BEYOND MAMMOGRAPHY: AN EXAMINATION OF BREAST THERMOGRAPHY

— By Len Saputo, MD

The most devastating loss of life from breast cancer impacts women between the ages of 30 and 50. For women between the ages of 40 and 44, breast cancer is the leading cause of death, according to the American Cancer Society. Yet the November 10, 2003 issue of the AMA journal, American Medical News, reports little evidence documenting that mammography saves lives from breast cancer for premenopausal women, which are many of the women who fall into these age ranges. (1)

Good evidence supports mammography as a valuable breast cancer screening tool for women in their late 50s and 60s, but reveals room for substantial improvement. For women over the age of 70, accumulated data documents limited value in doing mammograms since they do not significantly extend life. (2, 9, 10)

Obviously, as a detection tool, mammography has a valued place in clinical practice; however, other technologies are proving to be more effective in breast cancer detection and should become part of mainstream clinical practice in order to save more lives.

A Closer Look: The Prevalence, Fear and Risk Factors of Breast Cancer

According to the American Cancer Society (ACS), breast cancer is the leading cause of death in women between the ages of 40 and 44. Although breast cancer has only 10 percent the morbidity and mortality of coronary heart disease, it is generally more feared. (3)

ACS statistics further document that every year in the United States there are approximately 200,000 new cases of breast cancer and more than 40,000 deaths. Not included in this number are more than 47,000 new cases of carcinoma in situ breast cancer, which is better known as DCIS (ductal carcinoma in situ) or LCIS (lobular carcinoma in situ) and is a very early form of breast cancer.

DCIS and LCIS are very mild cancerous lesions that only become malignant in about 2 percent of cases. For this reason many physicians do not consider DCIS and LCIS true cancers.

The risk of breast cancer at age 25 is less than one in 19,000 whereas by age 35 it is one in 217. (4) Yet, the statistic people are most familiar with is that one in eight women will eventually develop breast cancer. It is important to appreciate that this number is a cumulative risk that only applies to women who have reached the age of 90.

The hereditary breast cancer genes, referred to as BRCA 1 and 2 genes, are known to be associated with both breast and ovarian cancers, but only account for 5 to 10 percent of all breast cancer. Newer, less well-known factors are estimated to account for another 10 percent of all breast cancers. In at least 70 percent of cases, however, the cause of breast cancer is yet unknown. (5)

Generally Accepted Risk Factors

The risk for breast cancer is increased if you:

- Had your first period before age 12
- Had your first child after age 30 or never were pregnant
- Were on hormone replacement therapy or birth control pills
- Consume one or more alcoholic drinks per day
- Have a family history of breast cancer
- Are found to have inherited the breast cancer genes
- Are postmenopausal and gained weight (not so for premenopausal women)
- Have elevated levels of insulin as seen with syndrome X or type 2 diabetes, which are conditions associated with central obesity and increased levels of insulin-like growth factor-1 (6)
- Are sedentary

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The History of Breast Thermography

Breast thermography has been available in clinical practice since the 1960s. Initially, physicians were very excited when they learned that breast cancers emit more infrared heat than normal healthy tissues, and that they could be detected using infrared scanners. However, this technology was brought into practice prematurely—before clinical trials were completed, and before sufficient information about other health conditions that also emitted large amounts of infrared light were understood.

Unfortunately, this resulted in many women having breast surgeries that did not have breast cancer. Eventually, the high rate of unneeded surgeries led to the rejection of infrared breast imaging in the United States, with the entire technology being sidelined by mainstream medical practice for several decades.

Since the 1970s, however, clinical research has continued, especially in Canada and France where this technology is considered more mainstream. More than 800 research papers have been published on the subject of breast thermography and a research databank on more than 300,000 women who have been tested with infrared breast imaging exists.

In addition, major advances in infrared imaging technology have been achieved that improve the sensitivity to 0.05 degrees centigrade, which makes identifying breast cancer much easier and more reliable. The combination of improved technology and scientific clinical research is sparking the return of breast thermography into clinical practice today.

How Breast Thermograms Work

Modern infrared scanners have thermal sensitivity of 0.05 degrees Centigrade. Because tumor tissue does not have an intact sympathetic nervous system, it cannot regulate heat loss. When the breast is cooled with small fans in a room kept at 68 degrees Fahrenheit, blood vessels of normal tissue respond by constricting to conserve heat while tumor tissue remains hot. Thus, tumors emit more heat than their surrounding tissues and are usually easily detected by heat-sensing infrared scanners.

Over time, cancerous tissues stay hot or become even hotter—they do not cool down. In sharp contrast, however, other possible conditions such as fibrocystic breasts, infections, and other benign disorders cool down as they resolve.

Breast thermograms have highly specific thermal patterns in each individual woman. They provide a unique "thermal signature" that remains constant over years unless a change exists in an underlying condition. Thus, over time, it is possible to differentiate between cancers and benign conditions. Based on this ability more accurately detect cancers over time, it becomes important to have a benchmark early on in a woman's life. For this reason, women should have breast thermography performed beginning at age 25.

Thermograms are graded with a system much like pap smears with grades 1-5. Th1 and 2 are normal, Th3 is moderately abnormal, and Th4 and 5 are severely abnormal and require careful follow-up because many of them are caused by cancer. Of significance, one recent study documented that women with Th1 and 2 scores can be reassured with a 99 percent level of confidence that they do not have breast cancer. (16)

Clinical Research Supporting Breast Thermography

At least five important studies published between 1980 and 2003 document that breast thermal imaging is a major advancement in identifying breast cancers not only with greater sensitivity and specificity, but also years earlier than with any other scientifically tested medical technology.

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These scientific studies include:

- Cancer, 1980, Volume 56, 45-51. (17) 58,000 patients with breast complaints were examined between 1965 and 1977. 1,245 patients with abnormal Th3 mammotherms had normal breasts by mammography, ultrasound, physical exam, and biopsy. Thirty-eight percent of women with normal breasts and 44 percent of those with mastopathy developed biopsy proven breast cancer within five years. Ninety percent of patients with Th4 or 5 had diagnosis of cancer made on the first visit.
- Biomedical Thermology, 1982, 279-301, Alan Liss, Inc, NY. Michel Gautherie, MD, followed 10,834 women over 2 to 10 years by clinical examination, mammography and thermography. (15) The study followed 387 people with normal breast examinations and mammograms but Th3 thermographic scores for an average of less than three years. In those without symptoms, 33 percent developed cancer. In those with cystic mastitis, cancer developed in 41 percent. These were predominately women between 30 to 45 years of age where breast cancer is the leading cause of death.
- Thermology, 1986, Volume 1, 170-73. (18) The effectiveness of mammography, clinical palpation, and thermography were compared in the detection of breast cancer. Thermography had the best reliability, but the best results were found when all three were used together.
- The Breast Journal, Volume 4, 1998, 245-51. (19) Keyserlingk et al documented 85 percent sensitivity in diagnosing breast cancer using clinical examination and mammography together. This increased to 98 percent when breast thermography was added.
- American Journal of Radiology, January 2003, 263-69. (16) The journal reported that thermography has 99 percent sensitivity in identifying breast cancer with single examinations and limited views. Further, a negative thermogram (Th1 or Th2) in this setting is powerful evidence that cancer is not present.

Important Highlights from Breast Thermography Studies

- Advances in infrared technology combined with data on 300,000 women with mammotherms document that breast thermography is highly sensitive and accurate. Today, this means that more than 95 percent of breast cancers can be identified, and that this is done with 95 percent accuracy. In women under the age of 50, where there is the most devastating loss of life from breast cancer, mammography, MRIs and PET scans cannot come close to matching the combined sensitivity and specificity (accuracy) of breast thermography.
- Breast thermography involves no radiation exposure or breast compression, is easy to do, is done in a private setting and is affordable.
- The FDA approved breast thermography for breast cancer risk assessment in 1982.
- Breast cancer screening is critical to begin long before age 40. For premenopausal women, it should begin at age 25 in order to identify young women who are already developing breast cancer. It takes approximately 15 years for a breast cancer to form and lead to death. Further, young women with dense breast tissue are the most difficult to evaluate using breast palpation, mammography, and ultrasound examinations, yet they have a significantly higher risk of developing breast cancer.
- Mainstream procedures are not approved for breast cancer screening in women under age 40—it is widely known and accepted that they miss too many cancers and lead to too many false positive findings that result in far too many needless breast biopsies.

Conclusion:

Today, breast thermography is the most effective way to identify women with breast cancer, especially in women under the age of 55, where it causes the most devastating loss of life. For women over 55, breast thermography is an important adjunct to clinical breast examination and mammography, as this combination has been documented to increase identification of breast cancers to 98 percent.

Because of its low cost and high degree of sensitivity and accuracy, all women who want to be screened for breast cancer should begin having breast thermograms beginning at age 25. Clearly, there are situations that warrant the use of other modalities such as mammography, ultrasound, MRI, PET scanning, nipple aspirations, or biopsy and these valuable tools should continue to be used in clinical practice along with breast thermography.

Many new technologies are on the horizon that may become mainstream in the near future. With the advent of highly sophisticated genetic technology, new proteins are constantly being discovered that offer promise as markers of early breast cancer. (20) Recently published reports also suggest that MRI technology may be blended with spectrophotometric measurements that could diagnose breast cancer without even doing a biopsy. (21)

The practice of medicine, just like everything in life, is in constant evolution—there is no guarantee that what is in the mainstream today will be here tomorrow. Yet, the advancement of all fields of endeavor often moves slowly and cautiously, sometimes at the expense of human life. We must remain open and alert as new, exciting, and safe strategies emerge, especially in situations where there is such a pressing need for new approaches.

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