

Medical Transcription



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Breast Anatomy and Pathology

Breast Anatomy and Pathology

The Breast refers to the upper ventral region of an animal's torso, particularly that of mammals, including human beings. In addition, the breasts are parts of a female mammal's body, which contain the organs that secrete milk used to feed infants.

It should be noted that male humans also have breasts (although usually less prominent) and are born with the main milk ducts intact. While the mammary glands that produce milk are present in the male, they normally remain undeveloped. In some situations male breast development does occur, a condition called gynecomastia. Milk production can also occur in both men and women as a rare adverse effect of some medicinal drugs (such as some antipsychotic medication). Both sexes have a large concentration of blood vessels and nerves in their nipples.

Anatomy of the female breast

The breasts are covered by skin; each breast has one nipple surrounded by the areola. The areola is colored from pink to dark brown, hairless, and has several sebaceous glands. The larger mammary glands within the breast produce the milk; they consist of several lobules, and each breast has some 10-20 lactiferous ducts that drain milk from the lobules to the nipple, where each duct has its own opening.

Most of the breast is adipose tissue (fat) and connective tissue (known as Cooper's ligaments). The breasts sit over the pectoralis major muscle and usually extend from the level of the 2nd rib to the level of the 6th rib anteriorly. The superior lateral quadrant of the breast extends diagonally upwards in an 'axillary tail'. A thin layer of mammary tissue extends from the clavicle above to the seventh or eighth ribs below and from the midline to the edge of the latissimus dorsi posteriorly.

The arterial blood supply to the breasts is derived from the internal thoracic artery (previously referred to as the internal mammary artery), lateral thoracic artery, thoracoacromial artery, and posterior intercostal arteries. The venous drainage of the breast is mainly to the axillary vein, but there is some drainage to the internal thoracic vein.

The breast is innervated by the anterior and lateral cutaneous branches of the 4th through 6th intercostal nerves. The nipple is supplied by the T4 dermatome.

Lymphatic Drainage

About 75% of lymph from the breast travels to the ipsilateral (same side) axillary lymph nodes. The rest travels to parasternal nodes, to the other breast, or abdominal lymph nodes. The axillary nodes include the pectoral, subscapular, and humeral groups of lymph nodes. These drain to the central axillary lymph nodes, then to the apical axillary lymph nodes. The lymphatic drainage of the breasts is particularly relevant to oncology, since cancer cells can break away from a tumour (breast cancer being a common cancer), and spread to other parts of the body through the lymph system by a process known as metastasis.

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Functions

The function of the mammary glands in female breasts is to nurture the young by producing milk, which emanates from the nipples during lactation. The mammary glands that secrete the milk from the breasts actually make up a relatively small fraction of the overall breast tissue. It is commonly assumed by biologists that the real evolutionary purpose of women having breasts is to attract the male of the species; that, in other words, breasts are a sexually dimorphic, or secondary sex characteristics.

Size, shape and composition

Most of the human female breast is actually adipose tissue (fat) and connective tissue, rather than the mammary glands. The primary anatomical support for the breasts is provided by the Cooper's ligaments with additional support from the skin covering the breasts themselves, and it is this support which determines the shape of the breasts. As breasts are mostly composed of adipose tissue, their size can change over time if the woman gains or loses weight. It is also typical for them to grow in size during pregnancy and whilst breast-feeding, mainly due to hypertrophy of the mammary gland in response to the hormone prolactin. The size of a woman's breasts usually fluctuates during the menstrual cycle, particularly with premenstrual water retention. An increase in breast size is also a common side effect of use of the contraceptive pill. The size of a woman's breasts is typically expressed as "bra size".

Development

The development of a woman's breasts, during puberty, is caused by sex hormones, chiefly estrogen. This hormone has been demonstrated to cause the development of woman-like, enlarged breasts in men, a condition called gynecomastia, and is sometimes used deliberately for this effect in male-to-female sex reassignment surgery. Breast hypoplasia is a condition where one or both breasts fail to develop during puberty.

Disorders of the Breast

Infections and inflammations
 Mastitis
 Bacterial mastitis
 Mastitis from milk engorgement
 Mastitis of mumps
 Subareolar mastitis

Other infections

Chronic intramammary abscess
 Chronic subareolar abscess
 Tuberculosis of the breast
 Syphilis of the breast
 Retromammary abscess
 Actinomycosis of the breast
 Inflammations
 Mondor's disease
 Duct ectasia
 Breast engorgement

Benign breast disease**Congenital disorders**

Inverted nipple
 Supernumerary nipples/supernumerary breasts
 Aberrations of normal development and involution

Fibroadenomatosis

Cyclical nodularity
 Cysts

Fibroadenoma - benign tumor
 Duct ectasia
 Nipple discharge
 Abscesses
 Mammary fistula
 Epithelial hyperplasia

Pregnancy-related

Galactocele
 Puerperal abscess

Malignant breast disease

Breast cancer (mammary carcinoma)
 Carcinoma in situ
 Paget's disease of the nipple, also known as Paget's disease of the breast

Mastitis - Mastitis is the inflammation of the mammalian breast caused by the blocking of the milk ducts while the mother is lactating. It can cause painful areas on the breasts or nipples and may lead to a fever or flu-like symptoms. It is not necessary to wean a nursing because of mastitis; in fact, nursing is the most effective way to remove the blockage and alleviate the symptoms, and is not harmful to the baby. Sudden weaning can cause or exacerbate mastitis symptoms. Mastitis can be discerned from simple blockages by the intensity of pain, heat emanating from the area, redness and fever in the mother. In some cases the fever can become severe, requiring antibiotics; ten percent of cases develop into abscesses that need to be drained surgically.

Types of mastitis are:

Bacterial mastitis
 Mastitis from milk engorgement
 Mastitis of mumps
 Subareolar mastitis

Mondor's disease - Mondor's disease is a rare condition, which involves thrombophlebitis of the superficial veins of the breast and anterior chest wall. It sometimes occurs in the arm or penis. It is named after Henri Mondor (1885-1962), a surgeon in Paris, France who first described the disease in 1939.

Breast engorgement - Breast engorgement occurs in the mammary glands when too much breast milk is contained within them. It is caused by insufficient breast-feeding and/or blocked milk ducts. When engorged the breasts may swell, throb, and cause mild to extreme pain. Engorgement may lead to mastitis (inflammation of the breast) and untreated engorgement puts pressure on the milk ducts, often causing a plugged duct. The woman will often feel a lump in one part of the breast, and the skin in that area may be red and/or warm. If it continues unchecked, the plugged duct can become a breast infection, at which point she may have fever or flu-like symptoms.

Inverted Nipple - An inverted nipple is a nipple that, instead of pointing outward, is retracted into the breast and sometimes cannot be seen. Inversion can occur only with stimulation or can be permanent, and it can occur in both women and men. One or both nipples can be inverted. In women, breast-feeding can correct the problem as the infant sucks the nipple outward. Cosmetic surgery can improve the nipple's appearance, but such surgery often entails severing the milk duct and thus can eliminate the ability to breast-feed.

Supernumerary Nipples - A supernumerary nipple (also known as a third nipple, accessory nipple, polythelia or polymastia) is an additional nipple occurring in mammals including humans. Often mistaken for moles, supernumerary nipples are diagnosed at a rate of 2% in females, less in males.

Fibroadenoma - benign tumor - Fibroadenoma of the breast is a benign tumor

characterized by proliferation of both glandular and stromal elements. Most often it appears before age 30 as a result of estrogenic hormonal excess. Usually the tumor is solitary, multiple tumors being rare. The tumor is mobile to adjacent structures: skin, muscle, lymph nodes.

Fibroadenomatosis - Condition of breast having multiple fibroadenomas is called as fibroadenomatosis.

Breast cyst - A cyst is a closed sac having a distinct membrane and developing abnormally in a cavity or structure of the body. Cysts may occur as a result of a developmental error in the embryo during pregnancy or they may be caused by infections.

Nipple discharge - Nipple discharge is the abnormal release of fluid from the nipples of the breasts. It is the third major reason, involving the breasts, for which women seek medical attention, after lumps and breast pain. There are many different types of discharges. Some associations include:

Cloudy white color - most common, can be galactorrhea

Clear or light white - pregnancy

Red - contains blood - most often due to breast infection or intraductal papillomas, but can be breast cancer Pus - infection

Abscesses - An abscess is a collection of pus collected in a cavity formed by the tissue on the basis of an infectious process (usually caused by bacteria or parasites) or other foreign materials

MALIGNANT BREAST DISEASE

Breast Cancer (Mammary Carcinoma)

Breast cancer is cancer of breast tissue. Worldwide, it is the most common form of cancer in females, affecting approximately 10% of all women at some stage of their life in the Western world. Although significant efforts are made to achieve early detection and effective treatment, about 20% of all women with breast cancer will die from the disease, and it is the second most common cause of cancer deaths in women. Two genes, BRCA1 and BRCA2, have been linked to the rare familial form of breast cancer. A study found that there is a small increase in the relative risk of breast cancer in current and recent users of combined oral contraceptives. Other established risk factors include not having children, delaying first childbirth, not breast-feeding, early menarche (the first menstrual period), late menopause, obesity and taking hormone replacement therapy.

Many breast cancers are diagnosed now by mammography before they are large enough to be palpated, but despite screening efforts, many women are diagnosed with breast cancer after they notice a lump or when experiencing symptoms due to metastatic disease.

A pathology report of a breast cancer will usually contain a description of cell type and grade. Other useful information derived from the pathology includes estrogen receptor and progesterone receptors status and HER2/neu status; these can help to guide treatment.

The most common invasive breast cancer cell type is infiltrating ductal carcinoma. Other types include:

Noninvasive ductal carcinoma in situ (DCIS)

Lobular carcinoma in situ (LCIS)

Infiltrating lobular carcinoma

Medullary carcinoma

After diagnosis, the next phase is tumour staging. This aims to assess the extent of the tumour and whether it has metastasized (spread to distant sites). The

standard way of categorizing tumour is by staging it using the TNM (Tumour, Nodes and Metastasis) system, which in turn determines treatment recommendations. The TNM system is specific for each type of cancer.

Treatment

The mainstay of breast cancer treatment is surgery when the tumor is localized, with possible adjuvant hormonal therapy (with tamoxifen or an aromatase inhibitor), chemotherapy, and/or radiotherapy.

Surgery

Depending on the staging and type of the tumour, just a lumpectomy (removal of the lump only) may be all that is necessary or removal of larger amounts of breast tissue may be necessary. Surgical removal of the entire breast is called mastectomy. During the operation, the lymph nodes in the axilla are also considered for removal. In the past, large axillary operations took out 10-40 nodes to establish whether cancer had spread-this has the unfortunate side effect of frequently causing lymphedema of the arm on the same side as the removal of this many lymph nodes affected lymphatic drainage. More recently the technique of sentinel lymph node dissection has become popular, as it requires the removal of far fewer lymph nodes, resulting in fewer side effects.

Adjuvant therapy

At present, the treatment recommendations after surgery (adjuvant therapy) follow a pattern. Depending on clinical criteria (age, type of cancer, size, metastasis) patients are roughly divided to high risk and low risk cases which follow different rules for therapy. The following list is a compilation of possibilities:

After a breast conserving therapy (lumpectomy, quadrant-resection), the high local recurrence risk (~40%) is reduced by radiation therapy to the breast

If the lymph nodes are positive, the high mortality risk (30-80%) is reduced by systemic treatment (either anti-hormones or chemotherapy).

In younger patients, the most useful systemic therapy is chemotherapy (usually older regimens such as CMF, FAC, AC and/or Taxol) and now the FDA approved regimen TAC (Taxotere, Adriamycin, Cytosan) or FEC for 3 cycles followed by Taxotere for 3 cycles. Another standard regimen includes dose dense AC (Adriamycin and cyclophosphamide) followed by Taxol. This is given on a two week cycle with growth factor support, e.g. pegfilgrastim.

In older patients with estrogen receptor positive tumors, the most useful systemic therapy is anti-hormone therapy (tamoxifen, aromatase inhibitors, GnRH-analogues)

Chemotherapy has increasing side effects as the patient's age passes 65

In patients with estrogen receptor negative tumors, the most useful systemic therapy is chemotherapy

In patients with estrogen receptor positive tumors, the most effective systemic therapy is hormone therapy with medications such as tamoxifen or an aromatase inhibitor (in postmenopausal women)

Radiation therapy is recommended in all patients who had lumpectomy, however radiation therapy after mastectomy is recommended only if four or more lymph nodes are involved with cancer. Radiation therapy is usually not indicated in patients with advanced (stage IV disease) except for palliation of symptoms like bone pain.

Breast cancer awareness

In the month of October, breast cancer is recognized by survivors, family and

friends of survivors and/or victims of the disease. A pink ribbon is worn to recognize the struggle that men and women face when battling the cancer.

Carcinoma In Situ

Carcinoma in situ (CIS) is an early form of carcinoma defined by the absence of invasion of surrounding tissues. In other words, the neoplastic cells proliferate in their normal habitat, hence the name 'in situ' (Latin for 'in its place'). For this reason, CIS will usually not form a tumor. Many forms of cancer originate from a 'carcinomas in situ' (CIS) lesion. Therefore, CIS is considered a precursor that may, if left untreated long enough, transform into a more malignant form of neoplasm, invasive carcinoma or, in common language, "cancer". Many doctors will not refer to 'carcinoma in situ' as "cancer" when explaining a laboratory report to a patient. However, because most forms of CIS have a real potential to turn into invasive carcinoma, CIS is usually treated much the same way as a malignant tumor.

Dysplasia vs carcinoma in situ vs invasive carcinoma

These terms are related since they represent the three steps of the progression towards cancer:

Dysplasia, Latin for 'bad form', is the earliest form of pre-cancerous lesion recognizable in a biopsy by a pathologist. Dysplasia can be low grade or high grade (see CIS below). The risk of low grade dysplasia transforming into high grade dysplasia and, eventually, cancer is low. Treatment is usually easy. Carcinoma in situ is synonymous with high grade dysplasia in most organs. The risk of transforming into cancer is high. Treatment is still usually easy. Invasive carcinoma, commonly called cancer, is the final step in this sequence. It is a disease who, when left untreated, will invade the host (hence its name) and will probably kill him. It can be often, but not always, be treated successfully.

Paget's disease of the Breast

Paget's disease of the breast, also known as Paget's disease of the nipple, is a condition that outwardly may have the appearance of eczema - with skin changes involving the nipple of the breast. Usually only affecting one nipple, there may be redness, oozing and crusting and a sore that does not heal.

Paget's disease is caused by breast cancer and is present in about 2% of all breast cancers. It typically results when malignant cells from an underlying carcinoma that originated in the ducts of the mammary glands spread to the epithelium.

Recommended tests are a mammogram and a biopsy to confirm the diagnosis.

Treatment usually involves some kind of mastectomy to surgically remove the tumour. Chemotherapy and/or radiotherapy may be necessary.

The condition is named after Sir James Paget, an English surgeon who first described it in 1874.

Breast-Feeding

Breast-feeding is the process of a woman feeding an infant or young child with milk produced from her breasts, usually directly from the nipples. Babies have a sucking urge that usually enables them to take in the milk, provided there is a good latch, a detached phrenulum, and a milk supply.

The Letdown reflex, also known as the milk ejection reflex, is caused by the release of the hormone, oxytocin. Oxytocin stimulates the muscles of the breast to squeeze out the milk.

Breast refusal

Though babies have a natural sucking reflex, they still have to learn how to feed and may occasionally resist feeding from the breast. To establish breast-feeding firmly, it is important for the baby to be put to the breast soon after birth so that

the baby is accustomed to feeding from the breast from the very beginning.

Causes of breast refusal include:

Formula feeding, sometimes without the knowledge of the mother. The use of artificial teats (nipples) or dummies leading to "nipple confusion" Poor feeding technique Over-handling after birth Thrush in the baby's mouth Distractions or interruptions during feeds Long separations from the mother Breathing difficulties, often caused by a common cold Swallowing difficulties, sometimes the painful result of ear or throat infections Pain from surgery (most commonly circumcision), blood tests, vaccinations, and other procedures commonly done without anesthesia

Exclusive breast-feeding means feeding a baby nothing but breast milk.

Predominant or mixed breast-feeding means feeding breast milk along with some form of substitute – infant formula or baby food and even water, depending upon the age of the child.

Feeding two infants simultaneously is called tandem breast-feeding.

Weaning

Weaning is the process of gradually introducing the infant to what will be its adult diet and withdrawing the supply of milk. The infant is considered to be fully weaned once it no longer receives any breast milk and begins to rely on baby food or other solid foods for all its nutrition.

Breast Implant

A breast implant is a sort of prosthesis used in cosmetic surgery to enlarge the size of a woman's breasts (known as breast augmentation) or to reconstruct the breast (for example, after a mastectomy, or during male-to-female sex reassignment surgery).

There are four types of breast implants:

Saline-filled, which have a silicone shell filled with sterile saline liquid.

Silicone gel-filled, which have a silicone shell filled with silicone gel.

String implant, a third, much less common type of implant, is a method of achieving extreme breast sizes, initially developed by Dr. Gerald W. Johnson, M.D.P.A., using polypropylene (PPP). String implants are unique in that they cause the breast to continue expanding after surgery, and are preferred by those women who choose to have the largest breasts possible, including many adult entertainers.

Tissue engineered implant, a new form of implant currently in development. The principle is that cells are taken from the patient themselves, which are then combined with an appropriate scaffold material to produce a Tissue Engineered Breast Implant. The advantage of this method is that there is no risk of leakage or rupture, and the size can remain stable for the lifetime of the patient.

Breast Reconstruction

Breast reconstruction is the rebuilding of a breast, usually in women. It involves using existing flesh or prosthetic material to construct a natural-looking breast. Often this even includes the reformation of a natural-looking areola and nipple. This procedure may involve the use of implants.

There are many methods for breast reconstruction. The two most common methods are:

Skin expansion-By far the most common method, the surgeon inserts a small balloon expander beneath the skin and periodically, over weeks or months, injects a saline solution to slowly expand the overlying skin (see tissue

expansion). Once the expander has reached an acceptable size, it may be removed and replaced with a more permanent implant. Reconstruction of the areola and nipple are performed in a separate operation after the skin has stretched to its final size.

Flap reconstruction-The second most common procedure uses tissue from other parts of the patient's body, such as the back, buttocks, thigh or abdomen. This procedure may be performed by leaving the donor tissue connected to the original site to retain its blood supply (the vessels are tunneled beneath the skin surface to the new site) or it may be cut off and new blood supply may be connected. This procedure has the downside of leaving scar tissue in both the donor and breast area, but avoids the risks of breast implants. Flaps generally tolerate radiotherapy better than implants which tend to develop capsule when irradiated.

Topfree equality

Topfree equality is a small but growing social movement in parts of North America. The goal of the movement is to give females the right to remove their clothing above the waist in public wherever males can legally do so (e.g., at a beach, swimming pool, or park). The reasons cited include keeping nursing mothers from having to find a hidden place for breast-feeding and tanning and comfort in places such as pools and beaches.

The movement is not concerned with fighting the right for women or men to be without a shirt in a restaurant or in places where such is not accepted for either gender, but with ensuring equality under law for women.

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