

**New frontiers in breast cancer detection: utilizing some of the latest diagnostic tools may increase breast cancer detection, patient comfort and safety - Special Report**

The quest to improve breast cancer detection technology and offer patient friendly alternatives to standard mammograms has inspired a great amount of research. Thermography, the Aurora Breast MRI Scanner and the General Electric Senographe[R] 2000D Full Field Digital mammography system with R2 ImageChecker[R] Computer-Aided Detection (CAD) are a few of the latest results.

**Thermography**

Two of the most exciting, yet overlooked, diagnostic procedures of this century are Digital Infrared Thermal Imaging (DITI) and Contact Regulation Thermography (CRT), otherwise simply termed thermography. Dr. Ali Meschi is a board-certified naturopathic physician at the forefront of this technique. "Thermography is a non-invasive, objective [and] non-radiative tool that uses [body heat] to diagnose the causes of a host of health conditions," he explains. Because it uses no radiation, it is completely safe. Utilizing high speed computers and very accurate thermal imaging cameras, body heat is processed, recorded and translated by a computer. The image map it produces can then be analyzed on screen, printed or sent via e-mail.

During the thermography procedure 112 electrodes are placed on the patient's body to acquire temperature readings. Two different readings are taken. First, the patient sits in a fairly cool, but not uncomfortable, room for 10 minutes. Then, the first temperature readings of the face/head, teeth and neck are taken by gently touching the body part's surface with the probe. The patient is then asked to remove her clothes from the waist up to create "cold stress" at about 68 degrees Fahrenheit and complete the first reading of the 112 data points. Then, the patient stands in her underwear another 10 minutes. After this period, the second reading of the data points is taken and the test is concluded.

Doctors use the image map acquired from these readings to determine if abnormal hot or cold areas are present. These hot and cold areas can relate to a number of conditions for which the FDA, Bureau of Medical Devices, has approved the thermography procedure. These include screening for breast cancer, extra-cranial vessel disease (head and neck vessels), neuro-musculo-skeletal disorders and vascular disease of the lower extremities. In the past decade, a number of advancements have brought thermal imaging to the diagnosis forefront.

Nonetheless, the utilization of thermography as a breast cancer screening tool has been a very controversial topic within the health care community for the past decade. However, the technology has gained scientific acceptance, been approved for screening purposes and is clearly a powerful tool in early breast cancer detection. "The concept is quite simple," Meschi reveals. "Thermography measures the heat from one's body. Metastatic cancers create heat, which can be imaged by digital infrared imaging. This is due to the metabolic activity of the tumor tissue as compared with the temperature of tissue adjacent to the tumor and in the opposite breast. By comparing the breast in question with the normal breast, which acts as the patient's own control, abnormal heat signatures associated with the metabolism of the tumor can be easily detected." Cancer tumors produce a chemical which promotes the development of blood vessels supplying the area where the tumor resides. Also, normal blood vessels under the control of the sympathetic nervous system are essentially paralyzed, causing an increase in blood vessel size. The blood increase in the region simply means more heat.

Since "thermal imaging has demonstrated in numerous studies to be capable of measuring these heat signatures years before conventional technologies can see a mass, the procedure uses no radiation, compression of breast tissue and is totally safe, thermography or DITI/CRT provides a safe early warning detection system," Meschi adds. A monthly self-exam, annual physician exam, yearly thermal imaging and mammography, when indicated, increase the effectiveness of early detection to greater than 95 percent.

**The Aurora Breast MRI Scanner**

Until now, the gold standard for breast cancer detection has been mammography. While mammograms remain a very effective diagnostic tool, they are not the final word in breast cancer diagnosis. Now there is Aurora, an MRI scanner specifically designed for breast imaging, available at only a handful of centers in the country.

During a breast MRI scan, a woman receives an intravenous injection with a contrast agent--a chemical solution that acts as a "stain" to illuminate areas of tissue with many blood vessels. "Since most tumors have a higher blood supply than normal tissue and grow abnormally quick, the contrast agent will usually make them easier to identify," says Dr. Mark Novick, radiologist and medical director of Manhattan East Breast Imaging. "While the MRI does not replace standard mammograms and ultrasounds, it will augment those imaging techniques."

In addition, the Aurora Breast MRI Scanner rates high on patients' physical and mental comfort. First, the patient's head is outside of the machine and second, the Aurora Breast MRI Scanner is the only one of its kind to place the technologist in the room with the patient. The patient lies on her stomach and goes in feet first, which eliminates the tunnel effect. Hundreds of images are taken during the MRI exam, analyzed by computer and physician, then compared to the patient's mammograms and ultrasounds.

The Aurora Breast MRI Scanner is often used after a woman has been diagnosed with breast cancer. "There will be cancers not seen on mammography or ultrasound that MRI can pick up," says Novick. "The MRI can better show the extent of the cancer so doctors can devise the best treatment plan." Preliminary unpublished data from the Faulkner-Sagoff Breast Imaging and Diagnostic Center in Boston show that up to 30 percent of planned lumpectomies should actually be mastectomies based upon the Aurora Breast MRI Scanner findings. "In fact," Novick states, "at other centers that have installed dedicated breast MRIs, surgeons grow to rely upon [them]. They do not want to operate until they have a breast MRI, to be sure they've done adequate mapping of the breast."

Novick also uses the Aurora Breast MRI Scanner on women with especially dense breast tissue, high risk factors (e.g., a family history or past occurrence of breast cancer) or scarring from prior lumpectomies. "The MRI is very helpful [in determining] if there is a recurrence at the lumpectomy site because a scar and recurrence can look the same on other imaging techniques," he explains. It is also the best tool to find gel bleed or silicone ruptures in breast implants.

Another area of potential breast MRI usage, already undergoing extensive assessment in Europe, is as a screening mechanism to assess the breasts of women in their 20s and 30s. Although screening mammography is not considered appropriate for most women under the age of 40, an increasing number of cancers is being diagnosed in this age group. Generally, these cancers tend to be discovered later, often due to the dense glandular nature of youthful breast tissue, and prove to be more aggressive than cancers in older women.

Unfortunately, due to the Aurora Breast MRI Scanner's high cost, many radiology practices rationalize it is more cost efficient to have a multipurpose MRI scanner. However, Novick believes the superior quality, significant patient comfort and ability to find cancerous lesions before they've had a chance to spread make this technology worth the investment. He considers the breast MRI the future of earlier breast cancer diagnosis. "The breast MRI is a life-saving medical advance and just the beginning of what is yet to come," Novick asserts.

**Computers Join the Fight**

First, there was the conventional analog mammogram, which produced a breast x-ray on film. Then, to help remove possible inconsistencies caused by traditional film developing, came the digital mammogram--a breast x-ray acquired directly into a computer and viewed on a high-definition video monitor. Now, women can have their digital mammograms scanned by a program that will point out suspicious abnormalities the human eye might not detect.

It's called the General Electric Senographe[R] 2000D Full Field Digital Mammography system with R2 ImageChecker[R] CAD. "While other imaging centers are cutting their mammography programs, we feel it is imperative women have access to the most advanced technology available and that includes a mammography system that is not only digital instead of analog, but also has the 'extra set of eyes' and detection capability of a computer program to aid in our radiologists' search for cancer," Novick insists.

"When a doctor reads a mammogram, he is going to pick up a certain amount of cancer," continues Novick. "Studies show that if the same mammogram is read by a second doctor, the detection

rate goes up by 15 percent." However, according to a recent study of more than 12,000 women, a physician using CAD technology resulted in a 20 percent increase in earlier breast cancer detection. "That means using CAD is a full 33 percent better than the trained eyes of two doctors," Novick concludes.

The R2 Technology's ImageChecker[R] function is like a "spell check" for the mammogram image. When the radiologist displays the image on the screen, it silently examines the mammogram for abnormalities while the doctor performs his or her review. When the radiologist is finished, he or she presses a button and ImageChecker[R] presents its results. "The computer directs the radiologist's attention to obscure details that might indicate the presence of tumors and microcalcifications that can sometimes be overlooked," Novick explains. Microcalcifications are sometimes the earliest and only visible indications of cancer.

Novick is excited that Manhattan East is the first private facility in New York City to offer this technology, but hopes and expects others will reverse the trend of eliminating mammography from their centers. "Experts believe digital mammography with CAD should become the imaging standard in the next five years, but what's going to make that happen is consumer demand," he stresses. "Women need to know what will best increase their chances of detecting cancer and push their doctors to adopt it."

"Workout in the Park" Comes to Los Angeles

Self magazine's 10th annual "Workout in the Park," a health and fitness festival, will take place at the Santa Monica Pier on October 11th from 11 a.m. to 3 p.m. Activities will include:

[heart] fitness classes led by Crunch[R] Fitness instructors

[heart] Rep Reebok (a new program that combines balance and weight training)

[heart] climbing wall

[heart] massages

[heart] henna tattoos

[heart] sampling the newest health and beauty products.

Proceeds benefit The Big Bam! Foundation and The Susan G. Komen Foundation. Tickets cost \$10 and may be purchased at [www.e2e-store.com/self](http://www.e2e-store.com/self).

Other benefits of digital mammography with CAD include:

- \* increasing a doctor's chance of detecting lesions in women with dense or fibrous breasts, which includes many women under age 40.
- \* eliminating traditional analog processing's variables, such as film developed too light or dark or with too much or little contrast. Digital mammography produces a more consistent image.
- \* reducing the need for additional mammogram views, which expose women to further radiation, are invasive, uncomfortable and stressful for the patient.

Arm Yourself, Literally

In 2003, breast cancer will account for nearly one out of every three cancer diagnoses in women. More than 70 percent of breast cancers occur in women who have no identifiable risk factors other than age and only 5 to 10 percent of breast cancers are linked to a family history of the disease. The good news is that an estimated 2,167,000 women are living with breast cancer. Becoming informed, involved and in control of one's medical care can improve one's outcome. Two new books take different approaches to inform and support women diagnosed with breast cancer.

Breast Cancer Q&A: Insightful Answers to the 100 Most Frequently Asked Questions (Avery Trade Paperback; \$14.95) by Charyn Pfeuffer provides answers to questions most commonly asked by breast cancer patients, including information on breast cancer basics, screening, prognosis, treatment options, complementary and alternative therapies as well as after care. As a breast health educator, Pfeuffer knows how to provide information that is clear, comprehensive, free of medical jargon and, most importantly, empowering. Breast Cancer Q&A is a resource a woman can trust in order to become her best advocate and beat her disease.

Taking a different tack to helping women diagnosed with breast cancer, Barbara Delinsky, bestselling author and breast cancer survivor, decided to use her success in fiction to put together the resource she wished existed during her treatment. UPLIFT: Secrets from the Sisterhood of Breast Cancer Survivors (Washington Square Press Trade Paperback; \$13) is a one-of-a-kind collection of inspiring personal anecdotes that amuse, comfort and instruct as well as nitty-gritty tips on even the smallest details of daily life. Delinsky says it is a "support group ... that offer[s] all the practical little secrets to survival that have nothing to do with doctors, machines or drugs and everything to do with women helping women." Handson, warm, funny and always real, UPLIFT arms readers with the various means by which countless women have faced their fears, survived their ordeal and bravely gone on with life. Working on UPLIFT has been labor of love for Delinsky, who is donating all proceeds to breast cancer research.

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