

ROCKING THE ROAD FOR A CURE

Diagnostic Tests, Symptoms, Current and New Treatments/ Approaches

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[Source: John Hopkins- Kimmel Cancer Center]

Diagnostic Tests

Our experts use a variety of imaging and diagnostic procedures to diagnose breast cancer.

Mammography: A mammogram, or breast x-ray, is one of the most widely used diagnostic tools for breast problems. There are two kinds of mammograms. Screening mammograms are done when there are no signs or symptoms of a problem. However, they help provide a picture for health care providers of what the patient's healthy breast tissue looks like, so that changes in breast tissue can be easily identified. Diagnostic mammograms are used for patients with a breast lump, thickening or nipple discharge and for patients who have had previous lumps or cancer. In addition to standard film mammography, the Johns Hopkins Avon Foundation Breast Center offers digital mammography. Unlike film-based mammography, digital mammography uses computer-based electronic conductors to convert X-rays to light and light to digital data, ultimately displayed on computer monitors as picture of the interior of the breast.

Ultrasound: Abnormalities identified through mammography or physical exam by the patient or physician can be imaged through ultrasound. This diagnostic technique can help determine if a lump is fluid-filled, like a cyst, or solid, like a benign or cancerous tumor. It also can help determine if an area of thickening is breast tissue or a tumor.

Galactography: This technique is used during mammography to evaluate the cause of nipple discharge. By injecting a dye in the duct giving rise to the discharge, the radiologist can determine if the nipple discharge is caused by a growth in the milk duct and its precise location.

Magnetic Resonance Imaging (MRI): This technique uses a magnetic field to image the body. An intravenous injection of a dye is given to the patient. The dye is absorbed better by cancers but not by benign lesions, helping physicians determine if a suspicious mass is a cancer.

Scintimammography: The newly-developed technology uses a radiotracer injected into the arm of the patient that travels to the breast tissue to pinpoint breast abnormalities. It is most commonly used in women with dense breast tissue that is more difficult to examine through other techniques, women with increased risk for breast cancer, and women with abnormal mammograms.

Fine Needle Biopsy: A small needle is inserted into the breast lump to extract a small number of cells. The cells are examined under a microscope for cancer.

Ultrasound-Guided Core Needle Biopsy: In a core need biopsy, the physician uses a special needle to remove a small sample of tissue from the lump. The tissue is examined under a microscope for cancer cells. The procedure is very accurate, usually painless, and does not cause scarring.

Stereotactic-Guided Core Biopsy: Also known as minimally invasive breast biopsy, this techniques is used to retrieve multiple samples of breast tissue from abnormalities such as microcalcifications that cannot be seen with ultrasound. Computer and mammography technology are used to accurately pinpoint the abnormality. Then, a needle is inserted into the breast through a tiny incision to retrieve the tissue samples. The incision is so small that no stitches are required.

Advanced Breast Biopsy Instrument (ABBI): This minimally invasive biopsy technique also uses stereotactic guidance but enables the radiologist to remove the entire lump in certain cases. The procedure requires a small incision, and it can be completed in less than an hour.

Surgical Biopsy: Johns Hopkins clinician-scientists are pioneering efforts to phase out surgical biopsies. However, surgical biopsies continued to be used in selected patients. They may be used to evaluate an abnormality that can be felt but did not show up in a mammogram or ultrasound or to remove a mass that is not accessible by needle biopsy. Usually surgical biopsy requires only local anesthesia. A radiologist injects a blue die into the mass as visual cue for the surgeon. The surgeon removes the suspicious tissue to be evaluated by a pathologist. Surgeons often can often provide a tentative diagnosis the same day through visual examination of the tumor. However, a definitive diagnosis can not be given until the pathologist examines the tissue under the microscope of the presence of cancer cells.

Cancer Symptoms

The earliest sign of breast cancer is an abnormality that shows up on a mammogram before it can felt by the patient or health care provider. As the tumor continues to grow, physical symptoms including:

a lump in the breast

thickening, swelling or dimpling of the breast

skin irritation

distortion or retraction of the skin

scaliness

Pain or tenderness (Breast pain is most commonly due to benign conditions, and is not usually the first symptom of breast cancer. However, any unusual change or sensation in the breast tissue should be brought to the attention of a health care provider.)

nipple discharge

Current Treatments

Breast cancer therapy often includes a variety of treatments including surgery, radiation therapy, and/or chemotherapy. Today, breast conservation therapies are available to more than 90 percent of patients with early stage disease. For those who are not candidates for breast conservation, new breast reconstruction techniques often restore the breast to pre-surgery appearance.

Surgical treatments for breast cancer include:

Lumpectomy: Lumpectomy is the surgical removal of the tumor rather than the entire breast. It is typically reserved for women with smaller, early stage disease and is often followed by radiation therapy to the breast. Lumpectomy can be performed under local or general anesthesia. The surgeon makes an incision large enough to remove all of the cancer as well as a margin of normal tissue all the way around the tumor. At the time of the lumpectomy the surgeon also will remove a sample of lymph nodes from under the armpit to see if they contain any cancer cells. The procedure takes approximately one to two hours. Many patients stay in the Hospital overnight, however, some choose return home the same day.

Mastectomy: In mastectomy, the surgeon removes the entire breast that contains the cancer as well as some lymph nodes from under the arm to see if any cancer cells have spread to this area. The procedure is performed with a combination of local and general anesthesia. Women who undergo mastectomy but choose not to have immediate reconstruction of the breast may return home the same day under the care of a home care nurse. Those who undergo reconstructive surgery usually remain in the hospital for two to three days or more.

Breast Reconstruction Surgery: Reconstruction techniques have greatly improved in recent years. There are two kinds of breast reconstruction, those that use artificial substances and those that use tissue from the patient's own body. The Tram Flap uses the patient's abdominal tissue to reconstruct the breast. In certain cases, when tissue cannot be taken from the patient's abdomen for medical reasons, the reconstruction is done with tissue taken from the back. Nipple reconstruction techniques also have improved during the last several years. Plastic surgeons are usually able to use tissue from the breast area to make a nipple which is then tattooed to match the other breast nipple.

Radiation Therapy: Radiation therapy is the use of high-energy x-rays to destroy cancer cells. Special machines deliver precisely targeted beams of radiation to the site of the cancer. This therapy is painless and has minimal side effects. Though rare, some women report a feeling of fullness or swelling in the breast, flu-like symptoms, or when lymph nodes are treated, swelling under the arm. Radiation therapy is most often recommended for patients undergoing lumpectomy and less frequently for women who have undergone mastectomy. Typical treatment for early stage breast cancer typically requires six weeks of daily treatments.

Chemotherapy: Chemotherapy involves the use of anticancer drugs, usually taken intravenously or orally, to destroy breast cancer cells that have survived surgery. While radiation works locally or only at the site where the radiation is targeted, chemotherapy travels throughout the body, or systemically, to kill cancer cells that have broken away from the tumor and have begun to travel throughout the body. As a result, chemotherapy can be very useful in preventing recurrence or the spread of the breast cancer known as metastasis. Standard chemotherapy regimens are usually administered every three weeks for three to six months. Great strides have been made in combatting the side effects, such as nausea and fatigue, commonly associated with chemotherapy.

Hormonal Therapy: Tamoxifen is the most common type of hormonal therapy. The drug is taken by mouth daily for five years to prevent breast cancer recurrence.

Supportive Care: Hopkins breast cancer experts are keenly aware of special concerns affecting breast cancer patients. Social Workers with our Patient and Family Services and Cancer Counseling Center work with patients and families to help them through the diagnosis and treatment of breast cancer.

More information on [HYPERLINK "http://www.nccn.com/Making-Treatment-Decisions/Default.aspx?id=458"](http://www.nccn.com/Making-Treatment-Decisions/Default.aspx?id=458) to "NCCN Standard Treatment Guide" t _blank" standard treatment guidelines from the National Comprehensive Cancer Network (NCCN).

New Treatment Approaches

Johns Hopkins breast cancer experts are committed to the continued development of improved prevention, detection and treatment methods for breast cancer. This commitment was recognized by the National Cancer Institute with a \$2.7 million SPOR (Specialized Projects for Research Excellence) grant for breast cancer research. Other Hopkins breast cancer research endeavors include:

Breast Cancer Vaccine: This novel therapy, in preliminary clinical trials, combines low-dose chemotherapy and a cancer vaccine. The vaccine, genetically engineered to target antigens produced by normal and cancer cells containing defective copies of the growth-promoting HER-2/neu gene, stimulates the immune system causing it to seek out and destroy microscopic breast cancer cells and premalignant cells. Because of the vaccine's ability to target normal cells genetically predisposed to turn malignant, additional studies of its potential as a breast cancer prevention strategy also are planned.

Sentinel Node Biopsy: The sentinel node is the lymph node that is the first node likely to be invaded by cancer cells if the tumor has spread. Many researchers believe that if this lymph node is negative for cancer that the cancer is limited to the breast and these patients could be cured with less invasive surgery and reduce the need for adjuvant therapy. Conversely, patients whose sentinel node is positive for cancer cells may benefit from more aggressive treatments. Studies to evaluate the prognostic benefits of sentinel node biopsy are currently underway.

Molecular Genetics: Using a computer-assisted technology called SAGE (Serial Analysis of Gene Expression) and DNA studies, breast cancer researchers have identified two genes that are consistently expressed at different levels in breast cancer and normal breast epithelial cells. Researchers believe these genes, call HER-2/neu and MUC-1, may be useful as tumor markers or therapeutic targets.

Hormone Resistance: Significant research efforts have focused on estrogen receptor cells in breast cancer. A cellular process known as DNA methylation has been found to alter the estrogen receptor gene in breast cancer. Researchers are attempting to use drugs to reverse this process and make breast cancer cells more responsive to therapy. Phase II clinical trials are underway on one such drug, called Suberoylanilide Hydrazinone (SAHA). Dr. Nancy Davidson completed laboratory studies on using SAHA to switch cancers that do not express estrogen receptors to ones that do. Breast cancers that express these receptors have a better chance of responding to drugs like tamoxifen, which is known to improve survival. Laboratory work revealed that clusters of tiny chemicals called methyl groups are attached to a region of estrogen receptor genes much like a light switch works to turn on and off a light bulb. When too many methyl groups become attached, the estrogen receptor gene is inappropriately turned off. Experimental drugs like SAHA may work to reverse this, making breast cancer cells sensitive to tamoxifen. Dr. Vered Stearns' Phase II trial will explore whether SAHA can do this in breast cancer patients — it will be administered to women before their breast surgery. Future steps in exploring this drug may be to combine it with tamoxifen. The Johns Hopkins Kimmel Cancer Center is planning to join a nationwide trial combining SAHA with Herceptin.

New Radiation Strategy: Standard chemotherapy and radiation can last more than 6 months. Johns Hopkins Kimmel Cancer Center radiation oncologists are studying a chemotherapy-radiation combination that shortens the duration to less than two months. Studies have shown that a lumpectomy is as effective a treatment as mastectomy for many women with breast cancer, but almost all women having lumpectomy need daily radiation treatments for 5 to 7 weeks following their surgery. Unfortunately, many women choose to have a mastectomy because of the difficulty and inconvenience of 7 weeks of daily radiation. Johns Hopkins radiation oncologist Richard Zellars, M.D. is studying the use of daily partial breast irradiation that lasts 3 weeks, compared to 7. With this approach only part of the breast is treated. Because a smaller area is receiving the radiation, a larger dose of radiation can be given each day. This allows patients to receive the same effective dose of radiation in a shorter period of time. In this study, radiation is given daily (weekends not included) for 3 weeks. Chemotherapy is given once every two weeks and is started at the same time that radiation begins. The bi-monthly chemotherapy lasts an extra 4 weeks after the radiation ends. In addition to shortening the duration of daily radiation treatments in the combined approach, the investigators believe that the radiation may make the breast cancer cells more sensitive (and more likely to be killed) by the chemotherapy.

[More Information](#)

<http://rockingtheroadforacure.tumblr.com/post/340464210/diagnostic-tests-symptoms-current-and-new>