

a Closer Look

Inside Medical Imaging of Baltimore

Fall 2009

a Journey Through **Breast Cancer**

Each fall our awareness of Breast Cancer is enhanced thanks to the many efforts of the American Cancer Society and the Susan G. Komen Breast Cancer Foundation.

They are great resources for prevention, information and support. Both of these agencies advocate early detection through regular self-breast examinations and screenings using mammography and other radiologic procedures. If a questionable area is detected on mammography, other radiologic procedures may include tests such as Ultrasound or MRI of the Breast. Choosing the right doctor and treatment center is perhaps one of the most important decisions to be made. The most recent literature strongly suggests that imaging studies should be done at an ACR (American College of Radiology) accredited facility. All of these facilities meet the highest standards available for breast imaging. The imaging facility should have board certified mammographers and technologists performing and dictating these exams. In addition



to being ACR accredited, it is important to have imaging performed at a facility that is a Comprehensive Breast Center. That is, a center that has the ability to perform mammography, ultrasound, Breast MRI and physician intervention when necessary and in a timely manner. Our relationship with GBMC and the Sandra and Malcolm Berman Cancer Center meets this goal.

Routine breast screening begins with mammography. If an abnormal area is identified, a compression view or ultrasound should be performed. A biopsy should be performed on any questionable area through a needle or vacuum assisted device.

This type of biopsy is usually done with the assistance of mammography, ultrasound or MRI guidance. If a biopsy proves to be cancerous, additional testing will be ordered to confirm the type of cancer from the specimen and other diagnostic imaging procedures may also be ordered to confirm the location of the cancer and to see if the cancer has spread outside the breast. Some of the procedures may include an MRI of the Breast and a Sentinel Node Biopsy. In some circumstances, a PET scan will also be ordered to confirm that the cancer has not spread to other locations in the body.

Once cancer has been found, the treatment of breast cancer is as varied as the disease itself and is tailored to the patient based on staging of the disease. Staging of cancer includes evaluating the lymph nodes. Lymph nodes are filters that trap cancer cells (and other unwanted cells) and eliminate them from the body. Pathologists check lymph nodes for cancer cells that have “escaped” from the tumor and are trying to spread. Doctors will use all of this information to map a treatment plan. A Sentinel node biopsy, also known as Sentinel lymph node dissection, is when the surgeon looks for the “sentinel node,” which is the very first lymph node that filters fluid draining away from the breast. If cancer cells are traveling in the lymph system, the sentinel node is more likely than the others to contain cancer cells. Rather than remove 10 or more axillary nodes, surgeons remove only the one



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Breast Imaging Tools



Dr. Judy Destouet's Story

My breast cancer diagnosis came 13 months ago. My gynecologist felt a lump in my left breast during my routine yearly examination. Even in retrospect the cancer was not detectable on my mammogram, which had been performed 6 months prior. I had an ultrasound performed one week later and the cancer was clearly evident on that study. I underwent an ultrasound guided core biopsy the same day. After the diagnosis was confirmed, I had a breast MRI study to evaluate for extent of disease. The MRI showed that the cancer was solitary on the left side, but it detected an enhancing nodule deep in my right (contralateral) breast. I underwent an MRI guided core biopsy with benign results. Because the invasive tumor was small enough, two weeks later I had a lumpectomy and sentinel node dissection. The tumor margins were clean and the lymph node was negative for tumor. Two months later I began whole breast irradiation treatment, which lasted for 6 weeks.

Throughout the diagnosis and treatment I had a very positive attitude. Cancer patients should take each day at a time and believe that they can fight and overcome this disease. Since my cancer was Stage 1 and node negative, I did not need chemotherapy. I will have to take an anti-estrogen drug for 5 years to decrease any chance of recurrence or metastasis. I really have had no major side effects from the treatment, other than for hot flashes and weight gain.

Women need to realize that mammography is a wonderful test for finding cancer but it is not a perfect tool. 20% of breast cancers do not distort the tissue sufficiently to be detected on mammography. Therefore, women must have a clinical breast exam by a doctor or trained professional every year. They should learn how to examine themselves, not because they will detect the smallest cancer, but because they may find a cancer that is missed on mammography. If a woman has dense breast tissue and she has a strong family history, she should ask her referring physician about obtaining a breast ultrasound in addition to a mammogram, because the sensitivity of mammography is decreased in dense tissue. For those women with BRCA 1 or 2 gene anomaly, an MRI should be considered in addition to routine mammography. MRI is more sensitive than mammography and ultrasound for the detection of invasive cancer, although there is a high false positive rate; i.e., many lesions that are not cancer are detected with MRI and unnecessary biopsies may have to be performed to rule out cancer.

My experience has made me more aware of what my patients go through when they are faced with a cancer diagnosis. The hardest part is waiting for test results! Once we have the answer we can deal with what needs to be done next to improve our chance of survival. ■

MAMMOGRAPHY is still the first step in cancer screening. The American Cancer Society suggests that women age 40 and older should have a screening mammogram every year and should continue to do so for as long as they are in good health. Mammography uses low dose radiation to examine breast tissue and can be imaged on film or digitally on a computer. The advent of digital mammography has increased cancer detection in many women. A large, multi-center Digital Mammographic Imaging Screening Trial (DMIST) sponsored by the ACRIN (American College of Radiology Imaging Network) has found that digital mammography was better at detecting cancer among women who are premenopausal or peri-menopausal, women who are under age 50 and women who have dense breast tissue. Some of the advantages of digital mammography include the images ability to be enhanced, magnified or manipulated for further evaluation. Digital images can be stored and retrieved electronically and when necessary, can be duplicated for consultation very easily and without distortion. If an abnormality is seen, patients may be recalled for compression images of a certain location. If this area persists, an ultrasound and or a biopsy of the area may be necessary. During the examination, the breast is placed on an imaging plate and compression is applied from above for a very short time. Compression is essential for better visualization of the breast tissue. The exam should take no longer than 20 minutes.

COMPUTER-AIDED DETECTION (CAD) involves the use of computers to bring suspicious areas on a mammogram to the radiologist's attention. This device is used after the initial review of the mammogram as a second check. This technology may improve the accuracy of screening mammography.

ULTRASOUND is an imaging tool that aids in tumor detection as an adjunct to mammography. Ultrasound is an imaging technique in which high-frequency sound waves are bounced off tissues and internal organs. Their echoes produce a picture called a sonogram. Ultrasound imaging of the breast is used to distinguish between solid tumors and fluid-filled cysts. Ultrasound can also be used to evaluate lumps that are difficult to see on a mammogram. Sometimes, ultrasound is used as part of other diagnostic procedures, such as fine needle biopsy. Ultrasound is not used for routine breast cancer screening because of its inability to detect certain early signs of cancer such as microcalcifications. During an ultrasound examination, the clinician spreads a thin coating of lubricating jelly over the area to be imaged to improve conduction of the sound waves. A hand-held device called a transducer directs the sound waves through the skin toward specific tissues. As the sound waves are reflected back from the tissues within the breast, the patterns formed by the waves create a two-dimensional image of the breast tissue. This is usually a short examination.

MRI OF THE BREAST uses a high field MRI system and a contrast injection to evaluate breast tissue. Recent advances in imaging allow for parallel imaging (imaging both breasts at the same time) and increased tumor detection using CAD stream. Computer aided image analysis (CADstream) aids in the image analysis and provides a more efficient, accurate and standardized method of analyzing and interpreting MRI studies. The American Cancer Society recommends that women at high risk for breast cancer add routine MRI breast screening to their annual mammogram. Women who fall into this category have a BRCA 1 or BRCA 2 mutation

or have had radiation to the chest between the ages of 10 and 30. Diagnostic benefit has been documented using MRI to identify tumors that are mammographically, sonographically and clinically occult. It has been shown that MRI can detect somewhere between 16% and 37% of unidentified breast cancers using other modalities.

In addition to screening, MRI of the Breast is a great imaging tool for detecting contralateral and ipsilateral or satellite lesions in patients with known breast cancer.

MRI has shown 11% to 31% additional disease in women with only a single known lesion. For this reason, MRI of the breast is suggested for all patients with newly diagnosed breast cancer. In addition, MRI can provide useful clinical information for surgical planning in breast conservation, which cannot be obtained by conventional imaging modalities. While MRI is highly sensitive, there are still some false positives which may need to be followed or biopsied. If a lesion is seen only on MRI, an MRI Guided Breast biopsy is indicated. For this procedure, the patient will need a shortened repeat MRI to localize the area in question. The biopsy is a vacuum assisted device and a clip is placed after the procedure.

PET/CT SCANNING: Positron Emission Tomography (with Cat Scan) can detect cancer cells in the body by taking pictures of the cells as they work. In order to do this, a small amount of radioactive (tagged) sugar is injected into a vein. Cancer cells and certain diseases use these tagged sugar molecules in a much higher concentration than normal body cells. As a result, the higher concentrations of cells show up as a “hot spot” on the PET/CT scan, localizing the cancer or the disease. It should be noted, that this examination is not used to detect breast cancer, but to see if the cancer has spread to other tissues or organs in the body. ■

Anne Wedge's Story



I have always been an advocate for breast cancer awareness; I have always performed self breast exams and have had my yearly mammograms. In the past, I have had 2 prior breast biopsies for benign lumps, one which wasn't detected by mammography or ultrasound. The most difficult part is waiting for the results of a biopsy! While getting undressed one night, I felt a lump in my breast. The next day, I had a mammogram and an ultrasound. A solid mass was seen and the Breast Center performed an ultrasound guided breast biopsy the same day. When the results came back positive for breast cancer, I had an MRI of both breasts. Luckily, cancer was only detected in one breast.

I discussed my many options with my surgeon. Because of my many risk factors, mother and maternal aunt with breast cancer, not having children, never breast feeding and early menses, I decided to opt for a bilateral mastectomy with reconstruction. I was afraid that I would be a prime candidate for a second breast cancer and I didn't want to take that risk. I also had a sentinel node biopsy and a muga scan prior to my surgery.

I did not receive the results of the sentinel node biopsy before my surgery, so no other testing was performed. I had 5 positive nodes from my sentinel node biopsy, which meant that I also needed a PET/CT scan prior to any other treatment. My one main regret is that I didn't have the PET/CT prior to my surgery. The recent surgical changes to my chest wall made diagnosing spread difficult.

I would like to leave with a personal plea. This is not a death sentence! Involve yourself in your treatment and educate yourself. The American Cancer Society is a wonderful resource. Every patient should know their surgical options, node involvement, and their staging and understand their pathology results. All patients will be cared for by a team of medical specialists. It is very important to trust in their knowledge and follow their advice. If you don't have faith in your team, you will always be second guessing yourself. This will keep you from having the positive attitude that will carry you through treatment. And last but not least, follow the rules; you must be compliant. Your team has a vast array of knowledge that can make this trip a lot easier on you and your family. ■

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node, or a cluster of two or three, which are most likely to have cancer. If the sentinel node is clean, chances are the other nodes are clean, too. But it's important to remember that sentinel node biopsy is not appropriate for everyone. It is mostly recommended for women who have early-stage disease, with a relatively low risk of lymph node involvement.

The procedure involves the injection of a blue dye tagged with a radionuclide directly into the biopsy site. A surgeon tracks the dye to the sentinel node and removes this node and possibly one or two nodes attached to the sentinel node. If cancer is found in the sentinel node, the surgeon will generally remove more nodes during this procedure or during a follow-up surgery. ■



Medical Imaging of Baltimore

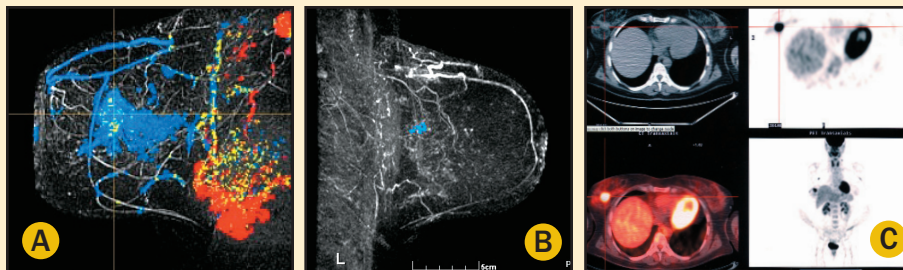
(on the GBMC Campus)
6715 North Charles Street
Baltimore, Maryland 21204-6822

410-296-5610
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HIGHLIGHTS

- High field open and closed MRI Scanners
- PET/CT Scanner
- State of the art scanners for improved speed and image quality
- Enhanced current applications
- Innovative new applications
- Non-invasive angiography
- MR Breast imaging
- MRI Guided breast biopsies
- Board-certified physicians
- Licensed, certified technologists
- Staff receives ongoing continuing education
- 24-hour report turnaround
- Extended hours of operation
- Paid parking
- Complimentary valet parking
- Partnered with GBMC
- Participation with numerous insurance plans
- Oral sedation available upon request (for patients with claustrophobia)

Case of the Month



CAD Stream image of right breast.

CAD Stream image of left breast.

PET/CT image of same patient.

HISTORY: Patient is a 54 year old woman with biopsy proven breast cancer in 2 areas in the right breast.

MRI: The patient was referred for an MRI of the Breast which shows **A** rapid enhancement in these two known lesions and a third unknown area in the same breast. A single focus of enhancement in the left breast, **B** probably benign, is also seen. Given the extent of disease in the right breast, the area in the left breast must be biopsied.

PET/CT scanning **C** was also performed on this patient to evaluate for metastatic disease. The known right breast mass is visualized. Right axillary lymphadenopathy is also seen. Nonspecific posterior triangle lymphadenopathy on the left side. Thyromegaly with nonspecific diffusely increased uptake, possibly due to thyroiditis. No other areas of metastatic disease are seen.

DISCUSSION: MRI of the breast is a useful tool for evaluating satellite and contralateral lesions in patients with known breast cancer. MRI is also useful in the setting of axillary adenopathy when a primary is unknown. While MRI has significant promise, it is important to realize there are drawbacks. There are still some false positives which may need to be followed or biopsied. When used in conjunction with mammography and ultrasound, a comprehensive assessment of the breast is attained.

PET/CT has been approved by Medicare in the staging, restaging and monitoring of response to therapy for breast cancer. This case demonstrates the utility of using PET/CT in the staging of breast cancer, by excluding distant metastasis. A tissue diagnosis will still be needed to confirm the presence of nodal metastasis.



Noreen's Corner

Noreen Pfeiffer

I hope that you find this newsletter informative and interesting. My

focus this fall has been purely about breast cancer and the available modalities for testing. Navigating through diagnosis and treatment can be a long and arduous ordeal. I am always awed by the strength of my patients. I have had the privilege of working with two women who are making this journey; they have graciously shared their stories for this newsletter. I feel the courage and wisdom of their experience will inspire women to get the screenings and care necessary for early diagnosis.

Our 2010 calendar will be available in late November or early December. If you would like additional copies, please give us a call at 410-296-5610 or e-mail me @ npfeiffer@mibmri.com.

