**MOBILE CASE VIGNETTE**

**Nurses in Motion**

**Nurse**

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Novel Breast-Imaging Methods

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Are you involved with a new procedure, diagnostic test, nursing intervention, or drug that impacts the oncology population? If so, consider writing for this column dedicated to the nursing implications of new patient care therapies. For more information, contact Associate Editor Deborah Davison, MSN, NP-C, CRNP, via e-mail at dddavison9@netzero.com.

For the past several decades, mammography has been the cornerstone of screening for breast cancer. Technology has improved greatly, as has radiologists’ skills in interpreting films. Many studies have attempted to analyze the contribution of regular mammography screening to decreasing mortality from breast cancer. These studies have demonstrated varying results. In 2001, Olsen and Gotzsche published a meta-analysis of mammography screening studies and concluded that no evidence existed that the regular use of screening mammography decreased mortality from breast cancer. This meta-analysis subsequently was attacked for its selection process and methodology, and, in 2002, the U.S. Preventive Services Task Force published guidelines supporting the use of screening mammography for women aged 40 and older, citing “fair evidence that mammography screening every 12–33 months significantly reduces mortality from breast cancer” (p. 344).

Despite the endorsement of the U.S. Preventive Services Task Force, screening mammography has its shortcomings. Even in facilities that perform a large number of mammograms, the sensitivity of mammography to detect breast cancer is approximately 80%–85% (Yaakob, 2003). This is a limitation of mammography itself and, in part, results from the difficulty of imaging dense breast tissue and interpreting the films. For this reason, continual attempts have been made to improve the technology of screening mammography or develop new imaging techniques to replace or complement mammography. Two methods currently under investigation are full-field digital mammography (FFDM) and magnetic resonance imaging (MRI).

**Full-Field Digital Mammography**

Most FFDM devices are very similar to traditional screen film units and, from the patient’s perspective, the experience of the test is essentially the same regarding technique and breast compression. In FFDM, a digital detector replaces the film cassette and the images are visualized on a monitor where a radiologist interprets them. The signs of breast cancer are the same with digital mammography as with screen film mammography. The U.S. Food and Drug Administration approved the first digital mammography device in 2000 (Lewin, D’Orsini, & Hendrick, 2004).

To date, no studies have shown a significant advantage of digital mammography over screen film mammography in detecting breast cancer. However, digital mammography does have other advantages, including the following:

- Digital mammography images have higher contrast than film, and the contrast can be changed on the monitor to improve visualization of suspicious areas.
- Using a monitor allows radiologists to magnify suspicious areas, which is ideal for visualizing small abnormalities such as microcalcifications.
- Digital images are not subject to artifacts and the variability that can occur with traditional film processing.
- Using digital mammography will eliminate the need for film libraries and allows images to be transmitted electronically among institutions for patient transfers or consultation with other radiologists.
- Examination time is shorter because no time is lost in developing films.

One of the most significant advantages of digital mammography is the ability to add computer-aided detection (CAD) to the system. Research has well established that if two radiologists interpret traditional screen film mammograms, the rate of cancer detection is improved. Unfortunately, such “double reading” is not practiced in many institutions because of increased costs and constraints on radiologists’ time. When CAD is used with digital mammography, the radiologist first reads and interprets the digital images. CAD then is activated and marks any areas of suspicion, which the radiologist reviews and interprets.

Studies continue to explore the advantages of digital mammography, especially regarding breast cancer detection. A large study by the American College of Radiology Imaging Network (ACRIN, 6652) was activated in October 2001 and reached its accrual goal of 49,500 women in November 2003. Results of this trial are pending.

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Magnetic Resonance Imaging

MRI first gained acceptance as a breast-imaging tool for use in evaluating breast implants for leakage. More recently, MRI has been studied in breast cancer screening. To date, its potential in screening and detection has not been proven, but studies are ongoing.

From the patient perspective, MRI differs greatly from mammography. Patients undergoing breast MRI are given an IV injection of gadolinium as a contrast agent. After patients are placed in the prone position in the MRI chamber, the study takes 45–60 minutes to complete. Patients are not exposed to radiation, and breast compression is not required. Hundreds of images may be obtained.

The MRI is interpreted by examining for areas of increased uptake of the gadolinium. Because breast cancers have an increased blood supply, the gadolinium tends to be taken up more intensely and quickly than in benign breast tissue. Some benign lesions also can demonstrate this enhanced uptake, creating the possibility of false positives.

MRI currently is being used as a preoperative adjunct to traditional breast imaging (mammography and ultrasound) to quantify the extent of disease in patients with diagnosed breast cancer, thereby assisting in surgical planning. Studies also are examining the role of MRI for use as a screening tool in women at high risk for breast cancer, especially young women for whom mammography is less sensitive.

A great deal of research is being done to define the role of MRI as a breast-imaging tool. Areas of study include evaluating patterns of enhancement that are consistent with ductal carcinoma in situ (early-stage breast cancer) and the use of pretreatment MRI as a tool for selecting appropriate treatment or predicting relapse-free survival.

Conclusion

The roles of FFDM and MRI have not been defined fully for the detection and management of breast cancer. Both modalities, however, clearly have a role and will contribute to clinicians’ ability to serve their patients.

Key Teaching Points

• Nurses are in a unique position to educate and counsel women about the value of regular breast screening. To fulfill this role, nurses must be well informed about the various modalities and their indications.

• Currently, no clear evidence suggests that digital mammography is superior to screen film mammography for detection of breast cancer. Digital mammography does allow manipulation of breast images on the monitor, making it a good choice for patients requiring magnification views of suspicious areas.

• The role of breast MRI is still evolving. MRI can be used to assist in surgical planning by helping to determine the extent of disease in patients diagnosed with breast cancer. Other uses for breast MRI are being studied, including its utility as a screening tool for high-risk patients.

References