Surgery 432 Team

4 Breast Diseases

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COLOR GUIDE: • Females' Notes • Important • Additional • Raslan's Notes

Objectives

You should know about the following topics:

1. Benign breast diseases:

Fibrocystic changes	Breast cyst	Mastalgia	Fibroadenoma	Ductectasia	Periductal metastasis and abcess
	•**Simple** •**Complicated**	•**Cyclic** •**Non-cyclic**	•**Giant fibroadenoma** •**Phylloides tumor**		

Lactative abscess	Fat necrosis	Mastitis	Glactocele	Nipple discharge	Microcalcification
					•**Adenoma** •**Gynecomastia**

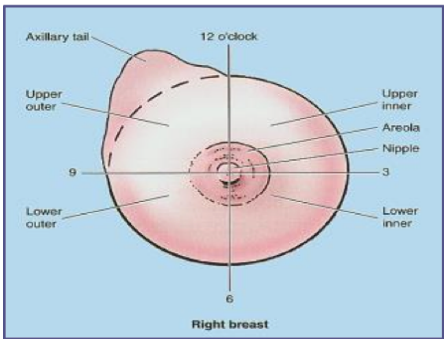
2. Carcinoma breast:

Ductal and lobular	Invasive and non-invasive	Malignant Phylloides	Sarcoma and lymphoma	Male breast carcinoma

Overview of the structure and function of the breast

❖ *Anatomy of the breast*

- Breasts (mammary glands) are modified sebaceous glands.
- The breast extends from the 2nd to the 6th ribs and transversely from the lateral border of the sternum to the mid-axillary line.

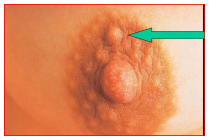


BREAST BORDERS:
Upper border: collar bone.
Lower border: 6th or 7th rib.
Inner border: edge of sternum.
Outer border: mid-axillary line.

BREAST DIVISIONS:
Each breast is divided into 5 segments.

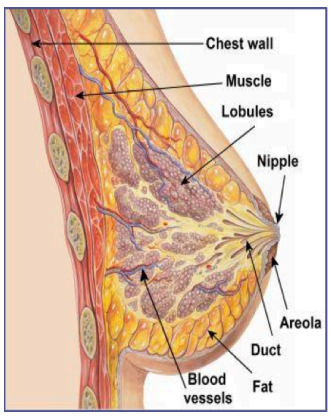
- **Four quadrants:**
  By *horizontal* and *vertical lines* intersecting at the nipple (upper outer quadrant, upper inner quadrant, lower outer quadrant, and lower inner quadrant). **Majority of benign or malignant tumors lie in the upper outer quadrant**
- **Tail of Spence** (the axillary tail): an additional lateral extension of the breast tissue toward the axilla.

EXTERNAL ANATOMY OF THE BREAST:
Nipple: pigmented and cylindrical, at the 4th 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 → ***Glands of Montgomery can get obstructed (blocked) and inflamed which could raise concerns to the female of a serious pathology, even though it's a simple occlusion.***


Blocked Montgomery Tubercle

MUSCULATURE RELATED TO THE BREAST:
The breast lies over the muscles that encase the chest wall. The muscles involved include the pectoralis major (60%), pectoralis minor, serratus anterior (30%), external oblique, latissimus dorsi, subscapularis, and rectus abdominis fascia (10%).

INTERNAL ANATOMY OF THE BREAST:
The breast is composed of 3 different types of tissue
1. Glandular tissue: It is the milk-producing tissue. Each mammary gland consists of ***15-20 lobes***. Each lobe is further divided into ***20-40 lobules*** composed of clusters of milk-secreting glands (alveoli/acini) and is drained by a ***lactiferous duct*** that opens onto the nipple.
2. Fibrous (supporting) 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 → any pathology that makes the breast increases in size or becomes edematous will lead to cooper's ligaments becoming tight causing ***dimpled appearance*** or what's called Peau d'orange "French for orange peel skin" e.g. in CA breast or Mastitis
3. Fatty tissue: Subcutaneous and retro- mammary fat. It gives the bulk of breast. No fat beneath areola and nipple.



LYMPHATIC DRAINAGE OF THE BREAST:

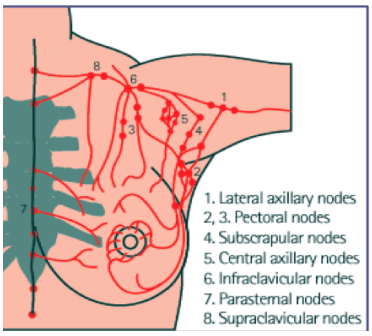
- Superficial lymphatic nodes drain the **skin** and deep lymphatic nodes drain the **mammary lobules**.
  - ***Axillary*** *(main lymphatic drainage goes to the axillary area)*, infraclavicular, supraclavicular, parasternal (internal mammary) → internal mammary nodes most of the time they ***can't be felt on palpation***, they're only seen on ***imaging***
- **Lymphatic drainage of the breast:**
  - ***The medial portion of the breast → to the internal mammary nodes***
  - ***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:**

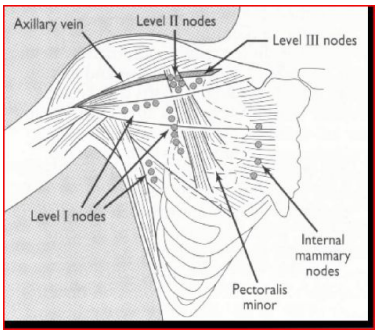
1. Anterior (pectoral) group: deep to pectoralis major.
2. Posterior (subscapular) group: along subscapular vessels.
3. Lateral group: along the axillary vein.
4. Central group: within the axillary pad of fat.
5. Apical group: which drains all of the other groups, lies behind the clavicle at the apex 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.



❖ *Physiology of the breast*

Normal physiological breast changes in females.

- **Puberty:** need estrogen and progesterone.
  - **Estrogen:** growth and appearance, milk-producing system.
  - **Progesterone:** development of lobes & alveoli, alveolar cells become secretory.

- Asymmetry is ***common***

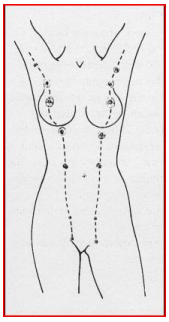
- **Menses:**
  - Progesterone: 3-7 days prior to menses, engorgement.
  - Physiologic nodularity: retained fluid.
  - ***Mastalgia.***

- **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.

Asymmetry 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).

- **Aging:**
  - Perimenopause: decrease in glandular tissue, loss of lobular and alveolar tissue. Loss of fat content
  - ***Fatten, elongate, pendulous.***
  - Infra-mammary ridge thickens.
  - Suspensory ligaments relax.
  - Nipples flatten.
  - Tissue feels "grainy".

Milk lines



❖ *NORMAL VARIATIONS OF THE BREAST*

- Accessory breast tissue (becomes more prominent in 3 stages, during puberty, pregnancy and lactation → due to breast proliferation. Most of the time it doesn't contain ducts or a nipple just a bulk of fat with some breast tissue) and supernumerary nipples, which develop along the ***milk lines*** (sites of accessory breast tissue and nipples).
- Hair.
- Lifelong asymmetry.

Breast asymmetry

Supernumerary nipple

Accessory tissue Biopsy

Clinical approach

❖ *Triple assessment of a patient with a lump:*

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

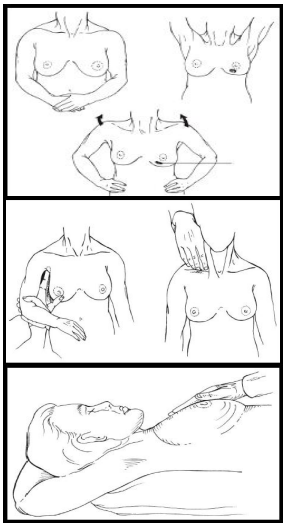
❖ *History*

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

- Age of the patient (e.g. 45 y/o lady has a higher risk than 16 y/o)
- Breast development stating from childhood to present.
- Endocrine status of patient mainly menstruation and OCP use.
- Size of lump in relation to menses.
- Pattern of pain in relation to menses.
- How regular the cycle is and quantity of blood.
- Changes in breast during previous pregnancies e.g. abscess, nipple discharge, retraction of nipple.
- Number of pregnancies.
- Breast feeding
- Abnormalities, which took, place during previous lactation period e.g. abscesses, nipple retraction, milk retention.
- Family history of breast diseases especially cancer and particularly in near relatives.
- Nipple discharge.
- Age at menarche.
- Age at 1st birth.
- L.M.P.
- For post-menopausal women: H.R.T (hormonal replacement therapy) and date of menopause.

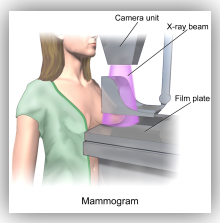
❖ *Physical examination*

- Exposure: from the waist and 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.



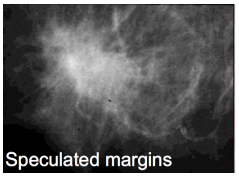
- Palpation:
  - Patient should be lying supine.
  - Place pad under shoulder to flatten breast.
  - Raise arm over her head.
  - Abnormal finding? Check the other breast.
  - Palpate both breasts
    - Palpate Sitting
    - Rest arm in your hand and palpate axilla. Her arm should be relaxed.
    - Palpate supra-clavicular and infra-clavicular nodes
- Using preferred pattern
- Palpate with pads of three fingers
- Note for any nipple discharge
- 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 normal side first.
- ***Examine abdomen and the back/lumbar spine (for metastasis)***

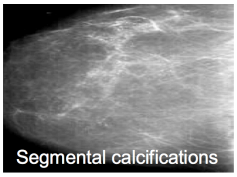
❖ *Imaging*



- **Mammography**
  - Screening tool → age of 40
  - Estimated reduction in mortality 15 – 25%
  - 10% false positive rate
  - Densities and calcification

Benign	Malignant
Circumscribed mass	Spiculated mass
Fat-containing lesion	Architectural distortion with no history of prior surgery
Microcalcifications	Microcalcifications
Round, uniform density, large, coarse	Linear, branching, pleomorphic, casting
Widely scattered	Tightly clustered
Long axis of the lesion is along the normal tissue planes	Lesion is taller than it is wide
Homogeneous internal echotexture	Decreased hyperechogenicity
Hyperechogenicity	Marked acoustical shadowing
Smoothly marginated	Spiculation



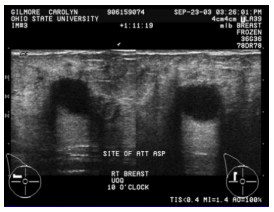


BI-RADS (Breast Imaging-Reporting and Data System)

BI-RADS Classification	Features
0	Need additional imaging
1	Negative – routine in 1 year
2	Benign finding – routine in 1 year
3	Probably benign – 6 month follow-up
4	Suspicious abnormality – biopsy recommended
5	Highly suggestive of malignancy – appropriate action must be taken

- **Ultrasound**

Benign	Malignant
Pure hyperechoic	Hypoechoic, spiculated
Elliptical shape (wider than tall)	Taller than wide
Lobulated	Duct extension
Complete tine capsule	Microlobulation



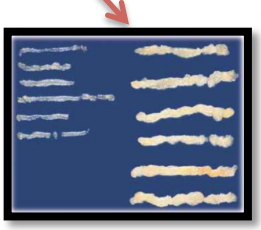
- **MRI**
  - *High risk patients*
    - ***History of breast cancer***
    - ***LCIS, atypia***
    - ***1st degree relative with breast cancer***
    - ***Very dense breast***
  - ***High sensitivity***
    - 10 – 20% will have a biopsy

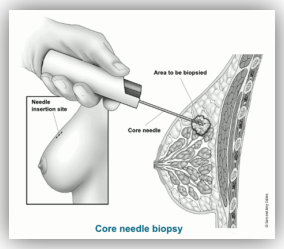
** For ***detailed*** information about imaging refer to Raslan (356-359)

❖ *Cytology and Biopsy*

- **Fine-needle aspiration cytology**
  - Procedure description: a thin needle is inserted into the mass for sampling of cells that are later on examined under a microscope.
  - Fast, inexpensive
  - 96% accuracy
  - ***Unable to differentiate between in-situ vs. CA*** → as it gives ***only cells*** not tissue

- **Core biopsy** → core and excisional biopsy ***give tissue***
  - Image guided
  - Stereotactic
    - *Suspicious mammographic abnormalities*
    - *Patients lay prone*
    - ***Biopsy under mammogram***





❖ Nipple discharge

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

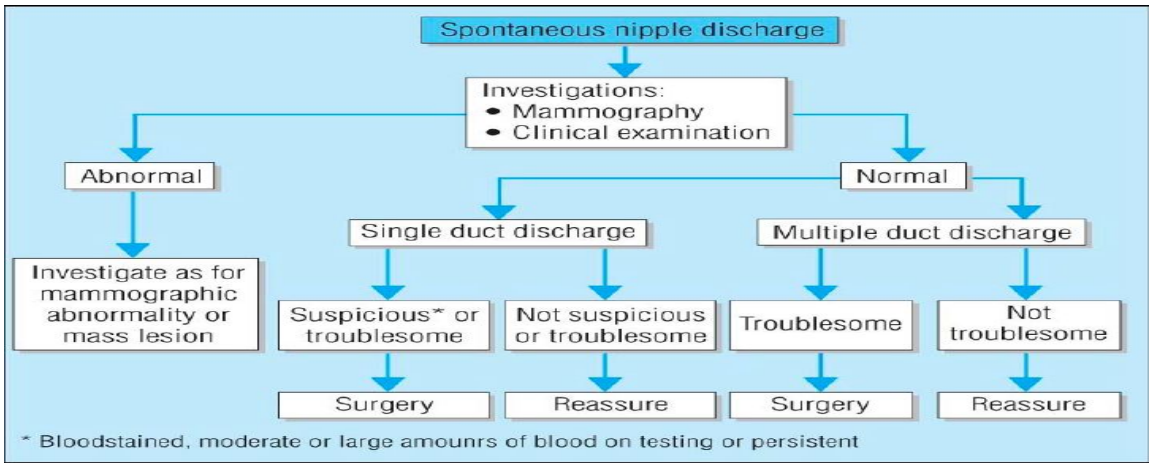
- **CAUSES OF NIPPLE DISCHARGE**

  Commonest causes in non-pregnant women:

  - ***Carcinoma***
  - ***Intra-ductal papilloma (most common cause)*** *most common cause of nipple discharge is* ***lactation,*** *most common* ***pathological cause*** *is intra-ductal papilloma*
  - ***Fibrocystic changes***
  - ***Duct ectasia***
  - ***Hypothyroid***
  - ***Pituitary adenoma (prolactin secreting adenoma "prolactinoma" 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*
- **CLINICAL 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*
  - *Consider ductography*
  - *Lab tests: thyroid, prolactin.*



- **MANAGEMENT:**

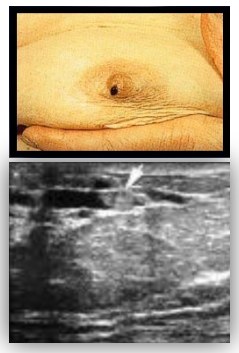
Physiologic

- *Treat cause if present*
- *Follow-up 6 months (observation)*

Pathologic

Biopsy and excise (single duct excision or total duct excision)

Bloody nipple discharge



For further evaluation of spontaneous nipple discharge a ductography can be performed. Ductography is useful in detecting the location of the lesion within the duct and the extent of involvement. This information can be extremely helpful in pre- surgical planning.

❖ Mastalgia (breast pain)

- Cyclical pain – hormonal
  - Dull, diffuse and bilateral
  - Luteal phase
  - Treatment: Reassurance, NSAIDS, evening primrose oil

This type is ***assuring.* **Secondary to hormonal influence. **Treatment simple analgesia

- Non-cyclical pain
  - Non-breast vs. breast
  - Imaging
  - Treatment: Reassurance, NSAIDS, evening primrose oil

**Worrying (specially if it's constant in one area) → investigate for underlying pathology

Genetics:

- ***Early age of onset***
- ***2 breast primaries or breast & ovarian CA***

- ***Clustering of breast CA with:***

Male breast CA
Thyroid CA
Sarcoma
Adrenocortical CA
Pancreatic CA
Leukemia/Lymphoma on same side of family

- ***Family member with BRCA gene***
- ***Male breast CA***
- ***Ovarian CA***

❖ BRCA

- Accounts for 25% of early-onset breast cancers
- 36 - 85% lifetime risk of breast cancer
- 16-60% life time risk of ovarian cancer

❖ BRCA Management

- Monthly BSE (breast self exam) – 18 y.o
- 6 month CBE (clinical breast exam) & annual mammogram – 25 y.o
- Discuss risk reducing options
  - Prophylactic mastectomies
  - Slapingo-oophorectomy upon completion of child bearing
- 6 month transvaginal US & CA125 – 35. y.o

Screening:

- *Prior breast cancer or atypia*
  - Annual mammography
  - 6 month CBE
- *Family Hx*
  - 10 years younger than relative's diagnosis
  - 6 month CBE
- *BRCA*
  - 25 y.o, annual mammography
  - 6 month CBE

COMMON BENIGN BREAST DISORDERS

- *Fibrocystic changes*
- *Fibroadenoma*
- *Intraductal papilloma*
- *Mammary duct ectasia*
- *Mastitis*
- *Fat necrosis*
- *Phylloides tumor*
- *Male gynecomastia*
- *Galactocele*

I. FIBROCYSTIC CHANGES "multiple cyst growth due to hormonal variation"

- Most common breast pathology → most common among ALL females "from all age groups"
- Lumpy, bumpy breasts
- 50-80% of all menstruating women
  Commonest incidence among age 30-50 (10% in women less than 21) "middle aged women/child baring age"
- Caused by ***hormonal changes prior to menses***
- Relationship to breast cancer doubtful

* Histology

- ***Adenosis*** "increased number of glands"
- ***Apocrine metaplasia*** → reversible transformation of cells to an apocrine phenotype "exocrine glands which secrete fluids"
- ***Fibrosis***
- ***Duct ectasia***
- ***Mild duct ectasia***

Ultrasonographic 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)

* Signs & 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.

* Investigations

- 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
- "Atypical Hyperplasia" on pathology report indicates increased risk of breast cancer → must excise

- **Comfort measures:**
  - Eliminate Methylxantines (coffee, chocolate): may take 6 months for relief.
  - Local heat/cold
  - Wear a good supporting bra
  - 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)
  - *Primrose oil* *"reduces pain"*

** *Big cyst >2 cm* → must aspirate.
** *Atypia or hyperplasia* → if atypia / hyperplasia / dysplasia changes were present must EXCISE, if simple then just reassure the patient & conservative management.
** *Complicated cyst* (i.e. both solid and cystic components) → Biopsy is needed from solid component to exclude malignancy.
** *Constant cyst* (i.e. doesn't change with multiple imaging in different times) → must biopsy

II. FIBROADENOMA

- 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***
- Commonest in **young age group**

- **Popcorn microcalcification** in mammogram

* Signs & 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

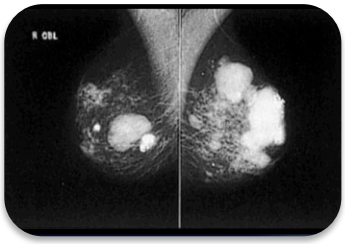
(*If more than 5 cm it is called a giant fibroadenoma*)

* Investigations

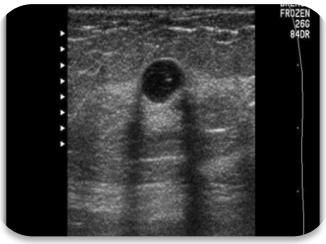
- Triple assessment
- Imaging: U/S mostly used because its more common in young and mammogram
- Biopsy
- Excision and close follow-up

** Fibroadenoma: To leave alone or to excise?
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
- Indeterminate diagnosis
- Persistent in an unusual age e.g. If 35 y/o and older recommended

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



Mammogram
Multiple Calcified
Fibroadenomas



U/S Fibroadenoma

Fibroadenoma

III. INTRADUCTAL PAPILLOMA

- 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 (IMPT)***
- 40-50 years of age

Intraductal papilloma

* Signs & 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

Bloody breast discharge

* Investigations & Treatment

- ***Test for occult blood***
- Ductogram → Breast ducts are 2-3 cm and the growth occurs in the duct so it won't be felt or be visible. On ultrasound and mammogram it will show normal breast tissue, so a ductogram is done which is a contrast material injected then an x-ray is taken (mammogram) and filling defects are assessed.
- Biopsy
- Excision of involved duct

** Papilloma: To leave or to excise?

If single papilloma → can observe and see if it disappears

If it doesn't resolve → excise

If presented with intraductal PAPILLAMATOSIS (appears as multiple filling defects on ductogram) considered a pre-malignant condition → must excise

Exclude malignancy in young by US or ductogram (filling defect), if 40 and above by U/S, ductogram and mammogram

IV. MAMMARY DUCT ECTASIA

- Inflammation and dilation of sub-areolar ducts behind nipples, ***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
- **Risk for non-lactating breast abscess**

"Most common cause for breast abscess is lactation, when there's a non lactating abscess it indicates the presence of underlying pathology e.g. duct ectasia, nipple inversion, diabetic patient, immunocompromised as if the patient is on steroids and gets a crack in the nipple"

* Signs & Symptoms

- Multi-colored discharge → this is assuring, it means the case is not likely to be a malignancy but either duct ectasia or fibrocystic changes
  - 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**

* Investigations & Treatment

- **Test for occult blood**
- Imaging → Mammogram and sonogram
- Biopsy → Excision of ducts if mass present
- Antibiotics
- Close follow up

Left breast – slit-like nipple characteristic of mammary duct ectasia

Right breast – nipple retraction from carcinoma

** Why Duct ectasia can cause an infection?
Because it leads to stasis → increased risk of infection & higher chance of developing abscess ***(periductal mastitis)*** ***non-lactating gives peri-areolar abscess "mostly comes in the periphery"***

** It's caused by mixed organisms → Treat with broad-spectrum antibiotics and abscess drainage.

** It has a similar presentation to malignancy as inflammation can cause nipple retraction → patient gets worried about malignancy → U/S and mammogram according to the age → reassure the patient, if 40 and above take aspiration for cytology.

V. Mastitis

- **Breast infection when bacteria enter the breast via the nipple**
- Ducts infected
- Fluid stagnates in lobules
- Usually during lactation "as the bacterial infection comes from the baby"
- Penicillin resistant staphylococcus common cause "if the patient is allergic to penicillin → cephalosporin or erythromycin"

Lactating women presented with fever, painful and tender breasts → most likely mastitis → broad-spectrum antibiotics (cephalosporin 1st generation IV), warm sponges, if abscess must drain it.

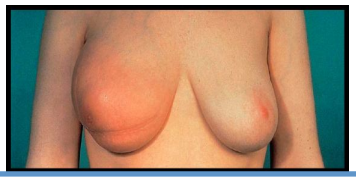
* Signs & Symptoms

- Pain and tenderness
- Nipple discharge: -Pus -Serum -Blood
- Localized induration
- Fever and rigor "you can differentiate between mastitis & malignancy by the fever, *as there's No high grade fever in malignancy*"
- Abscess: localized tenderness, severe fever and rigor

*** 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***
- ***Continue breast-feeding*** if she stops it gets worse since it leads to milk engorgement, which increases the infection. If the baby shows signs of sides effects from the antibiotics e.g. abdominal pain, diarrhea → she stops and uses breast pump

Peripheral Breast Abscess
Left – before management
Right – after recurrent aspiration and antibiotics



Inflammatory Carcinoma

Erythema and peau d'orange

Inflammatory carcinoma vs. mastitis
may have similar appearance, but completely different history
inflammatory carcinoma → non-lactating elderly, peau d'orange, must perform U/S, mammogram and biopsy.

VI. Fat Necrosis

- Cause → either trauma to breast (e.g. **seat belt trauma in car accidents**) or 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

*** Why is it important to know about Fat necrosis?**

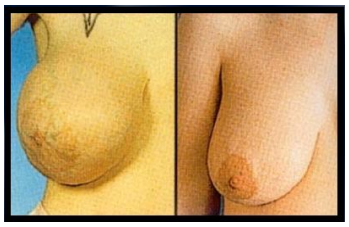
Fat necrosis is important because both clinically and radiologically can appear very similar to malignancy. ***In order to exclude cancer a biopsy should be performed***.

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 due to its large size)*

VII. PHYLLOIDES TUMOR (CYSTOSARCOMA)

- ***Giant fibroadenoma*** **(a variant of fibroadenoma)** it differs in having more fibrous tissue with rapid growth (patient presents with a history of a rapidly growing mass)
- ***Malignant potential***, lesions > 3 cm are more likely to be malignant "if it's malignant it behaves like sarcoma"
- 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***
- Often occurs in women aged 40+

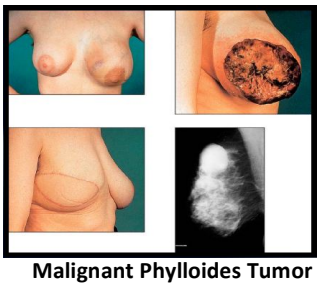
Giant Fibroadenoma



Before surgery **After surgery**

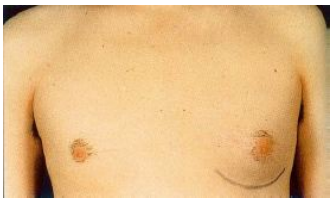
*** INVESTIGATIONS AND TREATMENT**

- 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! Chemotherapy and radiotherapy are not effective.



Malignant Phylloides Tumor

VIII. **MALE GYNECOMASTIA "*benign*, however, it's related to malignant conditions"**



- Diffuse hypertrophy of breast
- 30-40% of male population
- Adolescence and older men
- Caused by imbalance of estrogen/testosterone
- Mostly associated with Medical conditions like → hepatitis, COPD, hyperthyroidism and TB
- ***May be associated with genetic cancer families (Occurs in families with genetic mutation e.g. Colon, prostate cancer)***
- ***Must exclude testicular and adrenal malignancies*** (hormone producing tumors) also exclude liver disease & lung tumors
- Medications associated with gynecomastia:
  - Marijuana
  - Narcotics
  - Phenothiazines
  - Diazepams
  - Anything that affects the CNS
  - Ranitidine → usually used by males for treatment of peptic ulcer

*** TREATMENT**

- If pre-puberty → wait to see if it resolves
- Change medication
- Treat underlying illness

Galactocele

A lactating lady suddenly presented with breast mass non-tender, slightly uncomfortable, no fever. On ultrasound it appears there's a cystic mass → most likely Galactocele.

- *Galactocele is a Cyst containing milk usually located in the mammary gland and affects lactating women.*
- *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. Advice the patient to wear good supportive bra.*
- *If the cyst got infected management is the same as an abscess.*

BREAST CANCER

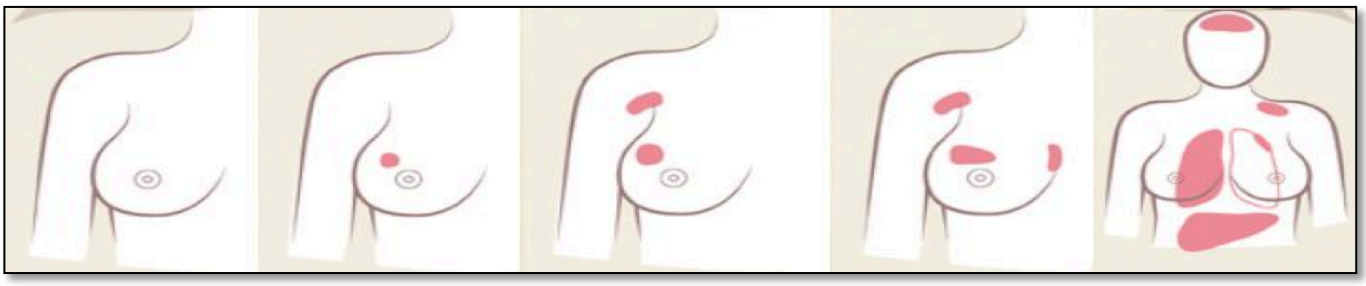
"Wasn't covered by the doctor or in her slides, only in Raslan & it' mentioned in the objectives so you need to know about it"

- FACTS:
  - *Breast cancer is the most common cause of death from cancer in western women*
  - *Age is the biggest risk factor in developing breast cancer – over 70% of cases occur in women over 50 years*
  - *9 out of 10 women who get breast cancer do not have a family history of the disease*
  - *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%*
  - *Although we know of many factors that contribute to the risk of women getting breast cancer, the cause remains unknown*
  - *Breast cancer is the most common cancer in women aged over 35 years*
  - *Most common type of breast cancer is ductal carcinoma.*
  - *Five year survival rates*
  - ***Diagnosis made at the localized stage has the highest survival rates.***
    - ***Diagnosis made at regional stage has less survival rates.***
    - ***Distant stage has the lowest survival rates.***

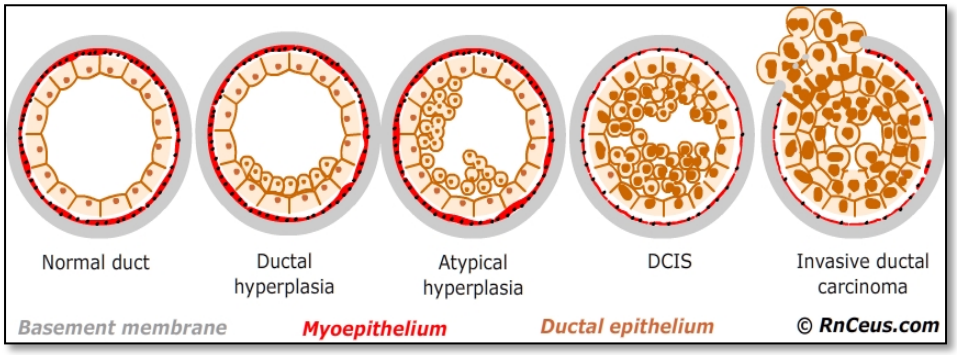
Established risk factors for breast cancer in women:

Relative risk >4	- Age (older age group higher risk) - Country of birth (North America, Northern Europe) - Mother and sister with history of breast cancer, especially at an early age - Biopsy confirmed atypical hyperplasia and a history of breast cancer in a first degree relative
Relative risk 2.1	- Nodular densities on mammogram occupying >75% of breast volume - History of cancer in one breast - Radiation to chest - Mother or sister with history of breast cancer, diagnosed at an early age - Biopsy-confirmed atypical hyperplasia without a family history of breast cancer
Relative risk 1.1	- Socioeconomic status (high) - Place of residence (Urban - Race/ethnicity (White >45 and Black <45) - Religion (Jewish) - Nulliparity, breast cancer >40 years of age - Age at first full-term pregnancy, age at menarche, age at menopause - History of primary cancer in endometrium, ovary - Obesity (Obese breast cancer > 50 years, Thin breast cancer <50 years)

- STAGING CLASSIFICATION OF BREAST TUMORS



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



Surgical treatment of breast cancer depending on stage:

- Stage 1 and 2 → WLE (wide local excision) or mastectomy, axillary nodes then radiotherapy and chemotherapy
- Stage 3 → neo-adjuvant chemotherapy then surgery
- Stage 4 → no role of surgery

❖ 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 multicenteric, 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.

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

❖ BREAST CANCER 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.
- Chemotherapy.
- Hormonal therapy.
- Ovarian ablation.
- Reconstruction

CHEMOTHERAPY

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

RADIOTHERAPY

Side effects

	Common reactions	Uncommon reactions
During the course of treatment	✔ skin reddening and irritation ✔ Fatigue ✔ loss of hair ✔ sore throat	✔ skin blistering ✔ nausea ✔ rib fractures (less than 1 in every 100)
After the course of treatment	✔ Discomfort and sensitivity in the treated area. ✔ increased firmness ✔ swelling of the treated breast	✔ Pneumonitis and scarring (about 1 or 2 women in every 100 women between 6 weeks and 6 months after therapy

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 when 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.

Common side effects	Uncommon side effects
✔ **Hot flushes or sweats** ✔ **Irregular menstrual periods (in women who have not gone through the menopause)** ✔ **Vaginal irritation, including vaginal dryness or discharge** ✔ **Fluid retention and weight gain**	✔ Light-headedness, dizziness, headache or tiredness ✔ Rash ✔ Nausea

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

POST-OPERATIVE BREAST RECONSTRUCTIONS

- 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

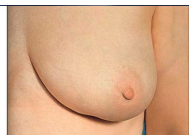
General notes

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

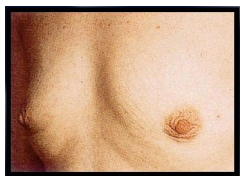
Breast presentation

- ***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.*

Dimpling due to Carcinoma



Change in contour due to carcinoma



Skin Dimpling Both Breasts Involution Due to Aging

Skin Dimpling Breast Infection

Skin Dimpling Previous Breast Surgery

- *Breast infections are mostly seen in lactating women & diabetic patients*
- *Nipple complex (inversion or retraction) can be either pathological or congenital → if the patient is born with it or had it since puberty it's not a worrying sign but she might have difficulties when lactating or develop breast abscess. If lately inverted you must rule out malignancy*

Inverted Nipple Since Puberty

Paget's disease

- *Paget disease of the breast (also know as Paget disease of the nipple and mammary Paget disease) is a rare type of cancer involving the skin of the nipple and, usually, the areola. Mostly it's associated with one or more tumors inside the same breast. These breast tumors are either* ***ductal carcinoma in situ or invasive breast cancer***
- *The symptoms of Paget disease of the breast are often mistaken for those of some benign skin conditions such as dermatitis or eczema/allergy → 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)*

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:

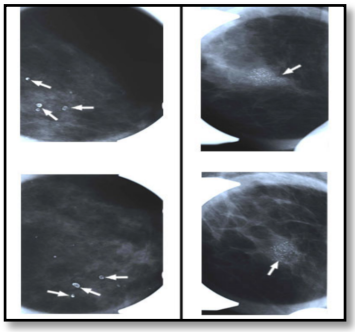
- *Observation*
- *Excision*
- *If malignant, along the lines of cancer cases*

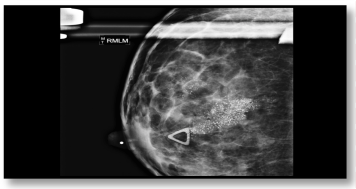
Imaging features which can be associated with ductal carcinoma in situ (DCIS)

- *Microcalcifications linear (75%-90%)*
- *Circumscribed mass*
- *Ill-defined mass*
- *Prominent duct or nodule*
- *Architectural distortion*
- *Asymmetry*
- *Sub-areolar mass*

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.

Calcification





- **Macrocalcifications → *non pathological***
  - Large white dots
  - ***Almost always non-cancerous and require no further follow-up***
- **Microcalcification → *could be pathological***

  ***** Less than 1 mm/ present in clusters***
  (minimal 4 calcifications in one spot)
  - Very fine white specks
  - ***Usually non-cancerous but can sometimes be a sign of cancer***
- **Benign vs. malignant calcification**
  - Based on size → macrocalc. are always benign. Microcalc. Mostly benign but can be malignant.
  - Based on shape → benign: punctate, linear, spherical, popcorn, vascular, smoothly dense. Malignant: mostly ductal, segmental and clustered
  - Based on distribution → widespread bilateral distribution is suggestive of a benign process.

SUMMARY

1. *Clinical/surgical classification of axillary lymph nodes:*
   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.
2. *Common benign breast disorders*

a) ***FIBROCYSTIC CHANGES***
- *Most common breast pathology → most common among ALL females "from all age groups"*
- ***"Atypical Hyperplasia" on pathology report indicates increased risk of breast cancer → must excise***

b) ***FIBROADENOMA*** *(if more than 5 cm called giant fibroadenoma)*
- *Second most common breast condition (most common lump)*
- *Totally benign, and NO malignancy potential*
- *Commonest in young age group*
- ***Popcorn microcalcification in mammogram***

c) ***INTRADUCTAL PAPILLOMA***
- *Most common cause of nipple discharge in non pregnant women*
- *Most common cause of persistent bloody nipple discharge (IMPT)*
- *In case of intraductal papillamatosis (multiple filling defects on ductogram) considered pre-malignant condition → must excise*

d) ***Mammary duct ectasia***
- *Multi-colored discharge*
  Thick, pasty (like toothpaste)/ White, green, greenish-brown or serosanguinous

e) ***Mastitis***
- *Usually during lactation*
- *Penicillin resistant staphylococcus common cause*
- *Pain and tenderness*
- *Fever and rigor*
- *Abscess: localized tenderness, severe fever and rigor*
- *Must continue feeding unless the baby develops symptoms of antibiotics side effects*

f) ***Fat necrosis*** → *both clinically and radiologically can appear very similar to malignancy. In order to exclude cancer a biopsy should be performed.*

g) ***PHYLLOIDES TUMOR (CYSTOSARCOMA)*** → *giant fibroadenoma with malignant potential, the only treatment is excision*

h) ***MALE GYNECOMASTIA*** → *Mostly associated with Medical conditions e.g. hepatitis, COPD, hyperthyroidism and TB. Must exclude testicular and adrenal malignancies*

i) ***Galactocele*** → *Cyst containing milk usually located in the mammary gland and affects lactating women.*

Questions

1) *Ductal carcinoma in situ (breast)*
   a. *In the great majority of cases present as palpable mass*
   b. *Usually present as mammographic finding of microcalcifiication*
   c. *Mastectomy is the treatment of choice in all cases*
   d. *Axillary dissection is an integral part of its surgical treatment*

2) *It's advisable to remove a fibroadenoma if:*
   a. *It's painful*
   b. *It's more than 3 cm in size*
   c. *There's a positive family history of breast cancer*
   d. *All of the above*

3) *All the following are mammographic features of breast carcinoma except*
   a. *Skin and nipple discharge*
   b. *Diagnostic for women below 20*
   c. *Speculated mass*
   d. *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 papilloma's are lesion of large duct*
   c. *May present with bloody nipple discharge*
   d. *Does not require surgical excision*

6) *Which one 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*

Answers:

1st Questions: B

2nd Questions: D

3rd Questions: B

4th Questions: C

5th Questions: D

6th Questions: A