Breast Cancer Diagnosis

Breast cancer develops in the breast tissue and may present as a lump, change in breast shape, nipple discharge, or dimpling of the skin. Although this cancer is predominantly found in women, men may also develop breast cancer. Early detection is key to determine appropriate therapies for optimal prognosis. Diagnostic screenings should consist of mammograms every 1-2 years which can begin as early as 40 years old. If a tumor is suspected, other diagnostic tools include ultrasound, MRI, and breast tissue biopsy. Lymphatic mapping and dissection may be necessary, since lumps found in the lymph nodes may also indicate breast cancer. Receptor positivity of estrogen, progesterone, and HER-2 receptors helps determine appropriate drug therapy selection and therefore improve prognosis.



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Mammography
Mammoth-graph
Mammography is a diagnostic screening method that uses x-rays to detect suspicious lumps. Digital mammography involves digitally coding x-ray images into a computer while 3-D mammography produces a clear 3-D image of the breast tissue. Mammograms are typically recommended every 1-2 years as early as age 40. Mammography screenings may be done earlier if the woman has a family history, genetic link, or previous diagnosis of breast cancer. The comparison of previous and current mammograms may reveal early changes in breast tissue.

Ultrasound
Ultrasound-machine
Ultrasound is a diagnostic tool that determines whether the mass detected via mammography is cystic or solid. Ultrasound is also used to locate a suspicious lesion for biopsy.

MRI for High Risk Patients
M-R-eyes Machine with Up-arrow Risk Patient
Women with increased risk of breast cancer may have an MRI done to determine breast tissue abnormalities not visible via mammography.

Confirmed with Biopsy
Confirmed Biopsy-needle
Tissue biopsy is a definitive tool for diagnosing breast cancer. Although surgical biopsy may be done to remove a breast mass or lump for analysis, less invasive techniques are more commonly performed. After locally anesthetizing the breast area, a needle is inserted into the breast tissue to extract cells for further examination. A larger tumor size indicates a poorer prognosis of breast cancer. Cells collected from biopsy that are poorly differentiated suggest a more aggressive cancer.

Considerations

Lymph Node Involvement
Lime-nose
Since breast cancer may spread to lymph nodes, examining the axilla is important to determine if the cancer has spread. Increased lymph node involvement raises the risk of reoccurrence. Diagnostic tests to determine lymph node involvement include lymphatic mapping and sentinel lymph node dissection (SLND). During an SLND, a dye is injected in the affected breast to determine which lymph nodes are involved and may be removed.

Receptor Positivity
Receptor Positive (+) Sign
Determining receptor positivity, or what receptors are expressed on the surface of cancer cells, is helpful in determining breast cancer treatment and prognosis. Using diagnostic testing to find out the presence of estrogen, progesterone, and HER-2 receptors helps determine appropriate drug therapy and sequence.

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Estrogen and Progesterone Receptors

Easter-eggs and Pregnant-jester

Estrogen and progesterone are hormones that affect the growth of breast cancer cells. Receptor-positive tumors express receptors for these hormones, and are well differentiated, have more normal DNA material, have a lower risk of recurrence, and are more responsive to hormone therapy. Receptor-negative tumors are poorly differentiated, have more abnormal DNA content, have higher recurrence risks, and unresponsive to hormone therapy.

HER-2

HER (2) Tutu Breast Cancer with Tumor-guy

In patients with breast cancer, overexpression of the HER-2 receptor is related to aggressive tumor growth, increased risk of recurrence, and a poorer prognosis. By using diagnostic testing to determine the increased number of HER-2 receptors, appropriate drug therapy selection can be initiated. Trastuzumab is a monoclonal antibody against this receptor which is useful in treating these types of cancers.

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