require further investigation and which might be breast cancer at an early stage when treatment is most likely to be effective.

Low energy X-radiation is used to provide adequate contrast in the image because the various tissues of the breast have similar attenuation coefficients. At the present time, the majority of mammographic images are produced using a screen-film combination exposed to X-rays generated at peak voltages in the range 25 to 32 kV from a molybdenum target tube.

Quality assurance may be defined as all those planned and systematic necessary to provide adequate confidence that a product or service will satisfy given requirements for quality. An effective quality system will help to active and maintain:

- Radiological information of adequate quality for medical diagnostic purposes.
- Minimum radiation dose to the patient and medical staff, compatible with adequate quality of the radiological information.

- Minimum cost containment by minimizing wastage of time and resources.
- Good professional practice.

The mammographic Detail phantom, Model 152 D is defined to test the performance of a mammographic system. Since this phantom is not available in Sri Lanka, our aim of this project is to develop a prototype phantom which is comparable to phantom model 152 D. This was used to get an overall assessment of the image quality produced by the whole mammographic imaging system at the Cancer Institute Maharagama.

Phantom was made up of acrylic base and a wax block containing 16 test objects which simulate calcifications, fibrous calcifications in ducts and tumor - like masses. An acceptable image was obtained using this phantom as for a patient's breast. Scores were given by the suggested image scoring system for the mammographic detail phantom model 152 D. A minimum score of 5 for fibers, 2 for specks and 3 for masses should be achieved to have equivalent imaging to 80% of the mammography units in the United States. Our mammography unit has the image score obtained by the prototype phantom, which gave 29 for fibers, 9 for specks and 3 for masses, which can be considered as optimum for mammography.