GE Healthcare

Digital Mammography Fact Sheet

Overview

Conventional mammography systems use x-ray film, which has to be processed and developed like normal photographic film. The new digital systems, such as the GE Senographe®, display the image of the breast directly onto a computer screen. The radiologist is able to zoom in, adjust the contrast and manipulate the image in order to have the very best chance of detecting tumours. In many cancer cases the changes in breast tissue are often very subtle, and detecting cancer is sometimes akin to detecting a needle in a haystack.

Digital mammography has several significant advantages:

Norwegian study shows digital mammography detects cancer earlier[1]. A large scale Norwegian in 2004 showed that in a group of 500,000 women, about 1500 additional cancers would potentially be detected earlier using digital mammography than would be detected using x-ray film. Early detection offers the opportunity to treat cancers earlier in their development with less aggressive treatments. Early detection can mean that the cancer is less likely to have spread to lymph nodes, and can make the difference between keeping and losing a breast.

Digital mammography considered better for women with dense breasts. A study of over 49,500 women in the US comparing digital mammography with film based systems showed digital mammography was significantly better in screening women who fit any of three categories: women with dense breasts, women under 50 and pre- or peri-menopausal women of any age (defined as women who had a last menstrual period within 12 months of their mammograms) [2].

Lower dose from x-rays. Digital mammography with the GE Senographe system reduces x-ray exposure by 25% compared with film based systems[3]. Although there are huge benefits from regular mammography, there is an extremely small radiation risk associated with the examination. It is important that this risk is minimized.

Fewer recalls because of technical failures: With digital mammography the radiographer can immediately see the image of the breast directly on the screen. This means if the image is not quite good enough – for example the woman has moved during the process - the procedure can be repeated straight away. With a conventional mammography system the x-ray film needs to be developed before any faults are detected. Recalls can be a very stressful time for the patient and her family.

Quicker, more patient-centred examination. Because the image is displayed directly on the screen, the radiographer can immediately check the quality and can devote more time to the patient rather than processing film. Examination times are quicker (60% time reduction regarding screen film), making it less stressful for the patient.

Breast history is more easily monitored. Because the system creates an electronic image rather than a hard copy, the problem of lost or mislaid films is eliminated. This makes it easier for the radiologist to study all a woman's mammograms taken over time and detect any changes.

Easier sharing of mammogram images between specialists - "telemammography". Digital mammograms are stored as an electronic image. This means they can be quickly sent to other centres for a second opinion, and shared much more easily by the multidisciplinary teams involved in breast cancer (typically a surgeon, radiologist and a pathologist). Digital images also will allow "telemammography" whereby the mammogram can be examined by a

radiologist in another centre. This will be particularly beneficial to rural hospitals, or where shortage of radiologists is a problem, and offers the promise of faster diagnosis.

Digital mammography opens the door to new, more advanced diagnostic applications
Digital mammography also enables new diagnostic opportunities that go beyond just replacing film with digital data. It also makes possible completely new applications that are not realisable with conventional mammography:

Tomosynthesis (currently under clinical investigation)
In certain cases a possible limitation of mammography is that it is a 2- dimensional technique and that several structures in the breast can overlap in the projection image. This can cause a combination of some structures in the breast to look like a malignancy or, worse, a genuine malignancy to be hidden by other structures, hence reducing sensitivity and specificity (causing false cancer diagnosis and missed cancers). The goals of tomosynthesis technology are to allow radiologists to get 3-dimensional images of the breast and further improve sensitivity and specificity of breast cancer detection.

GE Healthcare Senographe Facts
The Senographe 2000D was the world's first digital mammogram system in the world. It was launched in Europe in 1999.

About 100 engineers based in Buc (Paris) and 200 distributed globally work on the development of this system.

In 2008, 970 digital mammography systems were produced in GE Healthcare's factory.

Around 3,800 Senographe digital mammography systems are installed today around the world.

The latest generation of Senographe systems also enables the radiologist to take a sample of tissue (biopsy) in order to detect if lesion is cancerous. This means a sample can be taken during the consultation, offering the possibility of avoiding a separate surgical procedure for the patient.

References:

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2. Pisano E, Gatsonis C, Hendrick E, Yaffe M, Baum J, Acharyya S, Conant E, Fajardo L, Bassett L, D'Orsi C, Jong R, and Rebner M. Diagnostic Performance of Digital versus Film Mammography for Breast Cancer Screening - The Results of the American College of Radiology Imaging Network (ACRIN) Digital Mammographic Imaging Screening Trial (DMIST). *NEJM*, published online September 16, 2005 and in print on October 27, 2005.
3. K-P Hermann et al: "A Clinical Survey of Patient Dose in Full-Filed Digital Mammography. Paper #139 session A14, RSNA 2002.