19th Jun 2007

Advances in Breast Imaging

Impact in Asia Pacific

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Note: A summary of this article is published at Frost.com

Synopsis
Breast imaging techniques are diagnostics procedures that aim to detect breast cancer, which is currently ranked as the fifth most common cause of cancer deaths (after lung cancer, stomach cancer, liver cancer, and colon cancer). This article looks at the technology developments as well as the drivers for the adoption of breast imaging techniques in Asia Pacific.

Breast cancer is ranked the number one cancer among women, worldwide, and is the fifth most common cause of cancer deaths as well. It is known to occur as a result of either inherited or spontaneous gene mutations. According to the WHO, more than 1.2 million people will be diagnosed with breast cancer each year, worldwide; the good news is that if detected early, breast cancer is highly curable.

Detection is facilitated by mammography, an imaging technique that uses low-dose x-rays to examine the breast for cancerous tissue. While this process may cause some discomfort, it is considered vital to undergo this screening regularly, for women aged 40 and above, as mammography is currently the only diagnostic procedure that has been proven to reduce mortality from breast cancer.

New Technology in the Market - Digital Mammography
Mammography is one of the last modalities to enter the digital arena, where most diagnostic imaging procedures that include standard radiographs, MRI, CT, ultrasound, are already being performed using digital means.

With digital mammography, the image of the breast is acquired electronically and stored directly in a computer. While the cost of investment is up to 4 times higher than the film version, digital mammography offers several advantages such as;

1. Higher Accuracy for Certain Patients
Digital mammography offers significantly better results in early detection of breast cancer than film mammography in screening women who are pre-menopausal, or who have dense breasts. This includes younger women (under age of 50) who tend to have dense breasts, which have a lot of gland tissue compared to fat. Digital mammography may detect 15 to 28 percent more cancers in women possessing any of the above characteristics.

2. Better Image Clarity

A major advantage that digital mammography offers is the clarity of the image, which shows higher resolution and clearer contrasts, this is particularly important as tumors in dense breasts do not show up as well on the film as they do on the digital mammograms.

Digital Advantage of Digital Mammography

Since the images can be stored and sent electronically, the immediate benefits that one enjoys include:

- Ease in access, transmission, retrieval, and storage of these images
- The image is immediately available for diagnosis
- Digital mammograms are likely never to be lost

The digital diagnostic tools that are available can significantly increase the productivity of the reporting radiologist, due to:

- The ability to "zoom in "on to suspicious areas for clearer diagnosis
- Manipulating an "underexposed" film to adjust the contrast and signal-to-noise ratios, thereby, helping reporting radiologist 'see' certain breast tumors that are currently difficult to visualize on film.

This improves the workflow of the entire diagnostic process, with fewer women needing to return for extra views as digital images are available almost instantly upon being acquired. In addition to allowing better cancer detection, digital mammography examination requires less compression of the breasts, hence is less painful than film mammography.

Most importantly, digital mammography uses less radiation than film mammography, with no compromise in diagnostic accuracy.

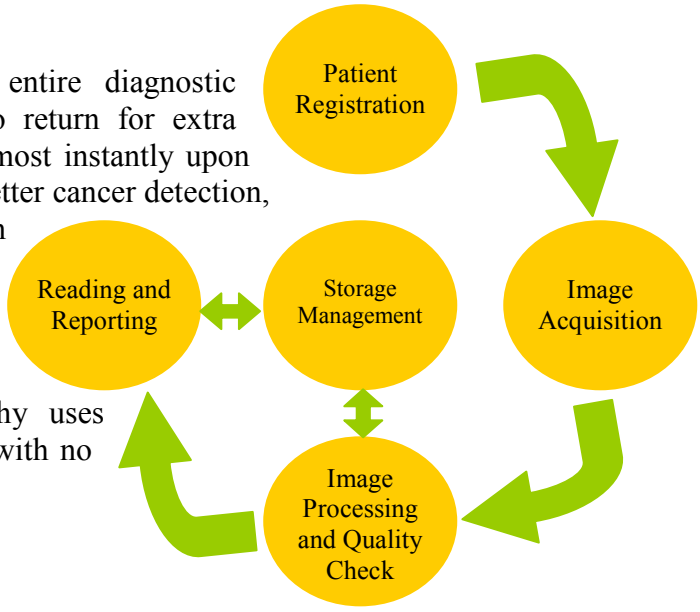

Fig 1.0 Typical Workflow of Digital Mammography

Spell Checker for Digital Mammograms

Another exciting development in the field of breast imaging is Computer Aided Detection or CAD. CAD acts as 'a second pair of eyes' in reviewing digital mammograms by using sophisticated pattern recognition to search for abnormality that may indicate the possibility of cancer. These findings are then highlighted to the reporting radiologist for further examination/interpretation.

Tele-Mammography
With digital mammography, one can have a mammogram performed at a rural area and have the images transmitted and interpreted at a remote medical center, which allows greater access to experts advice and second opinions as opposed to getting the same through mail courier and related delivery services.

While the file size of digital mammograms are relatively large, transmission of these images over long distances is still possible over broadband Internet or through wireless networks (such as through satellites). A study conducted by Dr Alan R. Melton of the New York Presbyterian Hospital-Columbia University Medical Center demonstrated the transmission of digital mammogram through Internet (in a secure environment) to an interpreting workstation 110 miles away, with each image transmitted in less than 45 seconds.

Rising Adoption of what? in Asia Pacific
While the technology is relatively new, digital mammography and CAD have already found their way into region, with installation sites in Singapore, Malaysia, Australia, Japan, South Korea, and Thailand.

A large part of this growth has come from the rising level of awareness and education on the importance of breast screening by various government agencies and NGOs. The continuous efforts in organizing breast cancer awareness programmes as well as promoting breast health screening, where patients enjoy subsidies in mammogram screening, has created a demand for better and faster mammogram services.

Boost of medical tourism in the region is also encouraging the adoption of digital mammography among hospitals in their quest for foreign patients. The adoption of high end technology for diagnostic and treatment reflects the high level of standards as well as a premier provider of quality healthcare services.

With increasing activities and programs promoting breast health awareness in the region, the market for digital mammography technology looks to be in the pink of health.

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