

# Breast Diseases

With all courtesy to our colleagues, Raslan and his team, a lot of our work is based on their Manual to Surgery Booklet.

- **Important**
- Mentioned by doctors but not in slides
- Additional notes from Surgical Recall 6th edition or Raslan's booklet
- Not mentioned by the doctor

# 431

# SURGERY TEAM

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## Anatomy of the breast

Breast are formed of modified sebaceous glands, which are full of ductal, glandular and fatty tissue, they also have lymphatics and blood supply.

### Breast borders:

- Upper border → collar bone
- Lower border → 6<sup>th</sup> or 7<sup>th</sup> rib
- Inner border → edges of sternum
- Outer border → mid-axillary line

### Breast Divisions: (5 segments)

- Four quadrants → divided by horizontal and vertical lines, majority of benign or malignant tumors are found in the upper outer quadrant
- Tail of Spence → contains most of the glandular tissue of the breast

### Muscles related to the breasts:

The breast lies over the muscles that encases the chest wall. The muscles involved include the pectoralis major (60%), pectoralis minor, serratus anterior (30%), external oblique, latissimusdorsi, subscapularis, and rectus abdominis fascia (10%).

### External anatomy of the breast:

- **Nipple:** pigmented and cylindrical, at the 4<sup>th</sup> intercostal space (at age 18)
- **Areola:** pigmented area surrounding the nipple.
- **Glands of Montgomery** (Montgomery's Tubercles): sebaceous glands within the areola, which act to lubricate the nipple during lactation

Some patients present to the hospital complaining of a minor issue, called Montgomery's tubercle, which is a blocked Montgomery gland due to secretions. It's a benign condition that doesn't require any further treatment and resolves on its own.

### Internal anatomy of the breast:

(The breast is composed of 3 different types of tissue, each component can cause a different type of pathology)

- **Glandular tissue (ductal tissue)** → milk producing tissue
  - Each mammary gland consists of 15-20 lobes, which radiate around the nipple and under the areola.
  - Each lobe is further divided into 20-40 lobules composed of clusters of milk-secreting glands (alveoli/acini) and is drained by a lactiferous into the nipples.
- **Fibrous tissue**
  - Strands of connective tissue called the suspensory ligaments of the breast (Cooper's ligaments) extend through the breast to the underlying muscle separating the breast's lobes.
  - Benign or malignant lesions may affect these ligaments and cause retraction or dimpling of the overlying skin
- **Fatty tissue**
  - Subcutaneous and retro- mammary fat. It gives the bulk of breast. No fat beneath areola and nipple.

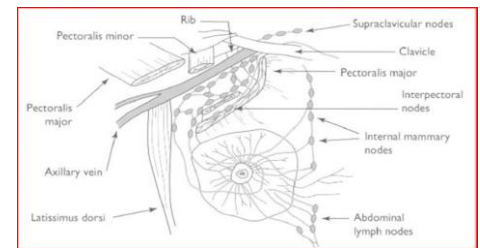
Common pathology arising from fatty tissue is Lipoma, which is a soft painless swelling that the patient presents with (lipoma is common in fatty tissue but not common in the breast). Clinically diagnosed by being soft, but you can't judge fully because the breast is composed of fatty tissue so it might be mistaken with a cyst or any other swelling. Ultrasound is used for diagnosis and confirmation is by fine needle aspiration. Management is either removal if it is large or it's left if there is no effect.

### Lymphatic drainage of the breast:

- Superficial lymphatic nodes drain the skin and deep lymphatic nodes drain the mammary lobules.
  - o Axillary, infraclavicular, supraclavicular, parasternal (internal mammary)
- Lymphatic drainage of the breast:
  - o The medial portion of the breast → to the internal mammary nodes
  - o The central and lateral portions 75-80% → drain to the axillary lymph nodes
- Axillary lymph nodes:

Axillary lymph nodes can be classified anatomically into 5 groups and clinically into 3 levels.

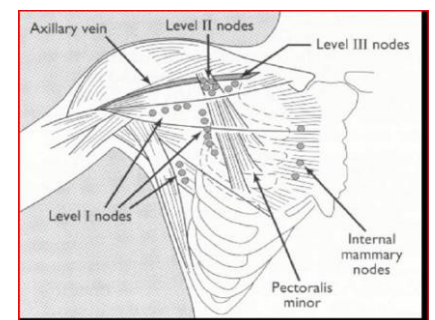
- Anatomical classification of axillary lymph nodes:
  - Anterior (pectoral) group: deep to pectoralis major.
  - Posterior (subscapular) group: along subscapular vessels.
  - Lateral group: along the axillary vein.
  - Central group: within the axillary pad of fat.
  - Apical group: which drains all of the other groups, lies behind the clavicle at the apex of axilla.



- Clinical/surgical classification of axillary lymph nodes:
 

This surgical classification is used in axillary dissection. It is based on the relationship of the lymph nodes to pectoralis minor. There are 3 levels of axillary lymph nodes and options for dissection:

1. Level 1: any lymph node below pectoralis minor (first group involved in malignancy), account for 80% of lymph nodes.
2. Level 2: any lymph node behind pectoralis minor.
3. Level 3: any lymph node above pectoralis minor.



Lymphatic channels are drained according to the blood supply that's why some tumors metastasize to the ribs and lungs

### Normal physiological breast changes in females:

- **Puberty:** need estrogen and progesterone.
- **Estrogen:** growth and appearance, milk-producing system.
- **Progesterone:** lobes & alveoli, alveolar cells become secretory.
- **Menses:**
  - Progesterone: 3-7 days prior to menses, engorgement.
  - Physiologic nodularity: retained fluid.
  - Mastalgia.
- **Pregnancy and lactation:**
  - Glandular tissue displaces connective tissue.
  - Increases in size.
  - Nipples prominent and darker.
  - Mammary vascularization increases.
  - Colostrum present.
  - Attain Tanner stage V with birth.
- **Aging:**
  - Perimenopause: decrease in glandular tissue plus loss of lobular and alveolar tissue.
  - Fatten, elongate, pendulous.
  - Infra-mammary ridge thickens.
  - Suspensory ligaments relax.
  - Nipples flatten.

- Tissue feels “grainy”.

### Normal variations of the breast:

- **Accessory breast tissue**
  - Commonly occurs in three stages: puberty, pregnancy or lactation.
  - Accessory breast is not well formed, there is no full duct or secretion or nipple only accumulation of breast tissue.
  - The patient is normal and a swelling occurs, it is due to increased glandular tissue in the axilla which increases in size due to the effect of hormones. Treatment: nothing is done only reassurance.
- **Supernumerary nipples**, which develop along the milk lines (sites of accessory breast tissue and nipples). Accessory nipple can be secreting during lactation if it is in the breast because it can have a duct.
  - Two deformity can occur in the nipple: Retracted and deviated nipple → presents in malignancy, inflammatory process, duct ectasia, or congenital
- **Hair.**
- **Lifelong asymmetry of the breasts.**

Asymmetry of the breasts is a common concern among female adolescents. Typically, the asymmetry is more noticeable during puberty and eventually breast size evens out during development. If it was a major and persistent asymmetry a breast augmentation or reduction surgical procedure may be considered AFTER breast development/puberty is complete (NEVER interfere surgically during puberty).

### Clinical breast examination:

- History
- Clinical examination
- Imaging
- Cytology and tissue diagnosis.

### Spectrum of complaints:

Women came to see a breast surgeons for the following reasons:

- Breast lump (painful/painless) - 60%
- Anxiety – 20%
- Breast pain without a lump – 10%
- Nipple discharge – 5%
- Change in breast contour – 2%
- Nipple-areolar complex disorder – 1%
- Axillary mass – 1%
- Screen detected lesion – 1%

#### Management of a patient with a breast lump:

- History and examination
- Ultrasound and mammogram if above 35 years old.
- FNAC or core biopsy or excision biopsy
- Definitive treatment which is either: Observation, Excision, if malignant, along the lines of cancer cases

#### Triple assessment of a patient with a lump:

- History and examination
- Mammogram (99%) if above 35 years old
- F.N.A

### History:

Full and complete history should be taken; particular attention should be paid to:

1. Age of the patient (e.g. 45 y/o lady has a higher risk than 16 y/o)
2. Breast development stating from childhood to present.
3. Endocrine status of patient mainly menstruation and OCP use.
4. Size of lump in relation to menses.
5. Pattern of pain in relation to menses.
6. How regular the cycle is and quantity of blood.

7. Changes in breast during previous pregnancies e.g. abscess, nipple discharge, retraction of nipple.
8. Number of pregnancies.
9. **Breast feeding**
10. Abnormalities that took place during previous lactation period e.g. abscesses, nipple retraction, and milk retention.
11. **Family history of breast diseases especially cancer and particularly in near relatives.**
12. Nipple discharge.
13. Age at menarche.
14. Age at 1st birth.
15. L.M.P.
16. For post-menopausal women: H.R.T (hormonal replacement therapy) and date of menopause.

#### Breast presentation:

- Skin dimpling: carcinoma, aging, breast infection, previous breast surgery
- Changes in nipple/areola: Duct ectasia, carcinoma, paget's disease, eczema
- Painless lump: carcinoma, cyst, fibroadenoma, fibroadenosis
- Painful lump: cyst, periductal mastitis, abscess, sometimes carcinoma
- Pain and tenderness (no lump): cyclical, non- cyclical, very rarely a carcinoma
- The cardinal signs of a late cancer of the breast: hard, non- tender, irregular lump, tethering or fixation, palpable axillary lymph nodes.

#### Clinical examination

- Exposure: from the waistband above.
- Position: sitting, supine and 45°
- Inspection: Inspect both breasts by having the patient perform the following maneuvers while sitting:
  - Patient's arms by her side.
  - Patient's arms above her head.
  - Patient's arms on her hips with valsalva (pectoral contraction maneuver).
  - Leaning forward while sitting.

Note for size, symmetry, skin changes (dimpling or tethering), nipple complex (inversion or retraction), color, contour, and scars.

  - Inspect axillae with the patient's arms over her head.

#### Upon inspection note for Skin dimpling and change in contour → Paget's disease

- Mistaken for allergy or eczema and steroids are given which masks the malignancy. Avoid steroids for undiagnosed features and if there are nipple changes because there might be ductal carcinoma (100% with Paget's disease) give only lubricant and if there is no response send for biopsy
- Most effective tool for diagnosis of Paget's disease is biopsy (ulceration and the exfoliating of the nipple)

- Palpation:
  - Patient should be lying supine.
  - Place pad under shoulder to flatten breast.
  - Raise arm over her head.
  - Using preferred pattern
  - Palpate with pads of three fingers
  - Examine normal side first
  - Note for any nipple discharge
  - Abnormal finding? Check the other breast
  - Palpate both breasts
  - Palpate lymph nodes
    - Palpate Sitting
    - Rest arm in your hand and Her arm should be relaxed.
    - Palpate axilla.
    - Palpate all lymph nodes (must examine ALL)

From distal arm to under arm with deep palpation

- Axillary (pectoral, medial, lateral, posterior, central)
- Supraclavicular
- Infra-clavicular
- Nodes deep in the chest or abdomen
- Infra-mammary ridge: shelf in the lower curve of each breast (Usually missed during clinical examination)
- Examine abdomen and the back/lumbar spine (for metastasis)

### Nipple discharge

- 5% of women coming to the clinic complain of nipple discharge
- 95% of these complaints are benign.

Commonest causes in non-pregnant women:

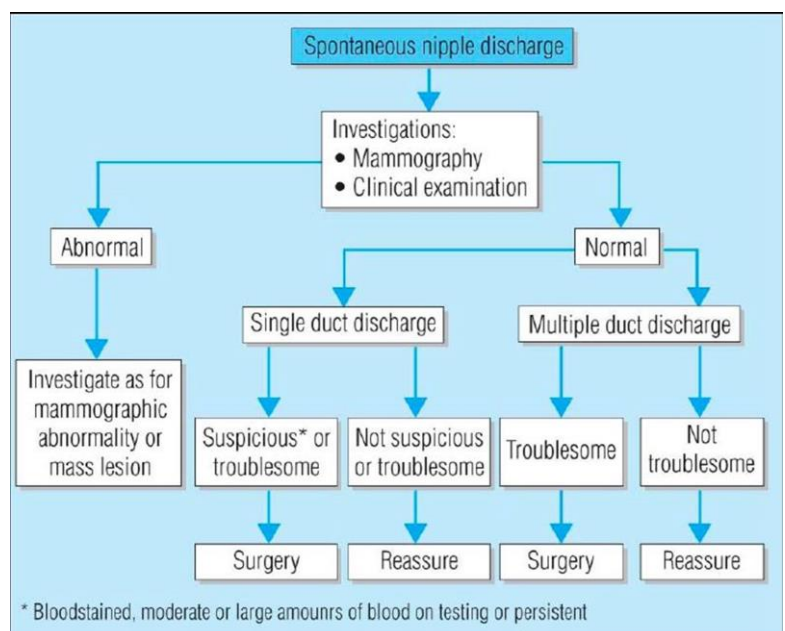
- Carcinoma
- Intra-ductal papilloma (most common cause)
- Fibrocystic changes
- Duct ectasia
- Hypothyroid
- Pituitary adenoma (prolactin secreting adenoma, can present with galactorrhea)

Clinical characteristics:

- Physiologic discharge (e.g. lactation): usually bilateral, multiple ducts, non-spontaneous, screen for phenothiazine use (antipsychotic)
- Pathologic discharge: Unilateral, spontaneous (without squeezing the nipple), single duct, discolored discharge

Evaluation:

- Most important points in history of nipple discharge are:
  - Is it spontaneous or on pressure? Is it coming from single or multiple?
  - Colors: Serous, serosanguinous, bloody, clear, milky, green, blue-black.
- R/O mass by clinical examination and mammogram.
- Identify source of discharge and test for presence of blood in discharge
- Imaging, Consider ductography
- Cytology and biopsy: core biopsy
- Lab tests: thyroid, prolactin.



Management:

- Physiologic: Treat cause if present, Follow-up 6 months (observation)
- Pathologic: Biopsy and excise (single duct excision or total duct excision)

## Common benign Breast disorders

### 1. Fibrocystic changes

- Characteristics
  - **Most common breast pathology**
  - Lumpy, bumpy breasts
  - 50-80% of all menstruating women
  - Commonest incidence among age 30-50 - 10% in women less than 21
  - Caused by hormonal changes prior to menses
  - Relationship to breast cancer doubtful
- Signs and symptoms
  - Mobile cysts with well-defined margins
  - Singular or multiple
  - May be symmetrical
  - Upper outer quadrant or lower breast border
  - Pain, discomfort and tenderness
  - Cysts may appear quickly and decrease in size
  - Lasts half of a menstrual cycle
  - Subside after menopause, if no HRT.

Ultrasanographic features of Cysts

- 1-Contain no or few echoes
- 2-Have smooth margins
- 3-Often compressible with ID
- 4-Have posterior enhancement  
(increased echoes=whiter)

### investigation

- Aspirate cyst fluid:
  - If bloody → go for surgical biopsy.
  - If non-bloody and disappear completely → observe.
  - If non-bloody and doesn't resolve → surgical biopsy.
- Imaging for questionable cysts
  - In young patients only U/S is performed show multiple cysts
  - In 40 and above patients both U/S and mammogram are performed to exclude any underlying malignant pathologies.
- Management
  - Treatment based on symptoms
  - Reassure patient that it is benign changes of the breast
  - **"Atypical Hyperplasia"** on pathology report indicates increased risk of breast cancer
    - If simple (one layer of cells and fluid) then just reassure the patient & conservative management
    - Atypia or hyperplasia ☐ if atypia / hyperplasia / dysplasia changes were present must EXCISE
    - Complicated cyst (i.e. both solid and cystic components) → Biopsy is needed from solid component to exclude malignancy (has malignancy potential).
    - Constant cyst (i.e. doesn't change with multiple imaging in different times) → must biopsy
  - Comfort measures:
    - Eliminate Methylxantines (coffee, chocolate) → it causes fluid retention: may take 6 months for relief.
    - Local heat/cold
    - Wear a good supporting bra (usually patients remove the bra due to pain but that results in accumulation of more fluid due to redundancy of the breasts)
    - Low-Sodium diet
    - Vitamin E: Antioxidant but do not take more than 1200/day
  - Medications for mastalgia:
    - NSAIDS (simple analgesia)
    - Monophasic oral contraceptive pills (to stabilize hormonal levels)

- Spironolactone
- Dopamine Agonists: Bromocriptine
- Rare or former use: Danazol (for severe cases, side effects include acne and hirsutism, only 50% respond to it, mostly not used), Tamoxifen, GnRH agonist (Luprolide)

## 2. Fibroadenoma

Glandular tissue that has overgrowth of fibrous tissue and connective tissue forming a firm capsulated mass. Healing of that mass and shape depends on the fibrous tissue surrounding it.

- Characteristics
  - Second most common breast condition (most common lump)
  - Most common in black women
  - Late teens to early adulthood (15-30 years old of age)
  - Rare after menopause Totally benign, and NO malignancy potential
- Signs and symptoms
  - Firm, rubbery, round, mobile mass
  - Painless, non-tender
  - Solitary, 15-20% are multiple
  - Well circumscribed
  - Mostly located in upper-outer quadrant of the breast
  - 1-5 cm or larger (if more than 5 cm it is called a giant fibroadenoma)
- Investigations and treatment
  - Triple assessment
  - Imaging: U/S mostly used because its more common in young and mammogram
  - Biopsy
  - Excision and close follow-up
    - EXCISE if →
    - 📏 >3-4 cm or giant fibroadenoma
    - Localized
    - Painful
    - Rapidly growing
    - A family history of malignancy (does NOT mean that fibroadenoma is pre-malignant but done only to relieve the patient's worries)
    - Patient's preference
    - Patient has no access for medical follow up
    - Indeterminate diagnosis (unclear pathology)
    - If 35 y/o and older recommended (unusual age)
    - Phylloides tumor (A variation of fibroadenoma but it has a small percentage of malignancy and can reoccur after incomplete excision)

**Popcorn microcalcification in mammogram**

If left alone it'll either remain the same or regress (some patients during pregnancy it regresses) or increase in size or calcify

## 3. Phylloides tumor (cytosarcoma)

- Characteristics
  - Giant fibroadenoma (a variant of fibroadenoma) with rapid growth (patient presents with a history of a rapidly growing mass)
  - Malignant potential (<1%), lesions > 3 cm are more likely to be malignant Most are benign, 25% recur locally if incompletely excised
  - The malignant form of this lesion mostly locally malignant (about 10%) can metastasize hematogenously to the lungs and not to the axillary lymph nodes (no need for axillary clearance)
  - Often occurs in women aged 40+ (rarely in younger age group)
- Investigations and treatment
  - Imaging: both mammography and ultrasound, they present as well-defined masses that are very similar to a benign fibroadenoma. The malignant forms are more likely



to have cystic spaces on U/S

- Treatment → excision is the only treatment (mastectomy)! Chemotherapy and radiotherapy are not effective.

#### 4. Intraductal papilloma

- Characteristics
  - Slow-growing
  - Overgrowth of ductal epithelial tissue
  - Usually not palpable
  - Cauliflower-like lesion
  - Length of involved duct
  - **Most common cause of persistent bloody nipple discharge (Important)**
  - 40-50 years of age
- Signs and symptoms
  - Watery, serous, serosanguinous, or bloody discharge
  - Spontaneous discharge
  - Usually unilateral
  - Often from single duct, pressure elicits discharge from single duct
  - 50% no mass palpated
- Investigations and treatment
  - Test for occult blood
  - **Ductogram**
    - Breast ducts is 2-3 cm and the growth is in the duct so it won't be felt or be visible.
    - On ultrasound and mammogram it will show normal breast tissue
    - A ductogram is done which is a contrast material injected then an x-ray is taken (mammogram) and filling defects are assessed.
    - Management:
      - ✓ If a single papilloma is noted → **leave it** (one filling defect), it will be get necrosed and sloughed on its own but if it persists and doesn't disappear remove the ductal system
      - ✓ If multiple filling defects are noted (**intraductal papillomatosis** a premalignant condition) → **remove** because carcinoma in situ might be found underneath.
      - ✓ Sometimes patient feels a lump which is a blocked duct accumulated by secretions (it is along the nipple and if you press gently blood will be discharged), ultrasound and biopsy to rule out malignancy
  - Biopsy
  - Excision of involved duct

#### 5. Mammary duct ectasia

- Characteristics
  - Inflammation and dilation of sub-areolar ducts behind nipples (dilatation of breast ducts), **completely benign**
  - May result in palpable mass because of ductal rupture
  - Greatest incidence after menopause
  - Etiology Unclear, Ducts become distended with cellular debris causing obstruction
- Signs and symptoms
  - ☒ Multi-colored discharge
    - Thick, pasty (like toothpaste)
    - White, green, greenish-brown or serosanguinous
  - Intermittent, no pattern
  - Bilaterally from multiple ducts
  - Nipple itching with drawing or pulling (burning) sensation
  - Mammary Duct Ectasia versus Breast Cancer:
    - **Left breast** – slit-like nipple characteristic of mammary duct ectasia
    - **Right breast** – nipple retraction from carcinoma

- Investigations and treatment
  - Diagnosed by history, physical exam and ultrasound (mostly diagnostic but depends on the patients age)
  - Test for occult blood
  - Imaging→Mammogram and sonogram
    - A 55 year old patient presented to the hospital with multiple nipple discharge and really worried, are we only going to do ultrasound?
      - ✓ No we are going to do a mammogram too to rule out other undetected pathology
  - Biopsy→Excision of ducts if mass present
  - Antibiotics
  - Close follow-up
    - Duct ectasia→stasis→risk of infection→higher chance of abscess (periductal/nonlactating mastitis) caused by mixed organisms so broad spectrum antibiotics are given and abscess drainage, responds well unlike lactating woman (nonlactating breast abscess/mastitis → think of underlying duct ectasia)

## 6. Mastitis

- Characteristics
  - Breast infection when bacteria enter the breast via the nipple
  - Ducts infected
  - Fluid stagnates in lobules
  - Usually during lactation
    - Instruct the mother to continue breastfeeding the baby even if she still has the abscess so the milk won't be accumulated in the breast. Stop if the baby has diarrhea or cramps due to the antibiotics and suck the milk out till the infection subsides
  - Penicillin resistant **staphylococcus common cause**
    - Staph due to the sucking baby, some woman are exposed if they have cracked nipples or the babies mouth is colonized by staph (mother is instructed to clean areola and babies mouth before feeding)
- Signs and symptoms
  - Pain and tenderness
  - Nipple discharge: -Pus -Serum -Blood
  - Localized induration
  - Fever and rigor
  - **Abscessvs mastitis**
    - Abscess → Localized tenderness, severe fever and rigor, has puss formation and not whole breast affected.
    - Mastitis equals cellulitis, which is infection of soft tissue without puss formation, and whole breast is affected.
  - **Inflammatory carcinoma vs. mastitis**
    - May have similar appearance, but completely different history
    - Inflammatory carcinoma →non-lactating, nonfebrile, not as tender as mastitis, elderly,peaud'orange, **must perform U/S, mammogram and biopsy.**
    - Mastitis → Lactating women presented with fever, painful and tender breasts
      - broad- spectrum antibiotics (cephalosporin 1<sup>st</sup> generation IV), warm sponges, if abscess must drain it.
- Treatment
  - Antibiotics
    - "Oxacillins"" for PP mastitis (PP=postpartum=after childbirth)
    - Cephalosporin for other abscesses→cephalexin, Keflex
  - Empty breast if PP
  - Incision and drainage of abscess

## 7. Fat necrosis

- Characteristics
  - Cause: Trauma to breast (e.g. seat belt trauma in car accidents) o Surgery Necrosis of adipose tissue
- Signs and symptoms
  - Pain or mass → usually non-mobile mass
- Treatment
  - Resolves over time without treatment but may be excised

Patient presents with an irregular lump attached to the skin and doesn't remember any trauma. Upon clinical and radiological examination you can't differentiate it from malignancy, on ultrasound and mammogram speculation and calcification similar to malignancy. We differentiate between it and malignancy by core biopsy (FNA is not done because due to its large size)

## 8. Male gynecomastia (Not labeled as pathological until the cause is ruled out)

- Characteristics
  - Diffuse hypertrophy of breast
  - 30-40% of male population
  - Adolescence and older men
  - Caused by imbalance of estrogen/testosterone
  - Medical conditions (hepatitis, COPD, hyperthyroidism, TB)
    - May be associated with genetic cancer families (Colon, prostate cancer)
    - Must exclude testicular and adrenal malignancies (hormone producing tumors)
- Medications associated with gynecomastia
  - Marijuana
  - Narcotics
  - Phenothiazines
  - Diazepam
  - Anything that affects the CNS
  - Cimetidine "for peptic ulcer", stop medication.
- Treatment
  - If pre-puberty → wait to see if it resolves
  - Change medication
  - Treat underlying illness
  - If no underlying cause → two options subcutaneous mastectomy or aspiration plastic

## 9. Galactocele

A lactating lady suddenly presented with breast mass nontender, slightly uncomfortable, no fever. On ultrasound there appears to be a cystic mass → most likely galactocele.

- Galactocele is a Cyst containing milk usually located in the mammary gland
- Signs and symptoms: dull aching pain with a well formed lump
- Diagnosis: clinically or by ultrasound
- Management: aspiration, which is both therapeutic and diagnostic under full aseptic technique to prevent infection. If it appeared small on ultrasound there's no need to aspirate just reassure the patient. If it accumulates again then aspirate again while reassuring the patient that it'll resolve after lactation period. Advise the patient to wear good supportive bra.
- If the cyst got infected management is the same as an abscess.

## Breast Cancer

(Not in lecture only in Raslan Booklet but the doctor said we should learn it it's important)

### FAST FACTS

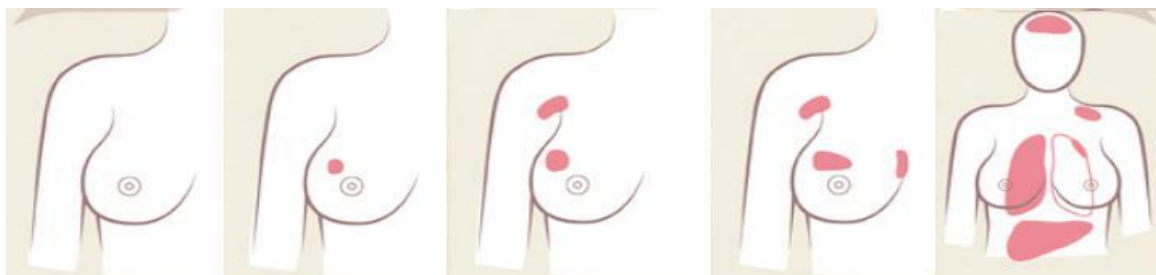
- 9 out of 10 women who get breast cancer do not have a family history of the disease
- Age is the biggest risk factor in developing breast cancer – over 70% of cases occur in women over 50 years
- Women aged 50–69 who have a breast screen every two years can reduce their chance of dying from breast cancer by at least 30%
- Breast cancer is the most common cancer in women aged over 35 years - 25% of all cancers diagnosed
- The average age of diagnosis of breast cancer in women is 45 - 55 years
- **Most common type of breast cancer is ductal carcinoma.**

Stage at diagnosis	Survival rates (%)
Localized	96.8
Regional	75.9
Distant	20.6

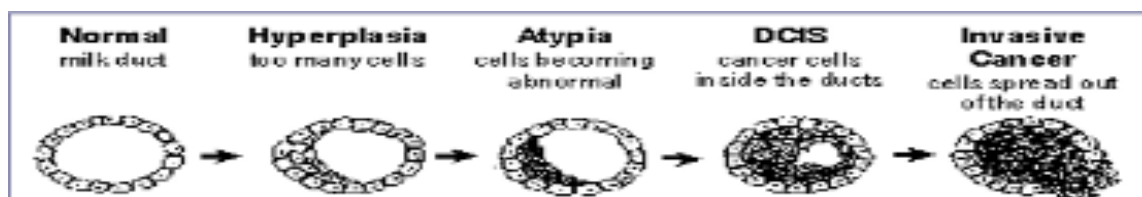
#### Established risk factors for breast cancer in women:

- |               |  |
|---------------|--|
| Relative risk | <ul style="list-style-type: none"> <li>- Age (older age group higher risk)</li> <li>- Country of birth (North America, Northern Europe)</li> </ul>   |
| >4            | <ul style="list-style-type: none"> <li>- Mother and sister with history of breast cancer, especially at an early age</li> <li>- Biopsy confirmed atypical hyperplasia and a history of breast cancer in a first degree relative</li> </ul>   |
| Relative risk | <ul style="list-style-type: none"> <li>- Nodular densities on mammogram occupying &gt;75% of breast volume</li> <li>- History of cancer in one breast</li> <li>- Radiation to chest</li> </ul>   |
| 2.1           | <ul style="list-style-type: none"> <li>- Mother or sister with history of breast cancer, diagnosed at an early age</li> <li>- Biopsy-confirmed atypical hyperplasia without a family history of breast cancer</li> </ul>   |
| Relative risk | <ul style="list-style-type: none"> <li>- Socioeconomic status (high)</li> <li>- Place of residence (Urban)</li> <li>- Race/ethnicity (White &gt;45 and Black &lt;45)</li> <li>- Religion (Jewish)</li> </ul>   |
| 1.1           | <ul style="list-style-type: none"> <li>- Nulliparity, breast cancer &gt;40 years of age</li> <li>- Age at first full-term pregnancy, age at menarche, age at menopause</li> <li>- History of primary cancer in endometrium, ovary</li> <li>- Obesity (Obese breast cancer &gt; 50 years, Thin breast cancer &lt;50 years)</li> </ul> |

### STAGING CLASSIFICATION OF BREAST TUMORS



Stage 4	Stage 3	Stage 2	Stage 1	Stage 0
Tumor of any size with distant metastases such as bone, liver, lungs, brain and including supraclavicular node involvement	Tumor more than 5 cm, with skin involvement or fixation, and involvement of fixed lymph node	Tumor more than 2 cm but less than 5 cm, 1 ipsilateral axillary lymph node involvement (movable)	Tumor less than 2 cm, no lymph node involvement	Neither palpable tumor nor axillary lymph nodes.



### HISTOPATHOLOGICAL TYPES OF BREAST CANCER

- *Infiltrating (or invasive) Ductal Carcinoma (IDC)*

Starting in a milk passage, or duct, of the breast, this cancer breaks through the wall of the duct and invades the breast's fatty tissue. It can **spread to other parts of the body through the lymphatic system and through the bloodstream**. Infiltrating or invasive ductal carcinoma accounts for about 80 percent of all breast cancers. **Most common type.**

- *Infiltrating (or invasive) Lobular Carcinoma (ILC)*

This type of cancer starts in the milk-producing glands. About 10 to 15 percent of invasive breast cancers are invasive lobular carcinomas. These **are multicentric, and they can appear in the other breast as well (bilateral)**.

- *Medullary Carcinoma*

This type of invasive breast cancer has a relatively **well-defined** distinct boundary between tumor tissue and normal breast tissue. It accounts for about 5 percent of all breast cancers. The **prognosis for medullary carcinoma is better** than that for invasive lobular or invasive ductal cancer

- *Colloid Carcinoma*

This rare type of invasive disease, also called mucinous carcinoma, is formed by mucus-producing cancer cells. **Prognosis for colloid carcinoma is better** than for invasive lobular or invasive ductal cancer.

- *Tubular Carcinoma*

Accounting for about two percent of all breast cancers, tubular carcinomas are a special type of invasive breast carcinoma. They have **a better prognosis** than invasive ductal or lobular carcinomas and are often detected through breast screening.

#### *Surgical treatment of breast cancer depending on stage:*

- Stage 1 and 2 WLE or mastectomy, axillary nodes then radiotherapy and chemotherapy
- Stage 3 neo-adjuvant chemotherapy then surgery
- Stage 4 no role of surgery

- *Adenoid Cystic Carcinoma*

This type of cancer rarely develops in the breast; it is more usually found in the salivary glands. Adenoid cystic carcinomas of the breast have a better prognosis than invasive lobular or ductal carcinoma.

### PROGNOSTIC FACTORS

- Size of tumor
- Grade of tumor
- Lymph nodes involvement

Mammogram of DCIS with malignant microcalcifications. Note the fine, linear, heterogeneous clustered calcifications associated with an ill-defined mass lesion. Although the hallmark imaging feature for DCIS is the presence of microcalcifications, DCIS can also present less frequently without them.

### BREAST CANER TREATMENT

#### Ductal carcinoma in situ treatment

☐ Depending on the degree of DCIS the options of treatment are

- Total mastectomy
- Lumpectomy
- Lumpectomy and radiation therapy

☐ DCIS does not spread to the axillary lymph nodes so these are usually not removed.

#### Lines of treatment

- Surgery:
  - For Stage I and II WLE or mastectomy + axillary nodes.
  - Surgical Intervention: 1. Mastectomy 2. W.L.E (wide local excision)
- Radiotherapy.

- **Side effects**

	Common reactions	Uncommon reactions
During the course of treatment	<ul style="list-style-type: none"> <li>✓ skin reddening and irritation</li> <li>✓ Fatigue</li> <li>✓ loss of hair</li> <li>✓ sore throat</li> </ul>	<ul style="list-style-type: none"> <li>✓ skin blistering</li> <li>✓ nausea</li> <li>✓ rib fractures (less than 1 in every 100)</li> </ul>
After the course of treatment	<ul style="list-style-type: none"> <li>✓ Discomfort and sensitivity in the treated area.</li> <li>✓ increased firmness</li> <li>✓ swelling of the treated breast</li> </ul>	<ul style="list-style-type: none"> <li>✓ Pneumonitis and scarring (about 1 or 2 women in every 100 women between 6 weeks and 6 months after therapy)</li> </ul>

- Chemotherapy.
  - Chemotherapy for breast cancer is usually given in cycles every 3 or 4 weeks.
  - The common schedules include:
    - CMF (Cyclophosphamide, Methotrexate and 5-Fluorouracil)
    - AC (Adriamycin, Cyclophosphamide)
    - Taxol or Taxotere
  - Chemotherapy side effects:
    - Hair loss
    - Effects on the blood.
    - Mouth problems
    - Skin problems
    - Fatigue
    - Anorexia
    - Nausea and vomiting

- Bowel problems
- Fertility
- Hormonal therapy.

Uncommon side effects	Common side effects
<ul style="list-style-type: none"> <li>● Light-headedness, dizziness, headache or tiredness</li> <li>● Rash</li> <li>● Nausea</li> </ul>	<ul style="list-style-type: none"> <li>● Hot flushes or sweats</li> <li>● Irregular menstrual periods (in women who have not gone through the menopause)</li> <li>● Vaginal irritation, including vaginal dryness or discharge</li> <li>● Fluid retention and weight gain</li> </ul>

#### ■ TAMOXIFEN

- Tamoxifen is a drug that has been used for the treatment of breast cancer. It can increase survival for some women with breast cancer and reduce their risk of developing cancer in the opposite breast. Tamoxifen is sometimes used whose breast cancer recurs.
- It is also being tested to see if it can prevent the development of breast cancer in unaffected women who are at an increased risk because of a strong family history of the disease.
- Tamoxifen is taken by mouth. Tablets are either 10 mg or 20 mg.
- It is usually started after surgery or after the completion of radiation Rx
- Tamoxifen should take it at the same time each day.
- Currently the recommended length of Tamoxifen therapy is five years.
- Ovarian ablation.
- Reconstruction  
The aim of breast reconstruction is to rebuild the breast shape and, if desired, the nipple and the areola.
  - Benefits:
    - Reconstruction usually doesn't restrict any later treatments, nor does it
    - Usually interfere with radiotherapy, chemotherapy or hormone therapy.
    - The patient will not need to wear an external prosthesis.
    - Follow-up after the operation is no more difficult and any recurrence of cancer in the area can still be detected.
    - Some women feel more self-confident and feminine after reconstruction
  - There are two main types of breast reconstruction:
    - Tissue or skin expander with breast implants
    - Flap reconstruction

#### LYMPHOEDEMA

- Definition: Lymphedema is long-term swelling of the arm after axillary surgery or radiotherapy to the axilla.
- Symptoms: include a general heaviness of the arm, a swelling of the fingers or sometimes difficulty putting on a long sleeve.
- The earlier treatment is started the easier it is to achieve good results.
- Less than 1 in 10 women who have had either lymph glands removed or radiation to the armpit will develop noticeable lymphedema. This risk increases to 1 in 3 if the pt. had both of these treatments.
- It can occur any time after the operation, even up to 10 years.

Ultrasound

- Harmless
- Good at all age
- No radiation
- Low cost
- **Good in solid and cystic lesion**
- **Tell you the exact dimension excellent in lymph node**

Mammogram

- **Very painful**
- Not very much beneficial below The age of 35
- Informative after the age of 40
- Expensive
- **Excellent to show you microcalcification**

Young women breast

- **More breast tissue**
- **Less fat**

Old women breast

- **Less breast tissue**
- **More fat**

MCQ

Raslan:

1. Ductal carcinoma in situ (breast):

- In the great majority of cases presents as a palpable mass
- Usually present as mammographic finding of micro-calcification
- Mastectomy is the treatment of choice in all cases
- Axillary dissection is an integral part of its surgical treatment

2. It is advisable to remove a fibroadenoma if:

- It is painful
- It is more than 3 cm in size
- There is a positive family history of breast cancer
- All of the above

3. All the following are mammographic features of breast carcinoma except?

- Skin and nipple discharge
- Diagnostic for women below 20
- Speculated mass
- Micro-calcification

4. All true for fibroadenoma except:



- a) Microscopically have both epithelial and stromal components
- b) During pregnancy and lactation may undergo partial/total infarction
- c) Affect old females
- d) Are pseudocapsulated

5. Regarding intraductal papilloma. All true except?

- a) Characterized by papillary configuration
- b) Solitary intraductal papillomas are lesion of large duct
- c) May present with bloody nipple discharge
- d) Does not require surgical excision

6. Which of the following factors increases the risk of breast cancer among women?

- a) Obesity and nulliparity
- b) Age at menarche
- c) Multiple pregnancies
- d) Low-fiber diet

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7. which doesn't cause nipple discharge:

- a) Paget disease
- b) eczema
- c) psoriasis
- d) cancer
- e) ductectasia

8. Which of the following indicate the worse prognosis in breast cancer:

- a) h. A 1.5cm axillary lymph node.

9. in benign tumor all of these true, except:

- a) can progress to malignant
- b) has the ability to metastasize

10. In TNM classification of tumors, T means:

- a) primary tumor
- b) equal to stage IV

11. Management of breast ca. includes all of the goals except:-saving the shape & function - prevention of complications

12. The risk of breast cancer among women is increased by which of the following factors?

- a) Obesity and nulliparity
- b) Age at menarche
- c) Multiple pregnancies
- d) Low-fiber diet
- e) Trace metals deficiency

13. It is advisable to remove a fibroadenoma if:

- a) It is painful
- b) It is more than 3cm in size
- c) There is positive family history of breast cancer
- d) All of the above

14. Ductal carcinoma in Situ (Breast):

- a) In the great majority of cases presents as a palpable mass.
- b) Usually present as mammographic finding of microcalcification.
- c) Mastectomy is the treatment of choice in all cases.
- d) Axillary dissection is an integral part of its surgical treatment.

15. Which of the followings is more likely to be associated with malignant breast lesions:
- Hyperechogenicity
  - Widely scattered
  - Microcalcification
  - Smooth margins
16. Fibroadenoma:
- Rare before the age of 40
  - The most common cause of breast mass in fourth and fifth decades
  - Recurrence after excision of large lesions is possible
  - Its size decreases with pregnancy
17. Feature (s) of breast lump which indicate malignancy include (s):
- Breast deformity.
  - Dimpling of the skin.
  - A mass of 4 cm size.
  - Ill defined margin.
  - Limited movement.

Answer Key: 1;B , 2;D , 3;B , 4;C , 5;D , 6;A

## Surgical recall questions:

### 1- What four nerves must the surgeon be aware of during an axillary dissection?

- Long thoracic nerve
- Thoracodorsal nerve
- Medial pectoral nerve
- Lateral pectoral nerve

### 2- What is the name of the deformity if you cut the long thoracic nerve in this area?

Winged scapula

### 3- What is the lymphatic drainage of the breast?

Lateral: axillary lymph nodes

Medial: parasternal nodes that run with internal mammary artery

### 4- What are the levels of axillary lymph nodes?

Level I (low): lateral to pectoral minor

Level II (middle): deep to pectoral minor

Level III (high): medial to pectoral minor

In breast cancer, a higher level of involvement has a worse prognosis, but the level of involvement is less important than the number of positive nodes (Think: Levels I, II, and III are in the same inferior–superior anatomic order as the Le Fort facial fractures and the trauma neck zones; *I dare you to forget!*)

### 5- Which hormone is mainly responsible for breast milk production?

Prolactin

### 6- What are the major breast cancer susceptibility genes

BRCA1 and BRCA2

### 7- What is the “TRIAD OF ERROR” for misdiagnosed breast cancer?

- Age >45 years
- Self-diagnosed mass
- Negative mammogram

*Note:* ~75% of cases of **MISDIAGNOSED** breast cancer have these three characteristics

**8- What are the history risk factors for breast cancer “NAACP”:**

Nulliparity  
Age at menarche (younger than 13 years)  
Age at menopause (older than 55 years)  
Cancer of the breast (in self or family)  
Pregnancy with first child (<30 years)

**9- Why does skin retraction occur?**

Tumor involvement of Cooper’s ligaments and subsequent traction on ligaments pull skin inward

**10- What are the different types of invasive breast cancer?**

Infiltrating ductal carcinoma (~75%)  
Medullary carcinoma (~15%)  
Infiltrating lobular carcinoma (~5%)  
Tubular carcinoma (~2%)  
Mucinous carcinoma (colloid) (~1%)  
Inflammatory breast cancer (~1%)

**11- When is the best time for breast self-exams?**

1 week after menstrual period

**12- What is the classic picture of breast cancer on mammogram?**

Spiculated mass

**13- Which option is best to evaluate a breast mass in a woman younger than 30 years?**

Breast ultrasound

**14- What is a “radial scar” seen on mammogram?**

Spiculated mass with central lucency, +/- microcalcifications

**15- What tumor is associated with a radial scar?**

Tubular carcinoma; thus, biopsy is Indicated

**16- How do you proceed if the mass appears to be a cyst?**

Aspirate it with a needle

**17- What hormone receptors must be checked for in the biopsy specimen?**

Estrogen and progesterone Receptors

**18- How does tamoxifen work**

It binds estrogen receptors

**19- What are common options for breast reconstruction?**

TRAM flap, implant, latissimus dorsi flap

**20- What is a TRAM flap?**

Transverse Rectus Abdominis Myocutaneous flap

**21- What are side effects of tamoxifen?**

Endometrial cancer, DVT, pulmonary embolus, cataracts, hot flashes, mood swings

**22- What are the mammographic Findings in Lobular Carcinoma In Situ?**

There are none

**23- What is the most common cause of bloody nipple discharge in a young woman?**

Intraductal papilloma

**24- What is the most common breast tumor in patients younger than 30 years?**

Fibroadenoma

**25- What is Paget's disease of the breast?**

Scaling rash/dermatitis of the nipple caused by invasion of skin by cells from a ductal carcinoma

**26- What are the common options for breast reconstruction after a mastectomy?**

Saline implant

TRAM flap

**27- What is the most common cause of green, strawcolored, or brown nipple discharge?**

Fibrocystic disease

**28- What is the most common cause of breast mass after breast trauma?**

Fat necrosis

**29- What is the clinical presentation of a fibroadenoma?**

Solid, mobile, well-circumscribed round breast mass, usually <40 years of age

**30- How is fibroadenoma diagnosed?**

Negative needle aspiration looking for fluid; ultrasound; core biopsy