Surgery of the BREAST

By

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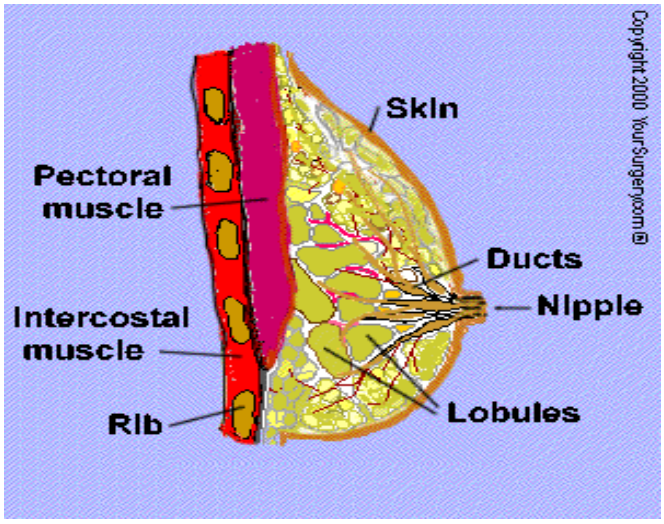
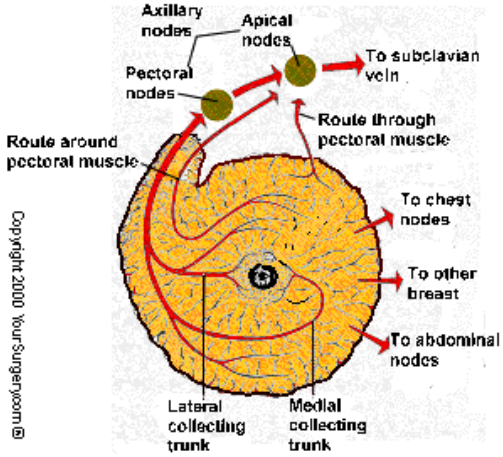
ANATOMY

- **It's a modified skin gland**
- **Lies between the two layers of the superficial fascia of the ant. Chest wall except axillary tail of Spence.**
- **Consists of 15-20 lobes.. lactiferous ducts … ampullae … lactiferous opening in the sumit of the nipple.**
- **Extends from the clavicle to the 8th rib, and from the midline to the anterior axillary fold.**
- **Between the deep layer of sup.fascia and the pectoral fascia lies the retromammary bursa.**
- **Traversed by the Cooper's ligaments which are fibromuscular strands containing lymphatics extend between the deep fascia and the skin.**
- **Nipple and areola are modified darkly pigmented skin containing sweet, sebaceous, Montogomry glds, hair follicles and the openings of the lactiferous ducts.**
- **Both nipples lie on the same horizontal plane with the same lateral, forward, downward direction.**
- **Arterial supply: axillary art, intercostal arts.**
- **The posterior intercostal veins is directly connected with the vertebral plexus of veins through valvless veins of Batson.**



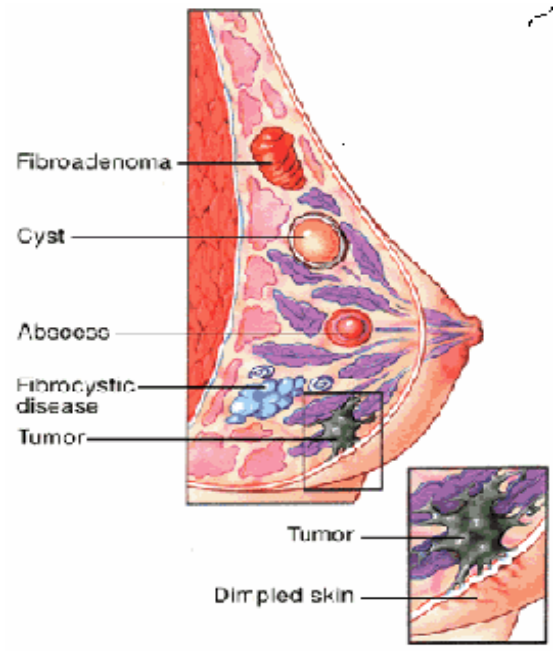
- **Nerves related are: med.and lateral pectoral nerves, intercosto-brachial nerve, thoraco-dorsal nerve, nerve of Bell.**
- **Lymph drainage: axillary, internal mammary, intercostal lymph nodes.**

- **Lymphatic plexuses are: retroareolar (Sabey), retromammary, intramammary.**
- **Axillary lymph nodes are 6 groups and 3 stations.**
- **Stations are related to the tendon of the pectoralis minor.**
- **Groups are: central, pectoral, subscapular, humeral, inter-pectoral (Rotter's) and apical.**



Benign Breast Lesions

- Under this title we'll discuss: breast abscess, fibroadenoma, fibrocystic disease, duct ectasia, intraductal papilloma, breast cysts, mastalgia.
- Benign lesions of the breast are more common than malignancy.
- Most common lesions affect the breast are; fibrocystic disease, mastalgia, breast abscess.
- The main problem in the benign lesions is to differentiate them from malignant lesions



Breast abscess

- Breast abscess is either acute pyogenic or chronic.
- Acute abscess usually occurs during lactation, usually preceded by diffuse non suppurative cellulitis for 3-5 days.
- Don't wait fluctuation but depend upon the duration of symptoms.
- Drainage must be under G.anesthesia with radial dependent incision (no counter incision).
- Chronic abscess may be: non specific(antibioma) or specific(T.B or syphilis).
- Chronic non specific abscess results from mismanagement of an acute abscess. usually misdiagnosed as a neoplasm (no differentiation except by biopsy). TTT is usually excision.

fibroadenoma

- Most common breast mass in the twenties, painless freely mobile (breast mouse).
- Either hard (intracanalicular) or soft (pericanalicular), the latter is sometimes hardly differentiated from cancer.
- Some consider them as neoplasm while others say that they are aberration of normal development and involution (ANDI) .
- Soft type is called phylloides tm due to its microscopic picture as tree leaves.

ANDI

age	Normal	aberration
<25	breast develpment	
	stromal	juv. hypertrophy
	lobular	fibroadenoma
25-40	cyclical activity	cyc. mastalgia
		cyc. Nodularity
35-55	involution	
	lobular	macrocysts
	stromal	sclerosing lesions
	ductal	duct ectasia

Soft fibroadenoma usually occurs bet 35-55 yrs, it's a vascular tm, hardly diff. from cancer, cystosarcoma phylloides is misnomer, heterogeneous consistency, no malignant potential, but local recurrence may occur.

- TTT is by excision or simple mastectomy.

Hard fibroadenoma usually occurs in virgins as painless mobile mass, smooth rounded mammographic density with no calcifications.

- TTT is follow-up or excision under local anesthesia.
- It isn't precancerous, it may be multiple and bilateral in which case conservation is wise

Mastalgia

- Means breast pain, it is the most common cause for breast-related consultation.
- Mastalgia may be non breast, cyclical, non-cyclical mastalgia.
- Non-breast mastalgia is breast pain not related to breast or chest wall lesions, it may be caused by angina, esophageal causes, cervical spondylosis, cholelithiasis, hiatus hernia, achalasia, pleurisy, pneumonia…etc.
- cyclical mastalgia is breast pain related to the menstrual cycle, 3-7 days before menstruation the lady develops pain, fullness, heaviness of their breasts.
- Etiology: hormonal aberration that is not consistent in every lady, water retention, neurosis, deficiency in EFAs esp. GLA (gamma linolenic acid).
- TTT is a matter of debate: primorose oil, tamoxifen, bromocripten, diuretics, pyridoxine (vit B6), danazol (antiandrogen, antigonadotrophin), LHRH analogues. (but no drug is ideal).
- Other measures may include; well fitted brassiere, caffeine in diet, low fat diet, regular exercise, Soya (contains phytoestrogens)
- Non-cyclic mastalgia is breast pain that is not related to cycles, it may be due to breast causes (periductal mastitis, sclerosing adenosis) or chest wall causes (Teitz syndrome), it may be diffuse or trigger spots in breast, TTT is that of the underlying pathology.

Fibrocystic disease of the breast

- The most common pathology affect the female breast, it is a part of ANDI.
- It affects the breast which is not lactating, so common at menarche and perimenopausal, usually improved by pregnancy and lactation.
- Its presentations are mastalgia, lumpiness of the breast, rarely nipple discharge, rarely pain is severe enough annoy the patient.
- Pathologically, both cellular and connective tissue elements are included (adenosis, fibrosis, cyst formation, epithelial hyperplasia) .
- Malignant potentiality is not proved but epithelial hyperplasia may be risky according to its score.
- Careful follow-up and assurance of the patient are mandatory, but mammography and FNAC may be necessary.
- TTT is usually non-specific in the form of pain killers, primrose oil, rarely antiestrogens and antiprolactin may be used.
- Sometimes the patient may present with a mass which can't be differentiated from cancer so biopsy is needed.
- Cysts may be large and refill after aspiration (blue dome cyst of Bloodgood).
- The condition takes one of two forms either diffuse or localized.
- The etiology of such pathology is not definite but hormonal aberration, psychic changes and changes in fatty acids profile are incriminated.
- Epithelial hyperplasia is considered by many as premalignant.
- Surgery is not indicated except : *exclude malignancy*, *severe pain*\ subcutaneous mastectomy, *to assure the patient*.
- Surgery is usually indicated in perimenopausal ladies.

Duct Ectasia

- The disease of old age.
- presents as retroareolar mass, pasty nipple discharge.
- A part of ANDI.

- Histologically, periductal infiltration with chronic inflammatory cells esp. plasma cells (plasma cell mastitis).
- Recently, many consider that duct ectasia and plasma cell (periductal) mastitis are different diseases pathologically.
- TTT is conservative, but biopsy from the mass is usually needed to exclude malignancy.

Nipple Discharge

- Physiologically, milk and colostrum.
- Pathologically, it may be single or multiple duct, bloody or not bloody.
- Single duct bloody discharge usually attract our attention and push for further investigations.
- Bloody discharge is due to benign pathology in more than 80% of cases.
- Fibrocystic dis., intraductal papiloma, duct ectasia, intraductal carcinoma, invasive duct carcinoma are the underlying pathologies in this frequency.
- In suspicious cases, mammography, galactography may be needed. Microdochotomy ⟨ single duct discharge, major duct excision ⟨ multiple ducts discharge.

Breast Cancer

- The most common cancer affects females.
- Western > eastern females.
- Affects one in 12 women in UK, one in 8 breast lumps is malignant.
- Risk factors;age (44-50yrs), rare before 25, geographical distribution (western>eastern UK, Scotland, Denmark, Canada), age of menarche and menopause(oophorectomy bef 35 ⟨40%decrease in br. cancer risk), age of first pregnancy, lactation (debate), weight (obesity), Diet (fat ⟨higher risk, green vegetables ⟨lower risk), alcohol intake, radiation, contraceptive pills(debate), postmenopausal estrogen replacement (for 5yrs after stopTTT), benign breast lesions, family history

Risk of cancer in benign breast lesions

- No increased risk mild hyperplasia, duct ectasia , apocrine metaplasia, simple fibroadenoma, microcysts, periductal ,mastitis, adenosis
- slight increased risk(1.5-2) gross cysts, moderate and floride , hyperplasia, papilloma, sclerosing , adenosis , complex fibroadenoma
- moderate increased risk(4-5) atypical hyperplasia

Family history

- 10% of breast cancers are due to genetic predisposition and its susceptibility is transmitted as autosomal dominant with limited penetration.
- BRCA 1(chr 17), BRCA 2(chr 13), p53 (ch 17) are all incriminated in the familial transmission of breast cancer.
- Women carry an inherited gene usually develop cancer at an earlier age, also those who develop breast and other organ cancer are usually carrying one or more of these genes.

- A woman's risk is greater when she has a first degree relative (mother, sister, daughter) who develop breast cancer before the age of 50yrs and the younger the relative at the development of cancer, the greater the risk.
- The risk is greatly increased if more than one first degree relative is affected before 50.

Pathology of breast cancer

- *Non invasive* * DCIS
  *LCIS
- *Invasive* *NOS most common 68%
  - *invasive lobular carcinoma
  - * medullary
  - *cribriform
  - *tubular
  - *mucinous
  - *papillary
  - *microinvasive
  - *other rare types (adenoidcystic, apocrine, metaplastic)
- *Paget disease*; duct carcinoma in situ (characteristic Paget cell) presents early as malignant eczema of the nipple approximately 2 years before appearance of a mass, once the mass appeared it's invasive ductal carcinoma.
- *Inflammatory carcinoma*; clinically it's duct carcinoma manifest with acute inflammatory manifestations (reddness, tenderness, diffuse swelling). Pathologically, there is dermal lymphatic invasion, according to TNM it's T4d.
- *Histological grading* depends upon; nuclear pleomorphism, tubule formation, mitotic counts \ undifferentiated, mild differentiated, moderate differentiated, well differentiated.
- State of hormonal receptors must be included in the pathological report
- Metastases occur relatively early (systemic from the start), usually the axillary nodes but the internal mammary group may be involved especially in the medial quadrants tumors.
- The first lymph node in the way is called the sentinel lymph node (how to assess?)
- Rarely, the breast cancer is occult with manifest metastases.
- The blood spread occurs later usually to the central skeleton (veins of Batson).
- Contralateral breast cancer is it a second primary or metastastatic!!!! (in situ element, distance between both, field between free or not, the time interval between occurrence of both, type of pathology).
- Manchester clinical staging
  - stage I small localized to the breast
  - stage II small mobile axillary glands
  - stage III large fixed axillary glands or large invading mass
  - stage IV distant metastases
- TNM staging
  - T; Tis:including Paget disease.T1:<2cm. T2: 2-5cm. T3: >5cm. T4:(a: invasion of chest wall {not the pectoralis}. b: invasion of the skin (peau

d'orange, satellite nodules, skin ulceration). c: both of them. D: inflammatory carcinoma)

- N; N1:axillary LN mobile, less than 3cm,
  - N2: fixed axillary glands, more than 3cm
  - N3: ipsilateral internal mammary glands
- M; M0: no distant metastases
- M1: there is DM (including supraclavicular LN)
- *** staging is the correlation between these three parameters.
- *** TNM is clinical and pathological staging, it is pre, per and postoperative data.
- *** Other systems of staging are not in use nowadays *(Colombia, AJCC, French).*

Prognosis

- Prognosis of breast cancer depends upon clinical and pathological factors:
- *Clinical factors* include: age of the patient (pre or postmenopausal), family history (1st degree relatives with bilateral premenopausal cancers), history of contra lateral breast cancer, size of the tumor, involvement of axillary lymph nodes, invasion of the skin or chest wall, presence of manifest metastases).
- *Pathological factors* include: genetic status, histopathological factors (type of the tumor, vascular and lymph invasion, number of mitotic figures, degree of differentiation), level of axillary lymph nodes affected, hormonal receptors, tumor free surgical margins.

Clinical Presentation

- The patient usually present in one of two categories: clinically detected tumor or pre clinical detected tumor.
- Clinically detected tumors usually manifest as: mass, cutaneous manifestations, nipple discharge, distant metastases.
- *Mass*: it may be breast or axillary, it is usually firm to hard, irregular, mostly fixed within the breast tissue, usually there is a small dimple over the mass due to the desmoplastic fibrosis. The most common site of the mass is the upper outer quadrant.
- *Cutaneous manifestations:* the skin is usually affected due to underlying fibrosis or invasion. The invasion is either direct invasion or through lymphatic permeation. The cutaneous manifestations are: *skin dimple, peau d'orange, satellite skin nodule, malignant ulcer, cancer en currase, recent retraction of the nipple, lymphedema of the arm.*
- Nipple discharge: recent single duct bloody discharge usually indicates more informative investigations as it's suspicious, but other bilateral or multiductal discharges are usually reflecting some sort of hormonal derangement
- *Distant metastases:* usually in the form of central skeleton bony metastases, brain metastases, long bone metastases, liver and lung metastases.
- NB:
  - Nipple may manifest the underlying neoplasm as long lasting destructive eczema, nipple retraction, nipple protrusion lightening of its color and change nipple direction, single duct nipple discharge.
  - A breast mass with nipple discharge we concentrate on the mass.

- Most of the skin changes described above are rarely seen nowadays because of active screening programs early detection.
- Clinical examination of the breast can detect breast masses as small as 1.5 cm, while mammography can detect masses as small as 3 mm.

Imaging of the breast

- The mammary glands are parietal structures usually need no imaging investigations as the clinical examination usually reveals almost all needed data. But as it's an areolar organ, detection of small masses may be difficult.
- Imaging of the breast can be achieved through: mammography, U/S, MRI, galactography .
- Mammography is still the most valuable method to visualize the breast, used as screening and in evaluation of breast masses, malignant masses are irregular, with spiky micro calcifications. It is specially useful in detecting the multifocal tumors, also in screening of the contra lateral breast tissue.
- U/S can usually differentiate between cystic and solid swellings and allows guided biopsy.
- MRI is a new expensive modality that looks hoping especially in postoperative recurrences, gadolinium is injected as an enhancement material.
- Galactography: soft tissue X-ray after injection of contrast water-soluble material into one of the lactiferous ducts and this usually used to detect any intra-luminal obstructing mass or filling defect within a duct, usually in cases of single duct suspicious discharge, but its diagnostic value is limited.
- CT scan : rarely used for the primary tumor but very common used for detecting the metastases. It is most sensitive way to detect the internal mammary lymph nodes.
- Other methods of imaging are of no clinical value such as *thermography*, *plethysmography*, *angiography* and *radioisotope scanning* (for distant metastases only).

Treatment of breast cancer

- The treatment of mammary carcinoma must be described under two main headings: prophylaxis and treatment.
- Treatment of mammary carcinoma is directed towards: local and systemic treatments.
- Local treatment means ablation of the primary timorous tissue with the draining lymphatic territories. This can be gained by means of surgery and radiotherapy.
- Systemic treatment means ablation of the distant macro- and micro metastases and to minimize the chance of local and systemic recurrences. This can be achieved by means of hormonal, chemo, immuno-therapy.
- Prophylaxis against breast carcinoma depends upon: detection of high risk groups, retinol (vit A), tamoxifen and prophylactic mastectomy.
- The main limiting prognostic factor is the early detection of the tumor, and this is only possible by the application of active screening programs.
- The active screening programs may be either: screening of the high risk groups or screening of the whole population.
- Screening is usually accomplished by mean of : breast self examination, regular physician examination and periodic mammography.

- Screening usually begins at 45yrs and may be earlier in high risk groups (as early as 30yrs). High risk group are those with: +ve family history (especially premenopausal bilateral cancers in first degree relative), previous breast carcinoma or ovarian, endometrial or colon carcinomas in BRCA1 or BRCA2 +ve patients.
- Surgical treatment of breast carcinoma includes: *excisional TTT* and *reconstructive strategy*.
- Surgical excision of the breast carcinoma takes one of the following forms: conservative breast excision, radical mastectomy or modified radical mastectomy.
- Conservative breast surgery means; excision of the tumor within a safety margin (tumorectomy or quadrantectomy), evacuation of the axilla (usually through a separate incision), postoperative irradiation of the breast tissue with a boost to the tumor bed.
- Radical mastectomy is rarely done nowadays due to its major morbidity and disability and it has no proved increase in the survival or tumor free results.
- Modified radical mastectomy; the most common procedure done, it preserves the muscles and so the cosmetic and functional results are much more better than radical operation. It involves simple mastectomy with axillary evacuation usually through a single incision.
- Super and extended radical mastectomy is just for academic interest. These procedures aim at removal of the supraclavicular and internal mammay lymph glands.

Radiotherapy

- Adjuvant radiotherapy means postoperative irradiation of the breast tissue, tumor bed and the axilla. It is done through external beam accelerator. Usually booster dose is delivered to the tumor bed.
- Neo adjuvant radiotherapy means preoperative irradiation of the tumor aiming at its shrinkage, so turn inoperable tumors to operable ones and allowing conservative surgery in operable large tumors.
- Irradiation of the axilla carries the risk of skin sloughing and lymphedema of the arm.
- Irradiation of the chest wall can cause osteomyelitis of the ribs, pleurisy and irradiation pneumonitis.
- Irradiation of the reconstructed breast may cause atrophy of the flap due to resulting endarteritis.