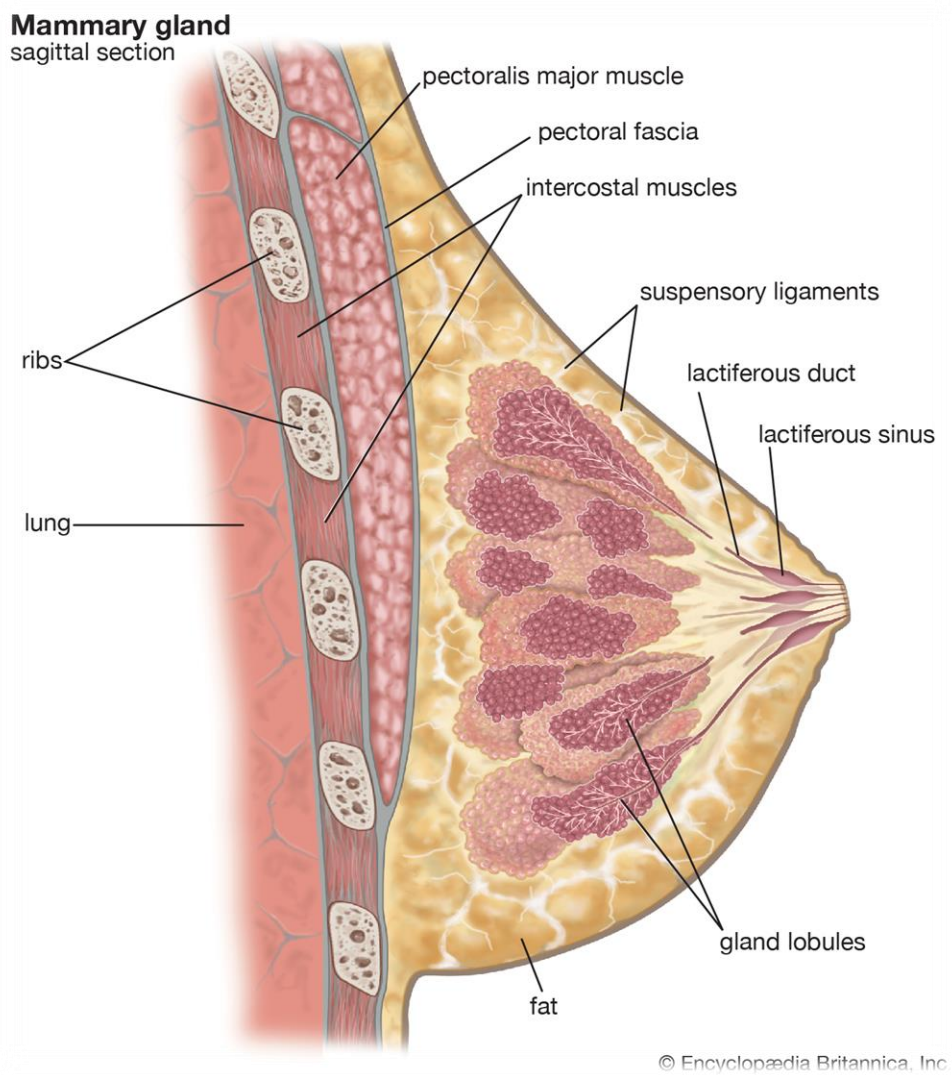
Breast Disease

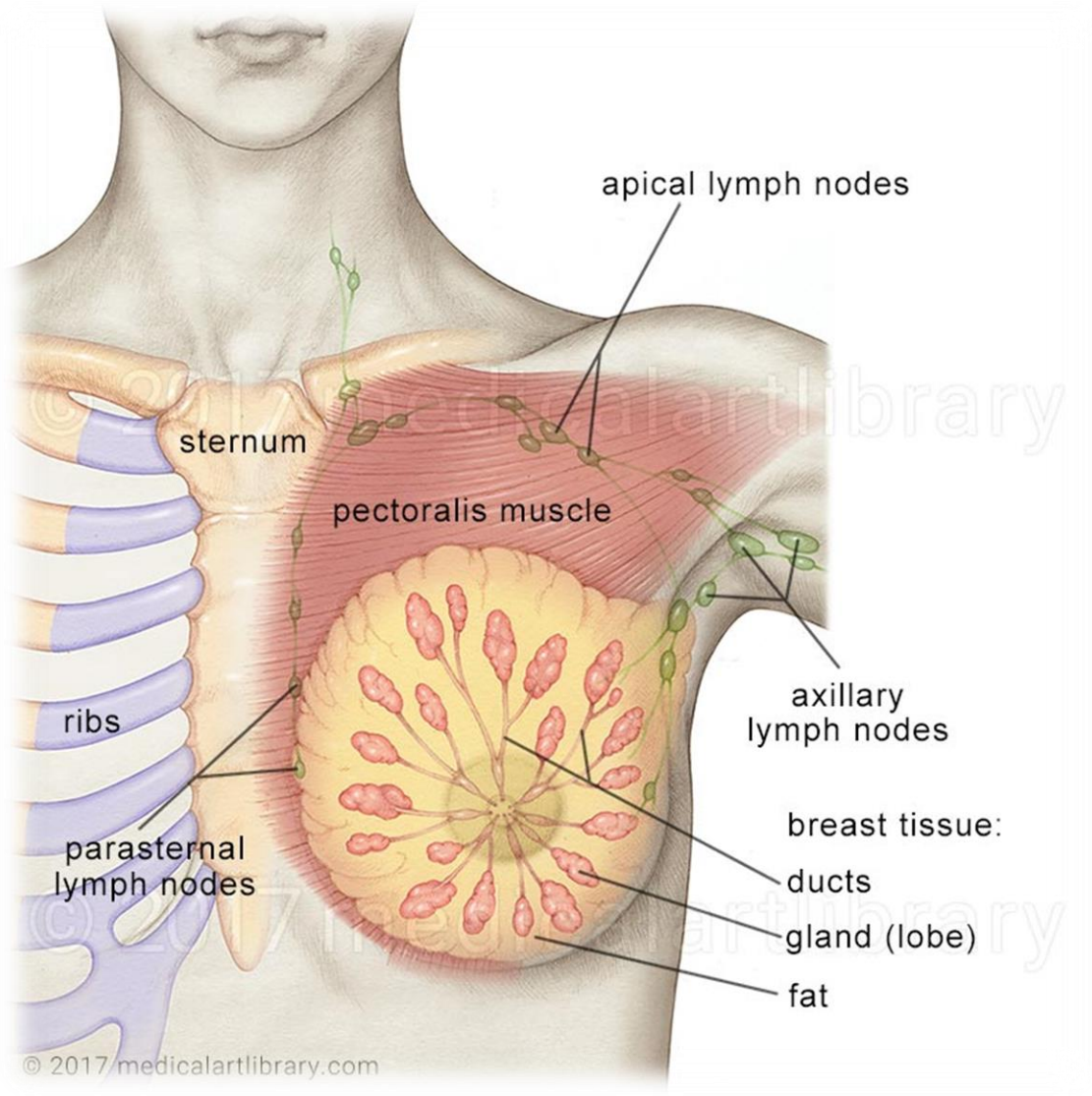
Dr. Hend Idriss

Anatomy and Physiology

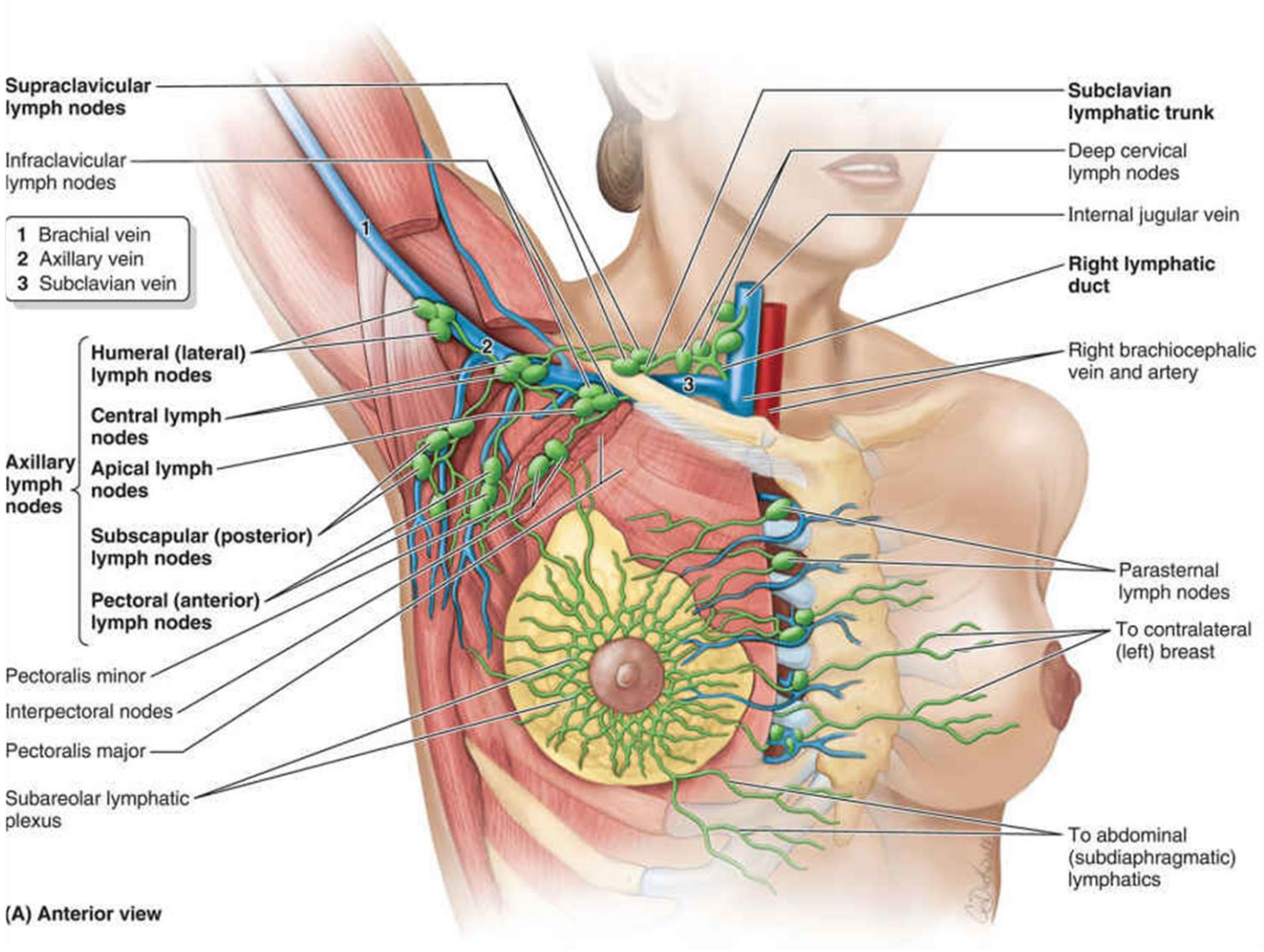
- Modified sweat Gland .
- Functional Unit is the Terminal duct lobular unit .



- Extended from clavicle superiorly to abdominal wall inferiorly .
- Blood supply comes from lateral thoracic artery and perforating branches of internal mammary artery .

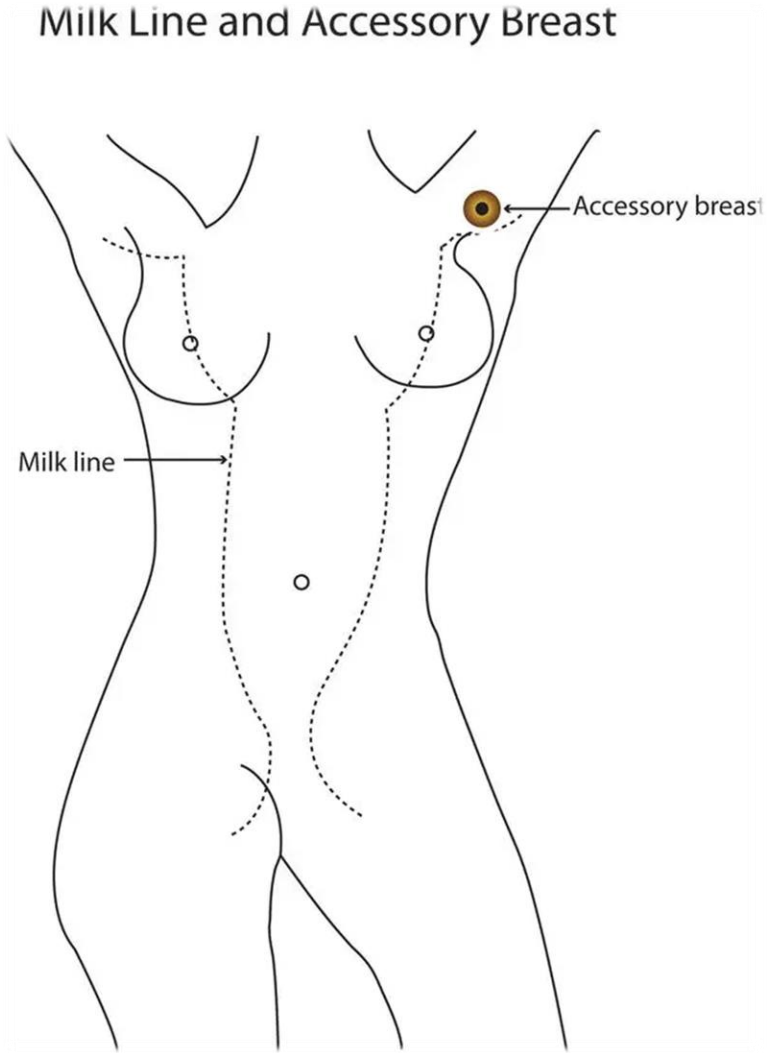


- Main route of lymphatic spread is to axillary nodes below the axillary vein .
- It also drains to internal mammary nodes , and inter pectoral (Rotter's) nodes .



Congenital abnormalities

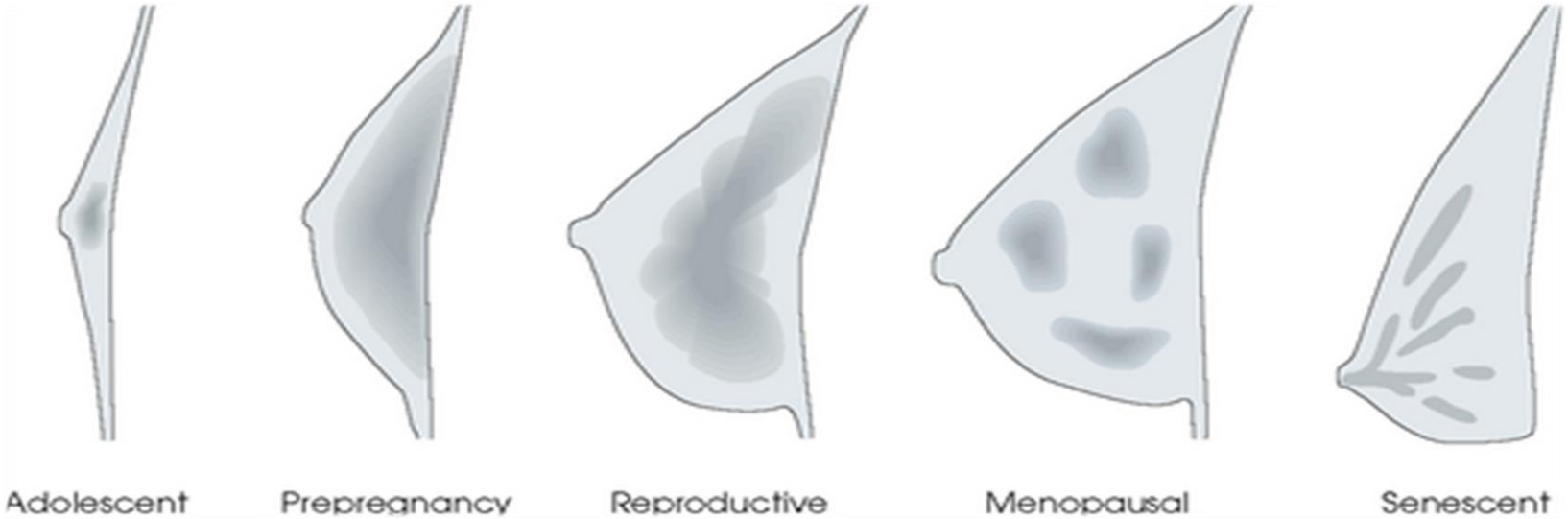
- Accessory nipple , Accessory Breast tissue .
- Breast asymmetry .



Breast Development and Function

Life cycle of the Breast

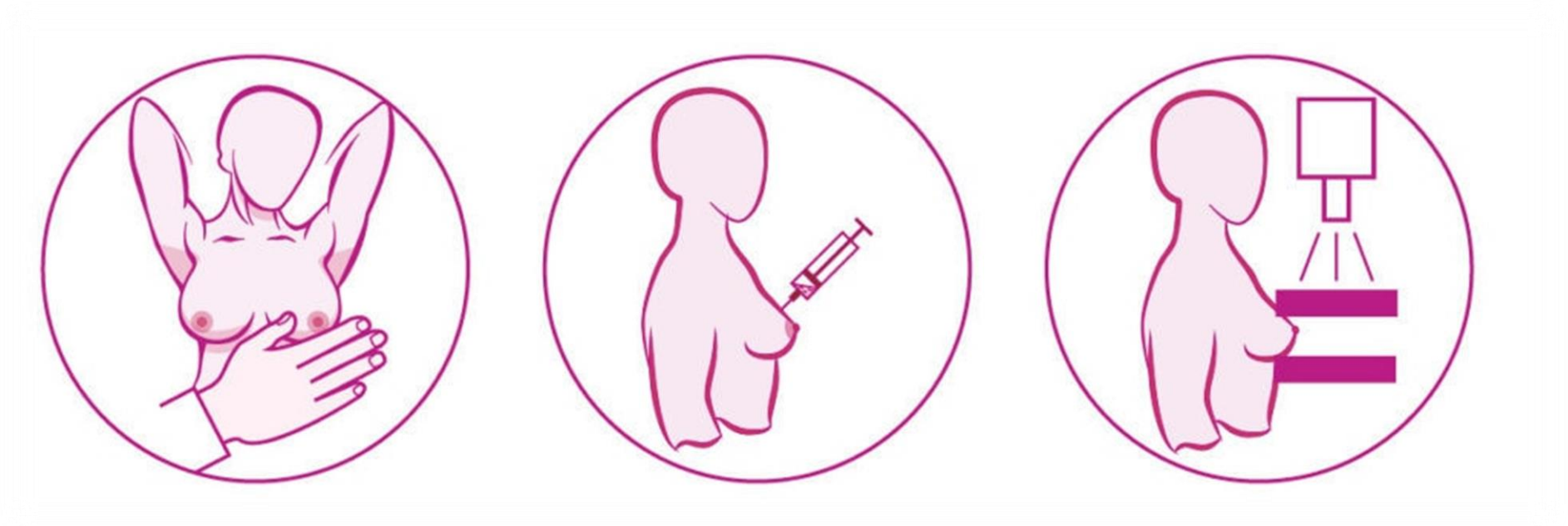
- Development and early reproductive life .
- Mature reproductive life .
- Involution.



Assessment of a patient with breast disease

Symptom	% of patients
Breast lump	36
Painful lump or lumpiness	33
Pain alone	17.5
Nipple discharge	5
Nipple retraction	3
Strong family history of breast cancer	3
Breast distortion	1
Swelling or inflammation	1
Scaling nipple (eczema)	0.5

Triple Assessment

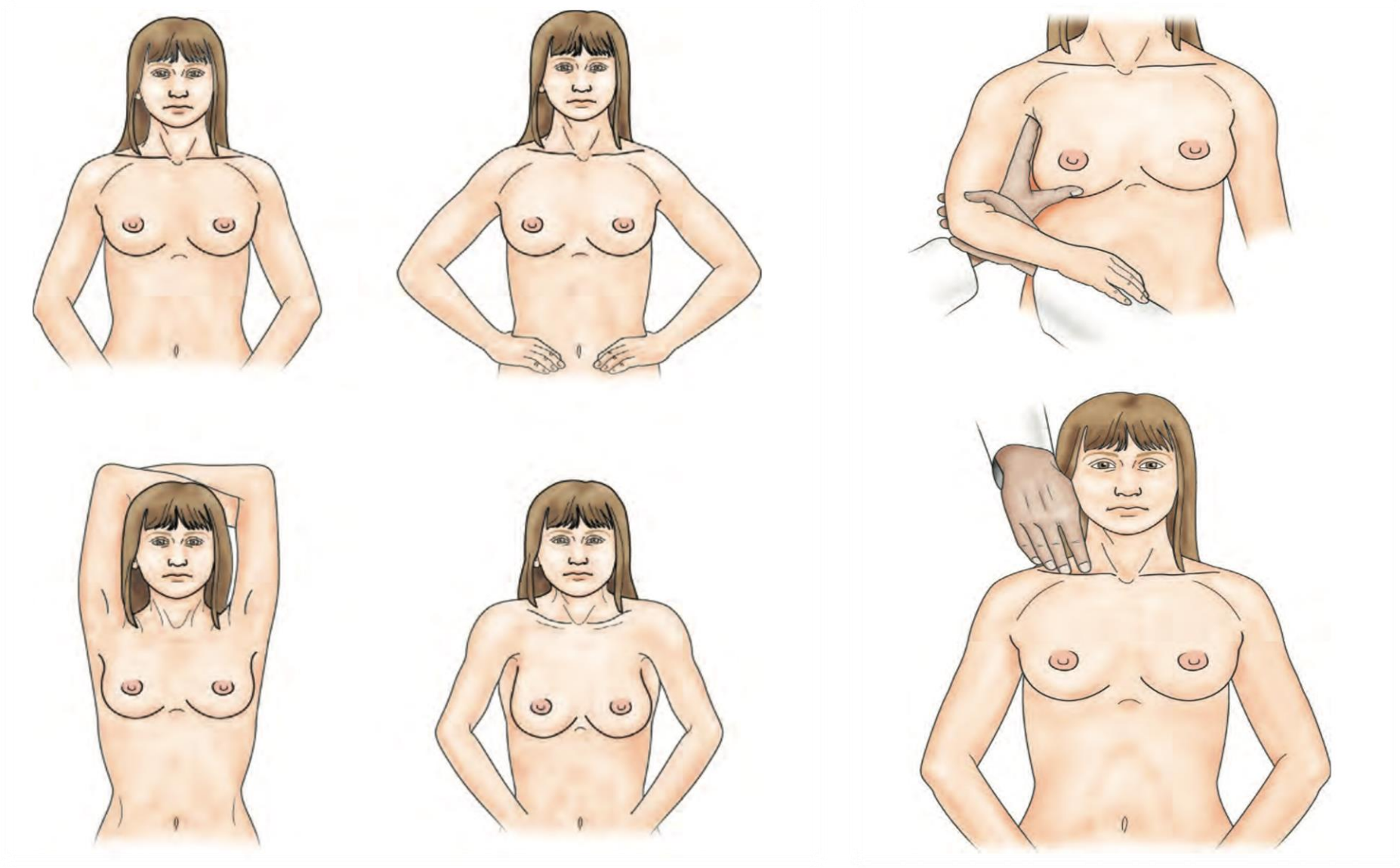


History

History

- The most important pointer to diagnosis is the age of the patient .
- Duration of the symptoms , other breast symptoms and history of risk factors should be obtained.

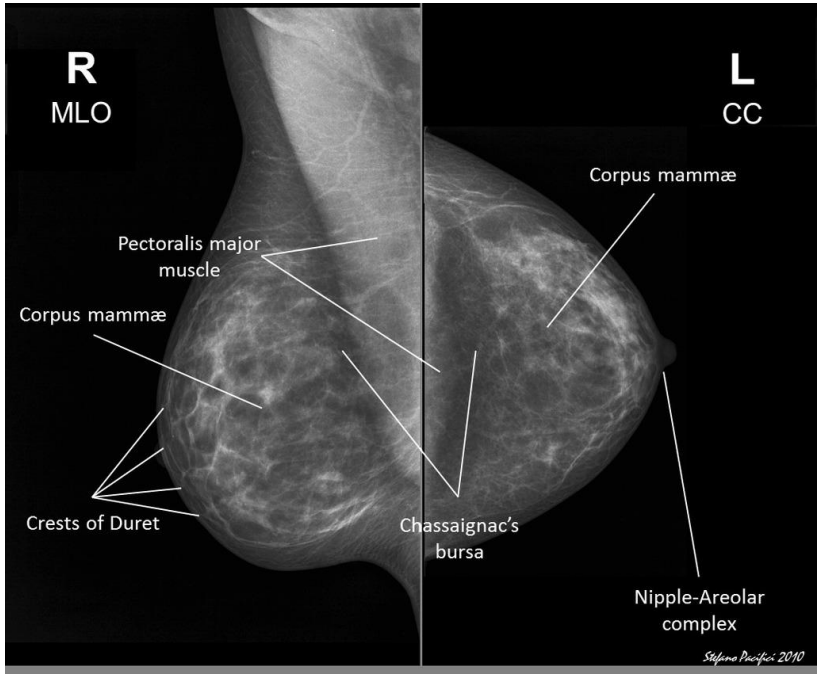
Clinical Examination

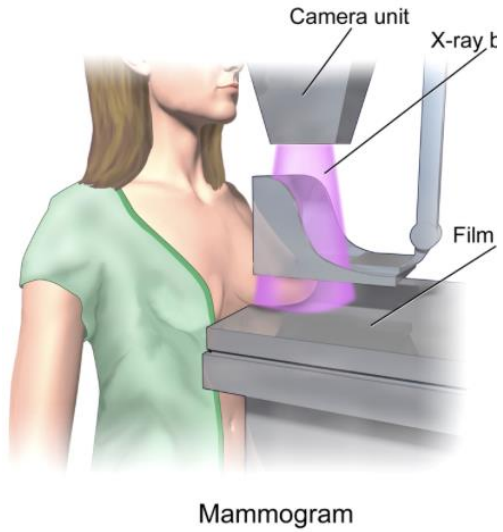


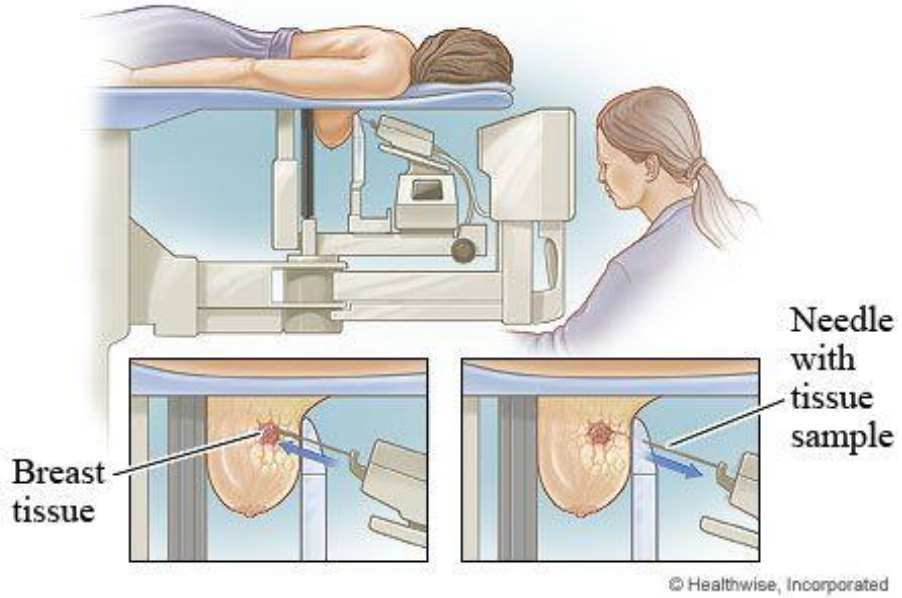
Imaging

Mammography

- 2 Views are obtained : MLO , CC .
- Limited value in younger patients .
- Stereotactic device can be used to biopsy calcification .

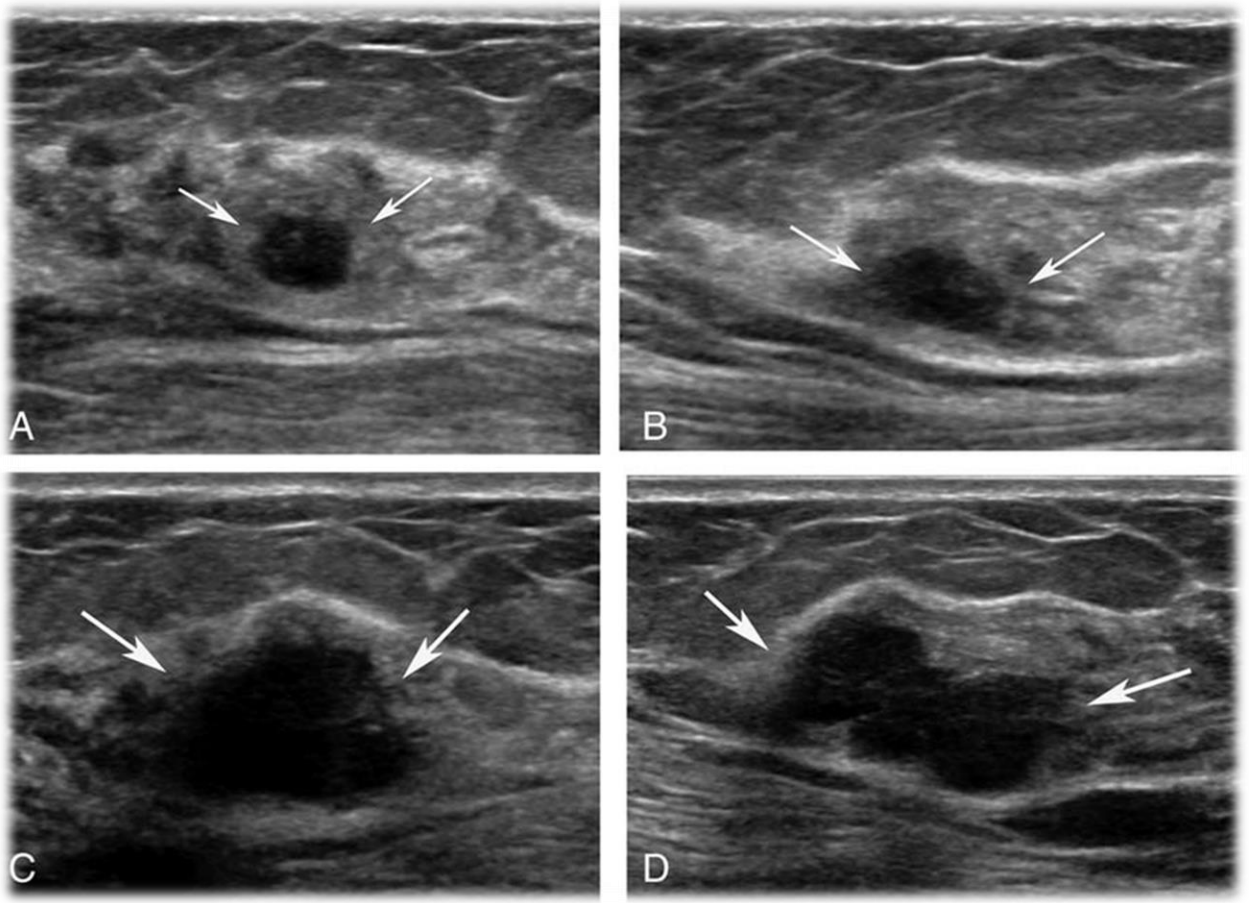






Ultrasonography

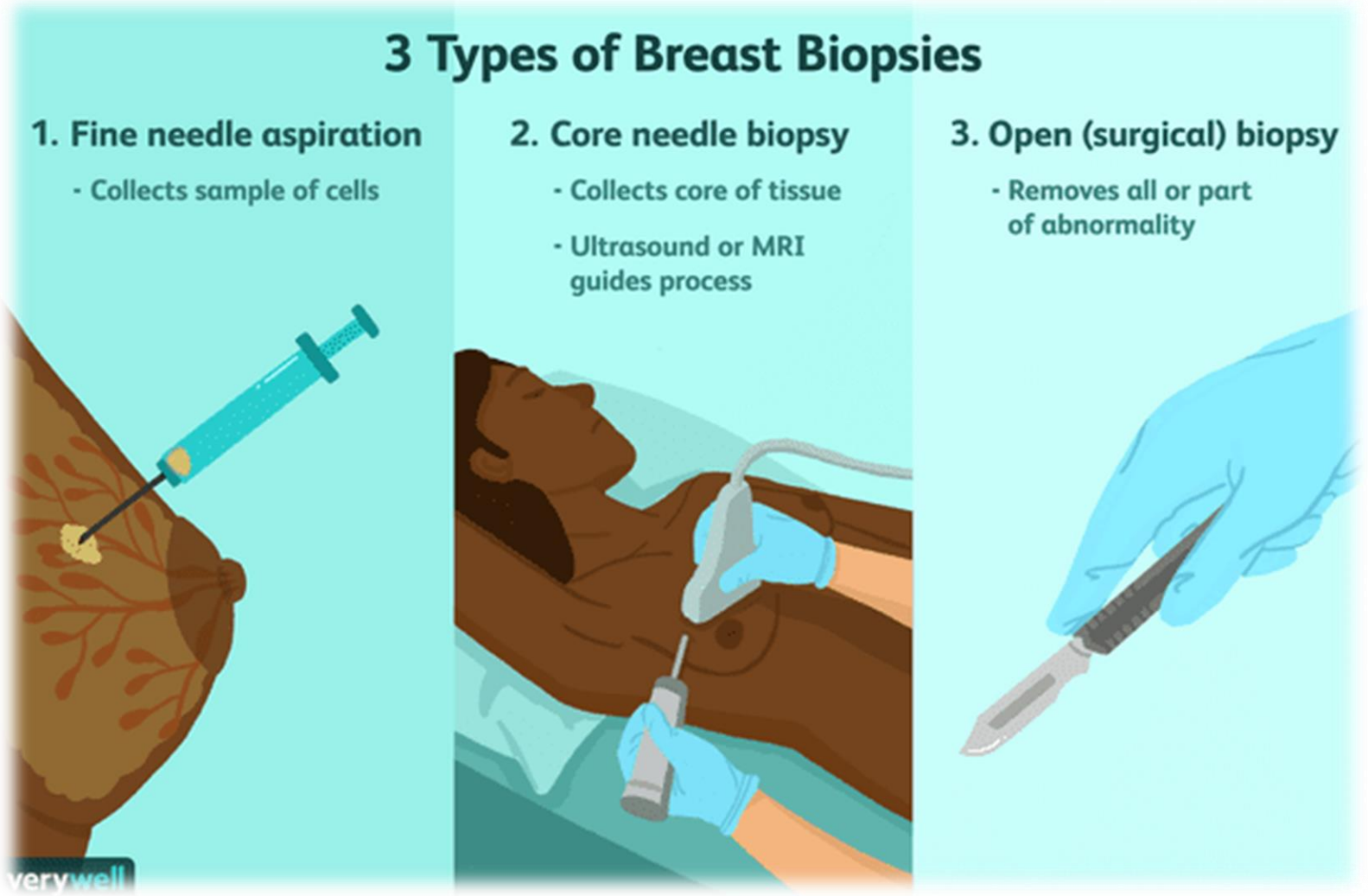
- Can differentiate between solid and cystic lesions .
- Cancer have “irregular” edges and appear “hypoechoic” .
- It is used to asses axillary lymph nodes.
- Most often it is used for biopsy .



Magnetic Resonance Imaging (MRI)

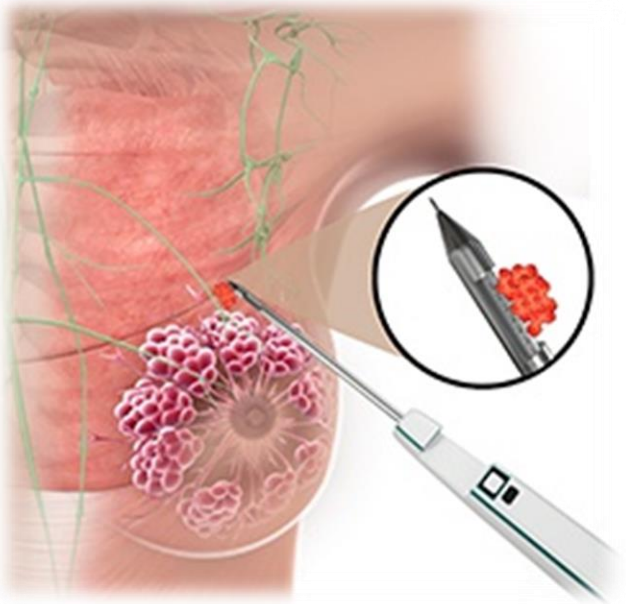
- It has high sensitivity for breast cancer , and demonstrate extent of cancer .
- Indications :
  - Screening high risk young women who carry BRCA1 or BRCA2 gene mutations
  - Assessing young women with dense breasts who have a lump or a cancer that is not well visualised on other imaging
  - To identify a breast cancer in women with a malignant axillary node where there is no obvious primary cancer seen on mammography and ultrasound
  - To assess response to chemotherapy or endocrine therapy
  - To assess breast implants for leakage and rupture
  - To assess treated breasts after surgery and radiotherapy.

Biopsy


3 Types of Breast Biopsies
1. Fine needle aspiration
- Collects sample of cells
2. Core needle biopsy
- Collects core of tissue
- Ultrasound or MRI guides process
3. Open (surgical) biopsy
- Removes all or part of abnormality
verywell

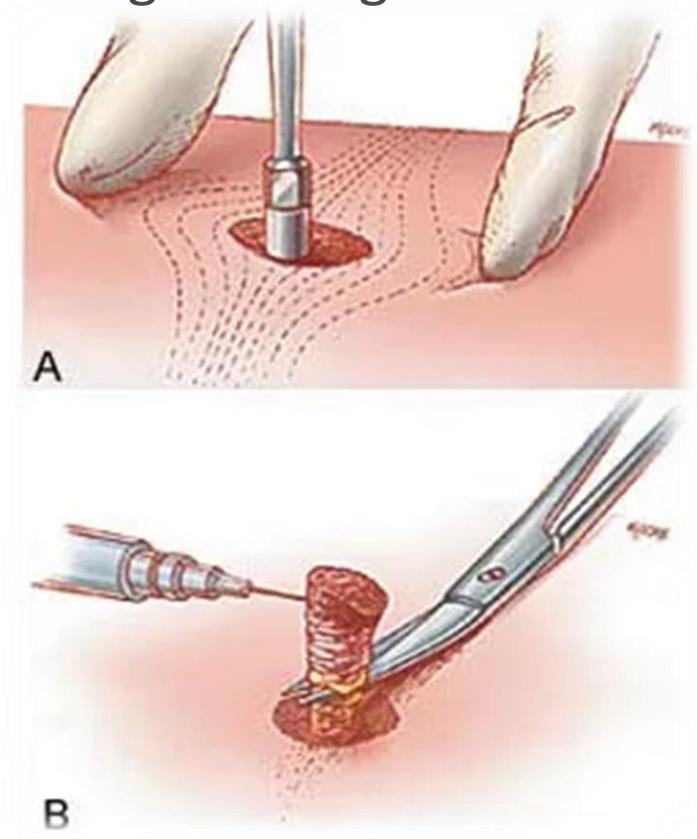
Core Biopsy

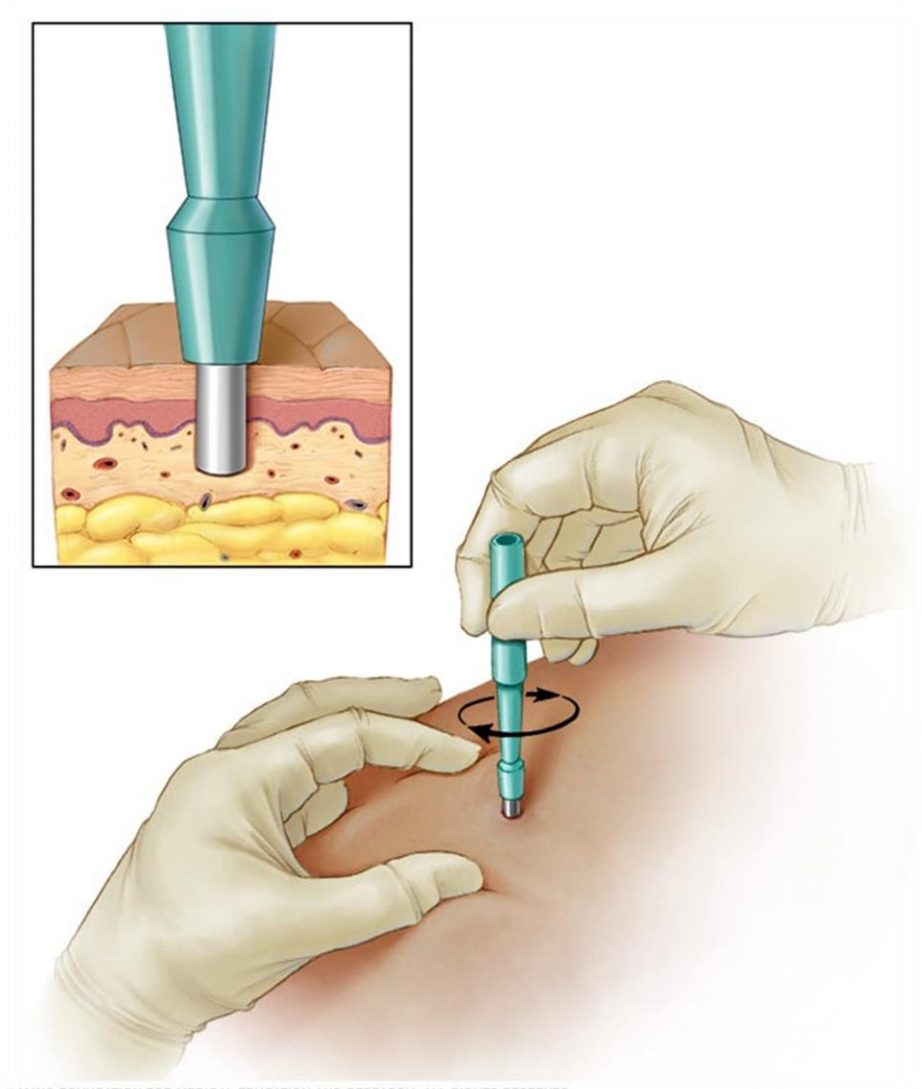
- Advantages :
  - It can differentiate invasive from in situ disease
  - Cancer type and receptor status can be assessed
  - It has an extremely low rate of false positives
  - It has a very high sensitivity when image guided.



Punch Biopsy

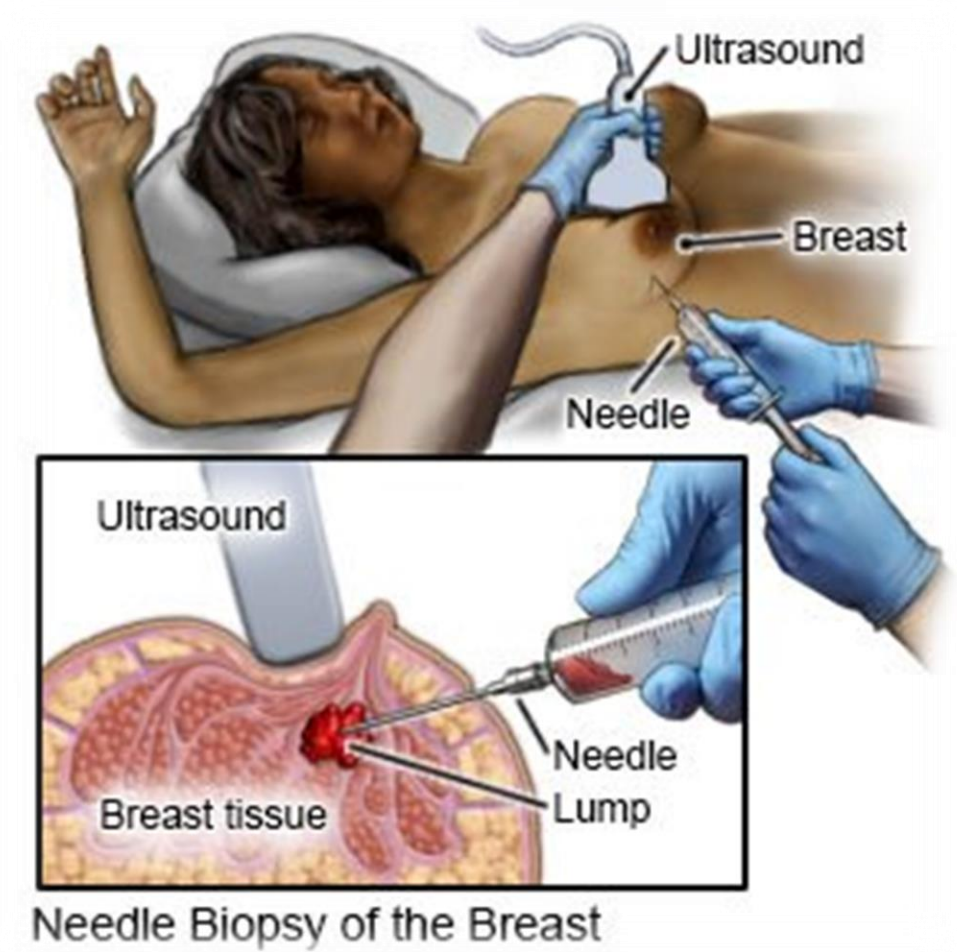
- Done for nipple ulceration or changes to diagnose Paget's





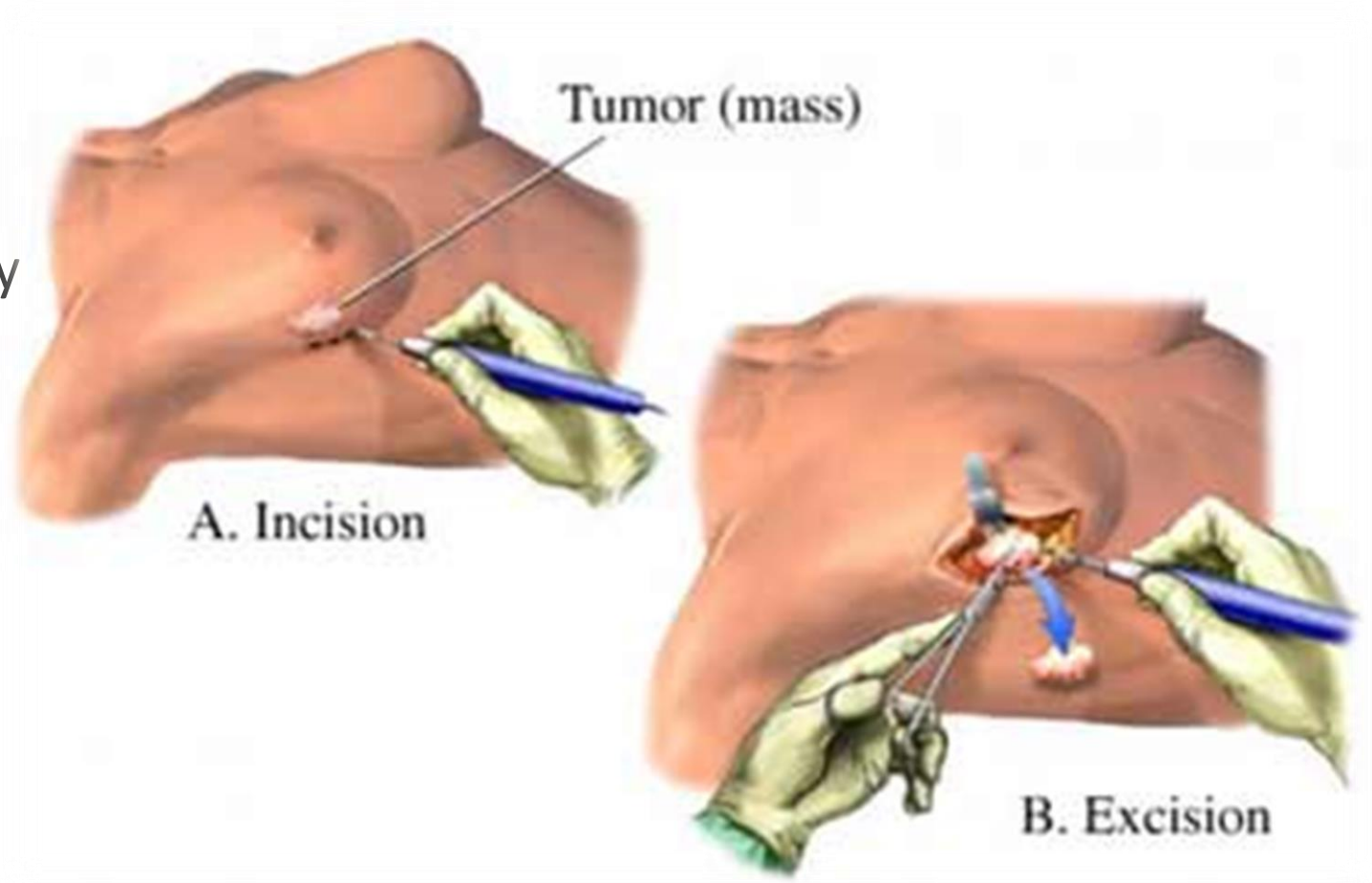
Fine Needle Aspiration Cytology

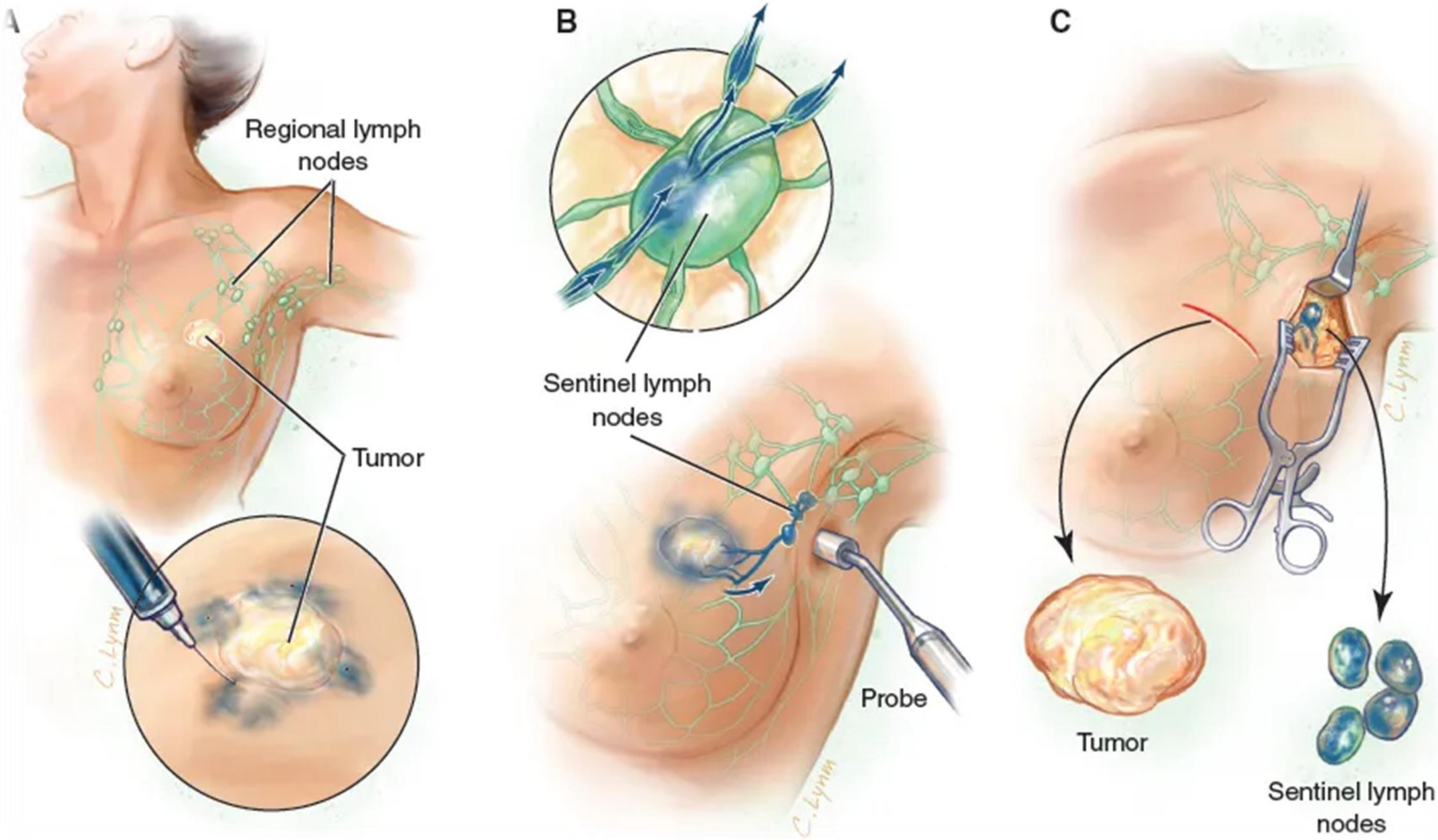
- Mostly used for symptomatic simple cyst .
- And for suspicious axillary lymph nodes .



Open Biopsy

- Should be performed only in patients who have been appropriately investigated by imaging and core biopsy.




A
Regional lymph nodes
Tumor
B
Sentinel lymph nodes
Probe
C
Tumor
Sentinel lymph nodes

Nipple discharge

Only Spontaneous discharge requires investigations .

Cause	Discharge characteristics	Management
Duct ectasia	Variable colour and consistency; multiple ducts	Reassurance Excision of ducts
Duct papilloma	Copious serous, bloody, single duct	Microdochectomy
Carcinoma in situ	Single duct, bloodstained, persistent, serous discharge	Image-guided biopsy or microdochectomy
Prolactinoma	Milky, multiple duct	Endocrine evaluation

Benign breast conditions

Cause	Discharge characteristics	Management
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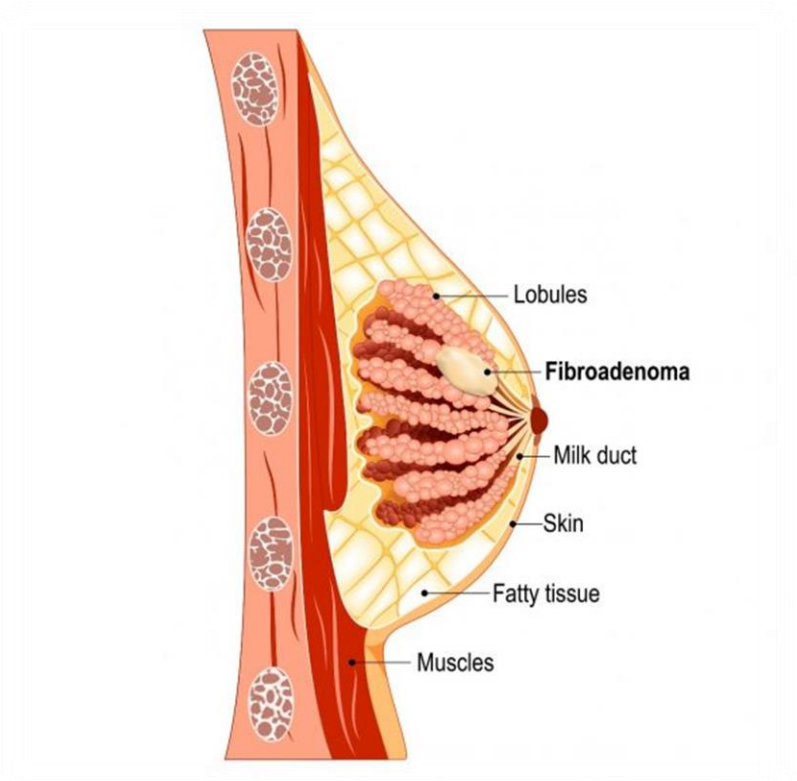
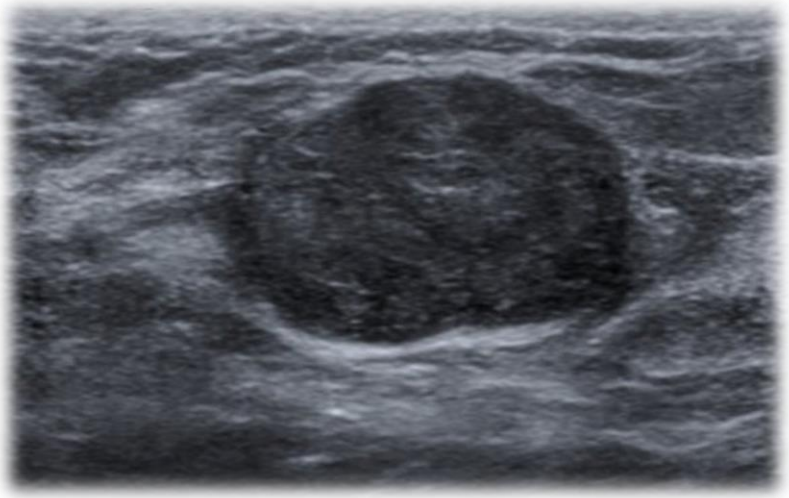
Prolactinoma	Milky, multiple duct	Endocrine evaluation

Fibroadenoma

- Common cause of breast lumps in younger women.
- It develop from a whole lobule and show hormonal dependence similar to that of normal breast tissue .
- 15–25-year age group
- usually well- circumscribed, firm, smooth, mobile lumps, and can be multiple or bilateral.





- Fibroadenoma has variable sizes , it might rarely increase in size , and it might be large or giant (>5 cm) .
- A fibroadenoma in an adolescent girl undergoes rapid growth, a condition known as juvenile fibroadenoma.
- After diagnosis management is either reassurance with no follow-up or excision .
- Patients with simple fibroadenomas are not at increased risk of developing breast cancer.

Breast lumpiness and pain

Premenstrual nodularity or lumpiness and breast discomfort are common and considered part of the normal cyclical changes .

Reassurance and wearing a soft supporting bra 24 hours a day is the mainstay of treatment .

Lumpiness or nodularity

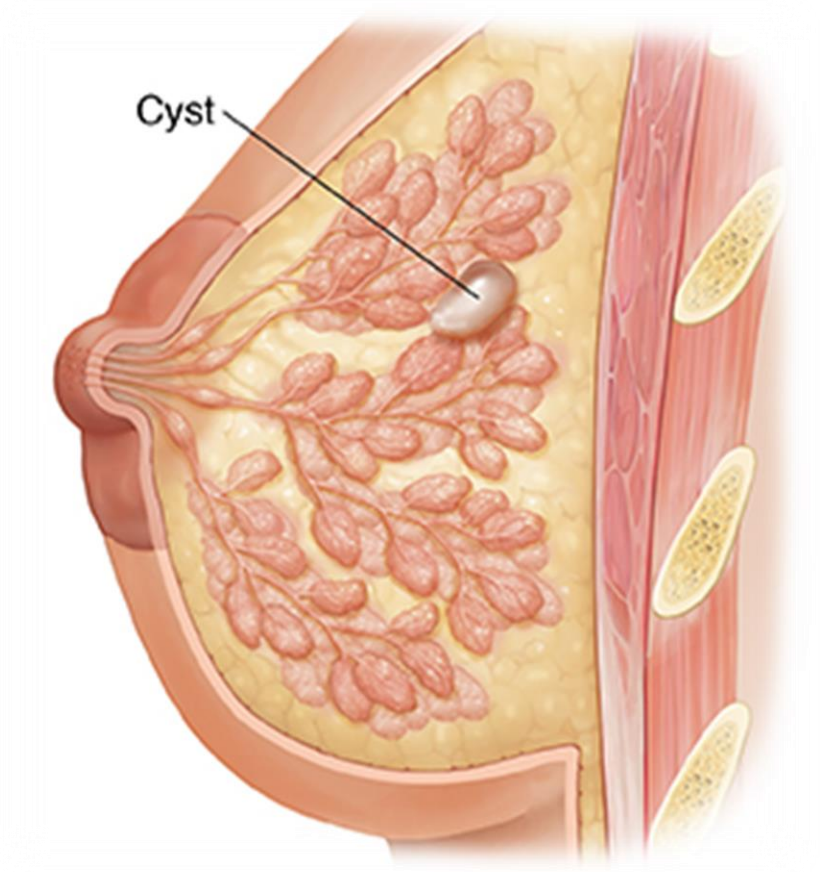
- It can be throughout the breast or localized .
- Diffuse bilateral nodularity is normal .
- Benign focal nodularity is often reported that it fluctuates in size in relation to the menstrual cycle.
- Breast cancer should be excluded .
- Others : A galactocoele is a cystic lesion that develops in lactating women and is full of milk.

Noncyclical breast pain

- Noncyclical breast pain is much more common than cyclical pain
- Oral or topical nonsteroidal anti-inflammatory agents (NSAIDs) can be effective in improving chest-wall pain.

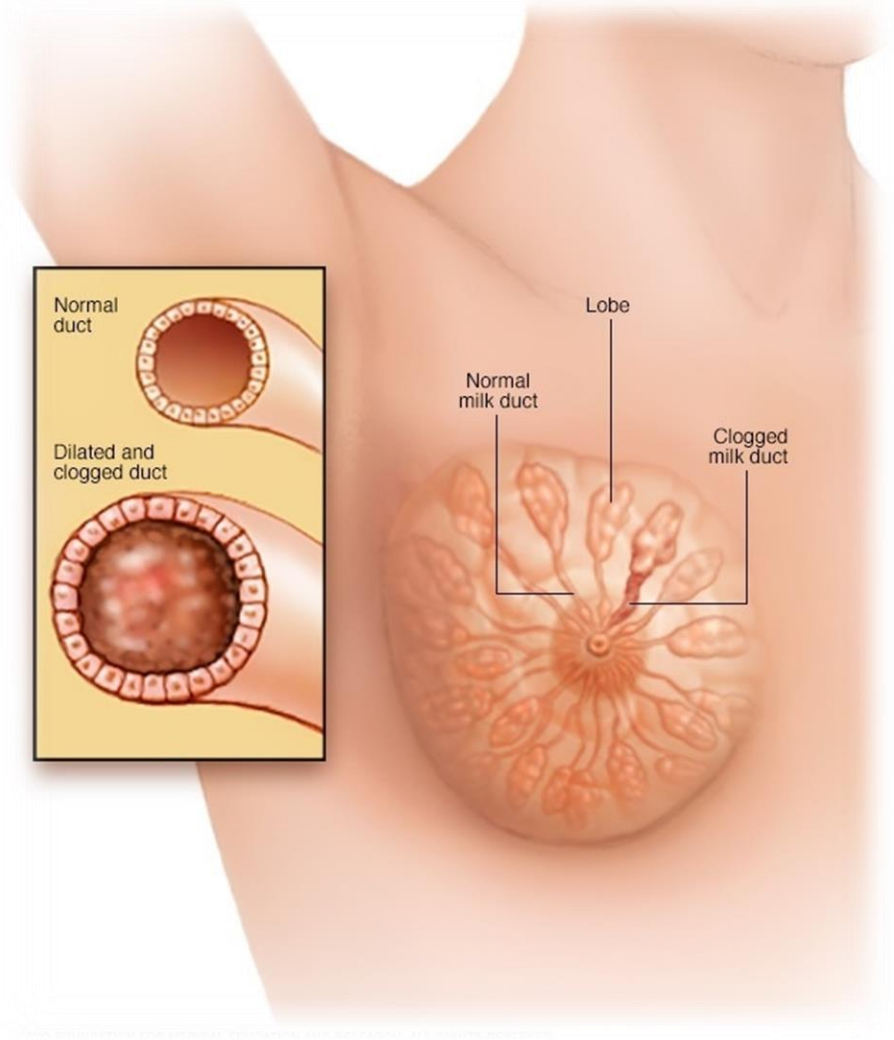
Breast Cyst

- Cysts constitute 15% of all discrete breast masses.
- most frequently seen in the perimenopausal period
- Symptomatic palpable cysts are treated by aspiration
- Patients with cysts do not have an increased risk of developing breast cancer.



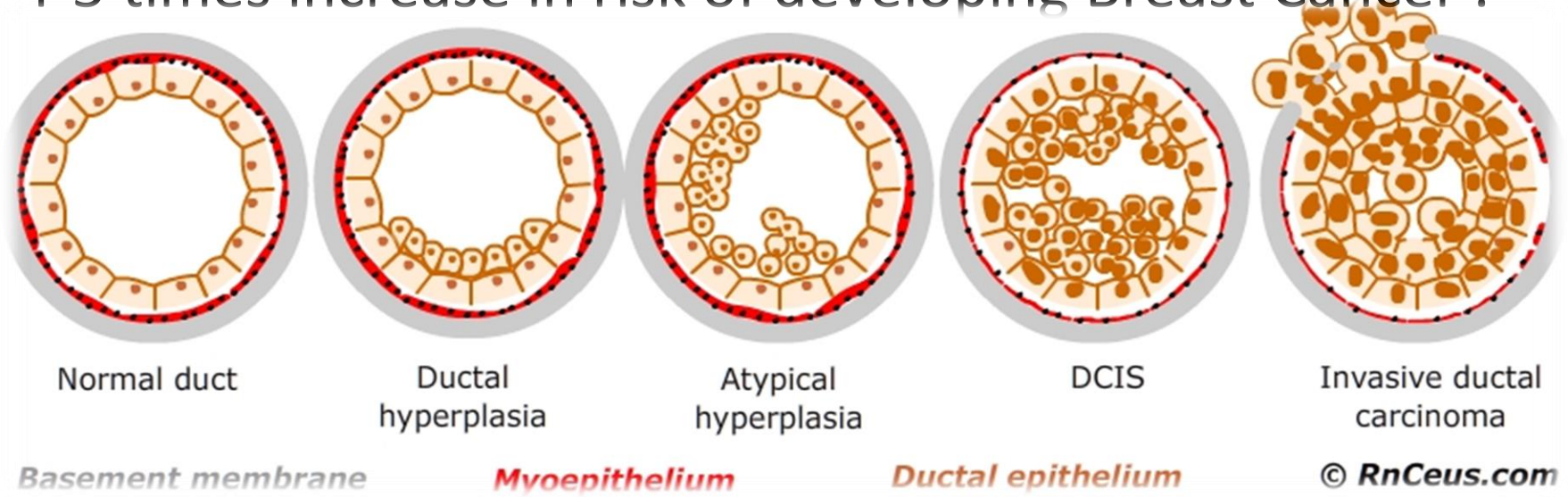
Duct ectasia

- The central subareolar ducts dilate and shorten with age
- Present with nipple discharge or nipple retraction .
- Cheesy Discharge and slit like nipple .



Epithelial hyperplasia

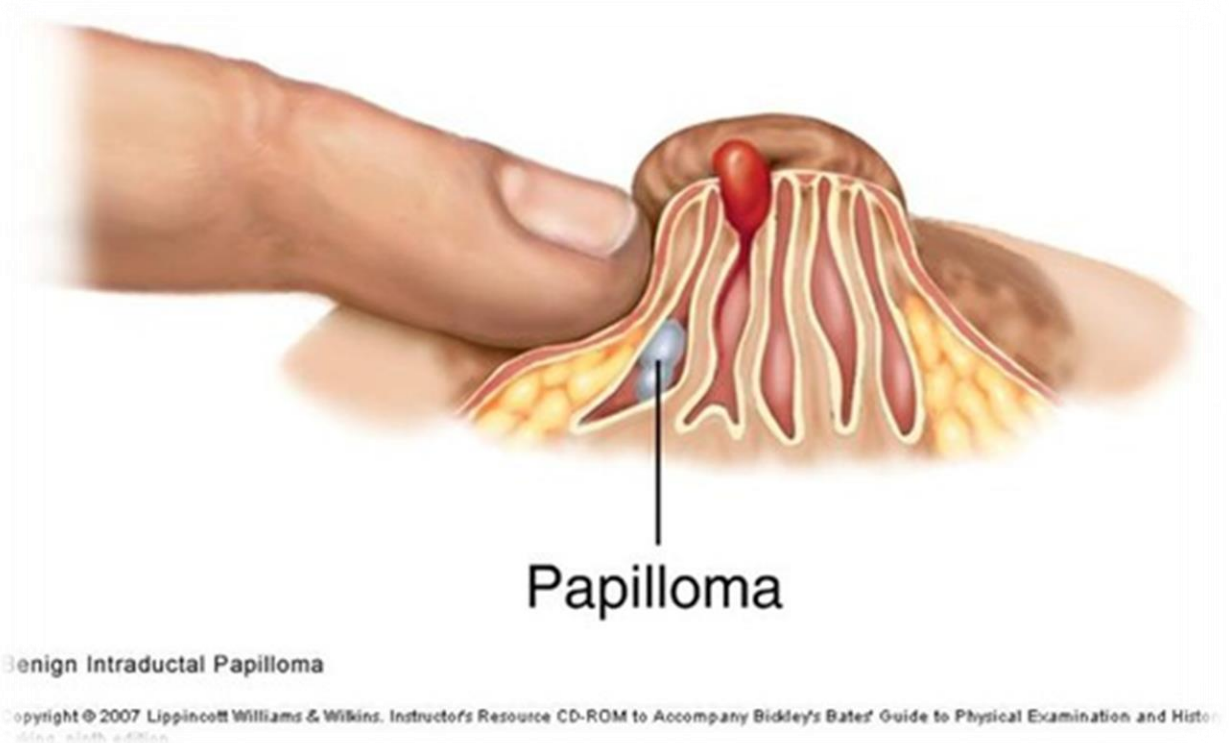
- Increase in the number of cells lining the terminal duct lobular unit .
- atypical hyperplasia
- 4-5 times increase in risk of developing Breast Cancer .



Benign Neoplasms

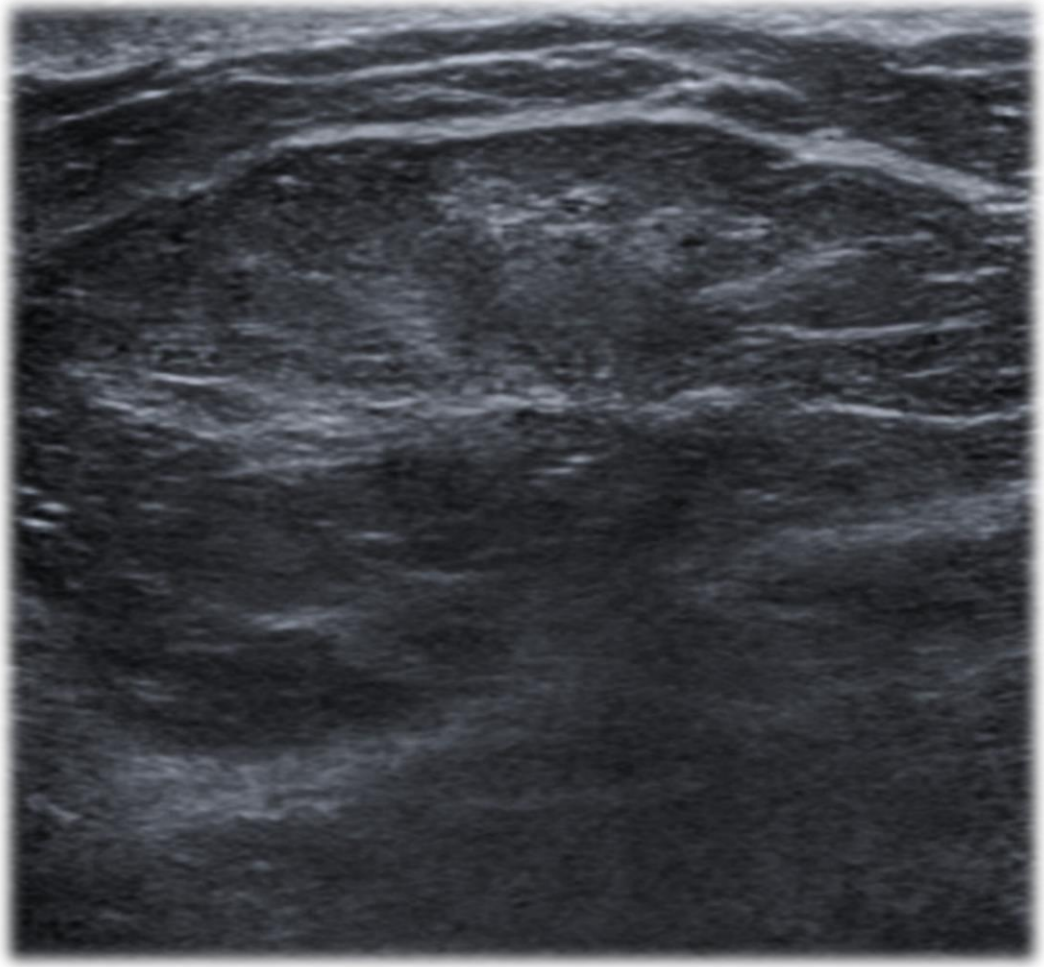
Duct papilloma

- most commonly in the ducts under the nipple , single or multiple.
- Nipple discharge is either serous or frankly blood-stained
- Treatment involves removal of the discharging duct
- with the papilloma .



Lipoma

soft, lobulated, radiolucent lesions diagnosis can be made by a combination of clinical examination and imaging.



Phyllodes tumor

- Rare fibro-epithelial neoplasms are mostly benign, but a small percentage are malignant.
- localized discrete masses , tend to be larger (>4 cm) and appear bosselated
- Might recur locally following simple excision
- Treatment of such tumours, whether malignant or benign, is wide excision.

Breast infection

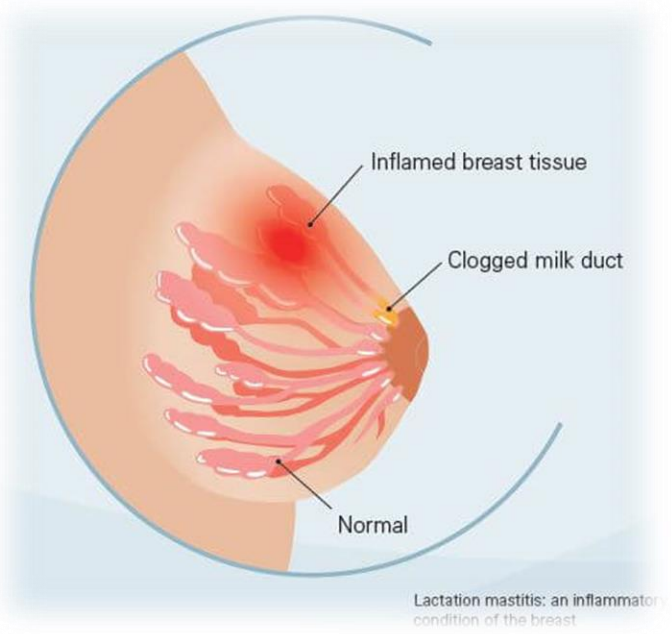
- It most frequently affects women aged 18–50 years.
- lactational and nonlactational.

The principles of treating breast infection are:

- Give appropriate antibiotics early to reduce the incidence of abscess formation .
- If an abscess is suspected, confirm pus is present by ultrasound before embarking on aspiration or surgical drainage.
- Exclude breast cancer using imaging and consider core biopsy in any inflammatory lesion that is solid and that does not settle despite adequate antibiotic treatment.

Lactating infection

- it usually develops within the first 6 weeks of breastfeeding.
- pain, swelling, tenderness and a cracked nipple or skin abrasion
- Staphylococcus aureus is the most common organism
- Early infection should be treated with flucloxacillin or erythromycin.



Nonlactating infection

Central (periareolar) infection

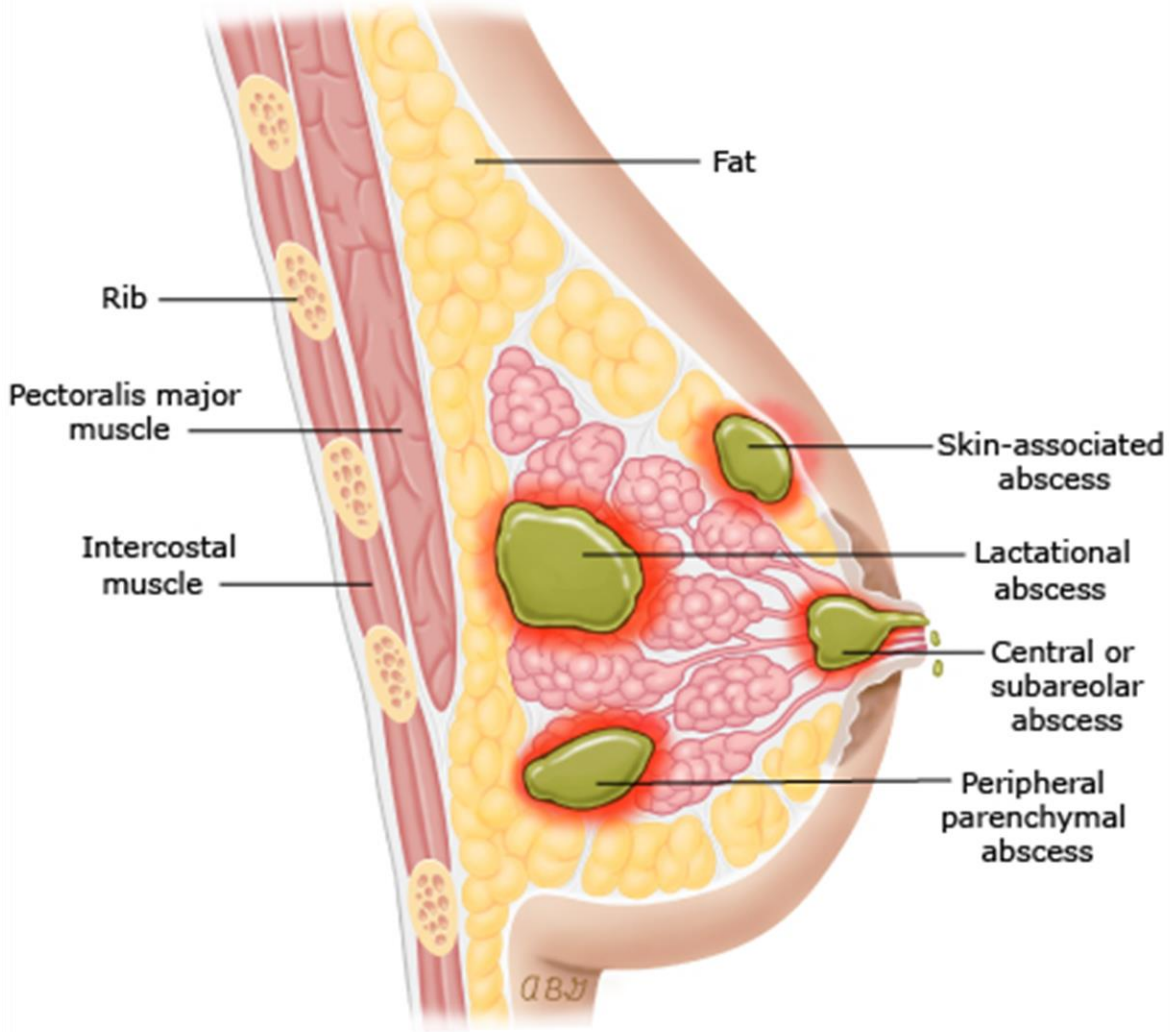
- Mostly in younger women with periductal mastitis
- smoking is important in the aetiology
- Treatment of periductal mastitis is with appropriate antibiotics , aspiration and excision of the diseased duct(s).

Mammary duct fistula

- Communication between the skin and a subareolar duct as a result of periductal mastitis .
- excision of the fistula and dis- eased duct(s) under antibiotic cover

Peripheral nonlactating abscesses

- Some are associated with an underlying condition, such as diabe- tes, rheumatoid arthritis, steroid treatment or trauma
- recurrent aspiration with antibiotics or incision and drainage.

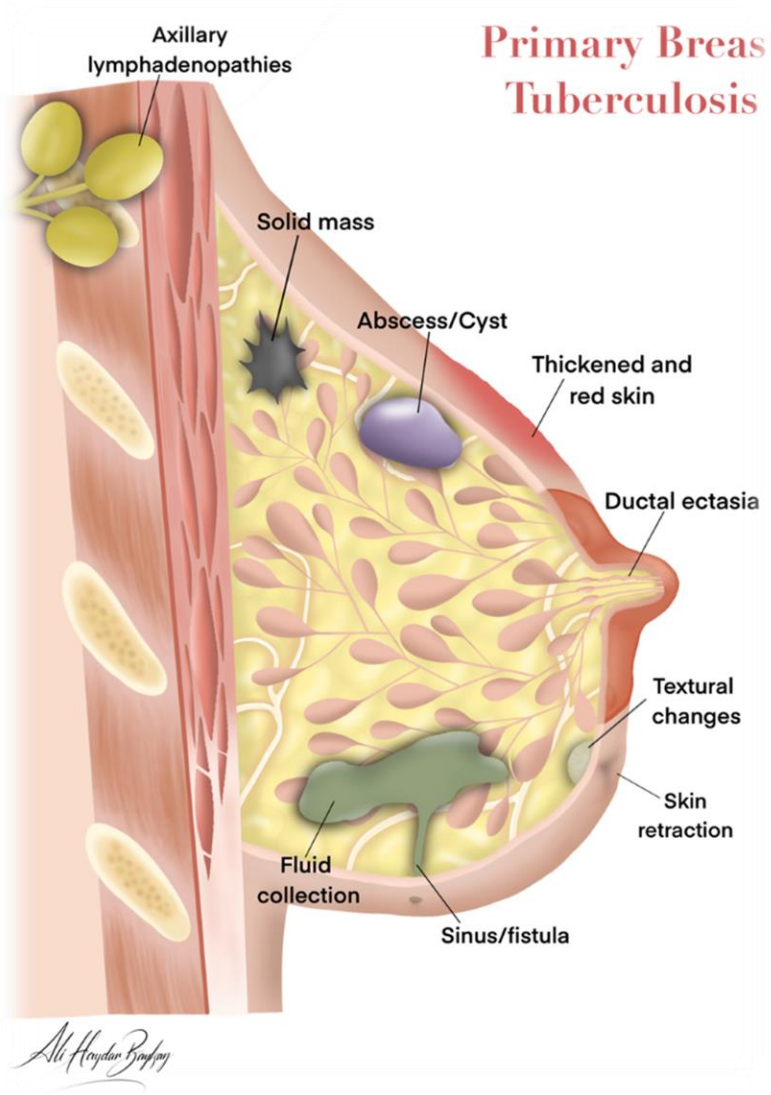


Type of infection	No allergy to penicillin	Allergy to penicillin
Lactating and skin-associated	Flucloxacillin (500 mg 6-hourly)	Clarithromycin (500 mg 12-hourly)
Nonlactating	Co-amoxiclav (375 mg 8-hourly)	Combination of clarithromycin (500 mg 12-hourly) with metronidazole (200 mg 8-hourly)

[a]Doses are for adults

Tubercular mastitis

- Affects females in the reproductive age group .
- Painless or painful breast lump.
- Can be diagnosed by FNA for tissue and cultures
- prolonged course of antitubercular treatment is preferred



Skin-associated infection

- Most commonly affects the lower half of the breast .
- **Intertrigo** is infection related to chafing of the skin .
- **Epidermoid cyst .**
- **Hidradenitis suppurativa** .

Breast Cancer

Risk factors for breast cancer

Factor	Relative risk	High-risk group
Age	>10	Elderly
Geographical location	4–5	Developed country
Age at first full pregnancy	3	First child in early 40s
Previous benign disease	4–5	Atypical hyperplasia
Cancer in other breast	>4	Women treated for breast cancer
Weight	2	Body mass index >30 in postmenopausal women
Socioeconomic group	2	Social classes I and II
Alcohol consumption	1.3	Excessive intake
Exposure to ionising radiation	3	Abnormal exposure in young females after age 10
Oral contraceptives	1.24	Current use
Combined HRT	2.3	Use for ≥10 years
Family history	≥2	Breast cancer in first-degree relative

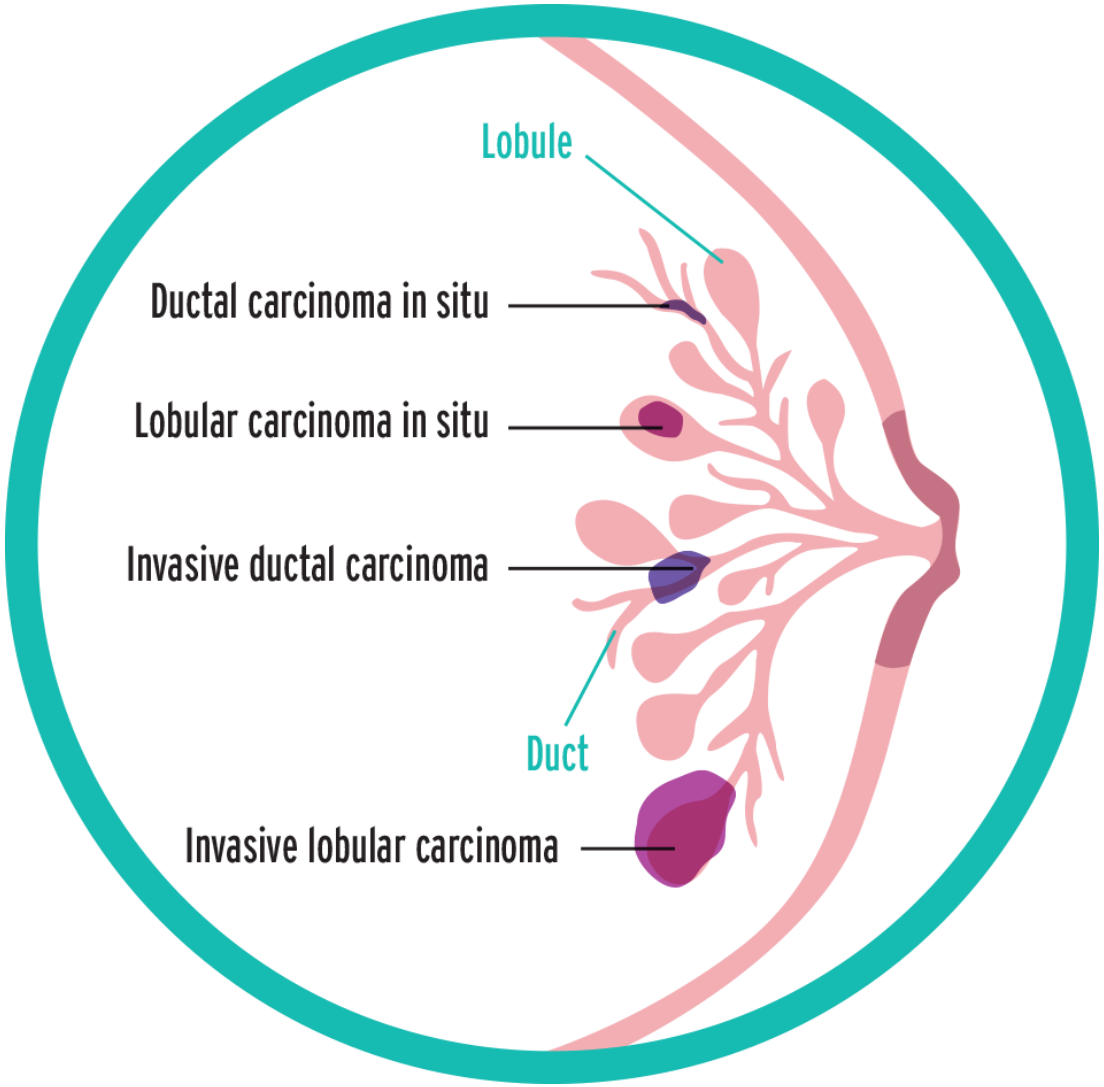
High risk genes

- BRCA1 and BRCA2 genes are thought to account for over three quarters of highly penetrant genetic breast cancer.
- Mutations in the p53 gene account for over 70% of cases of the Li Fraumeni syndrome .
- Cowden's syndrome is caused by mutations in the phospha-tase and tensin homolog (PTEN) .

High risk women have the following options:

- Bilateral risk reducing surgery: removal of as much breast tissue as possible +/- nipple. This reduces risk by at least 95%. The uptake rate of this surgery is increasing as are the cosmetic results of surgery .
- Regular screening: involves MRI in younger women and mammography+/-MRI in older women .
- Chemoprophylaxis: tamoxifen, raloxifene and the aromatase inhibitors given for 5 years reduce the rate of breast cancer development.

Types of breast cancer

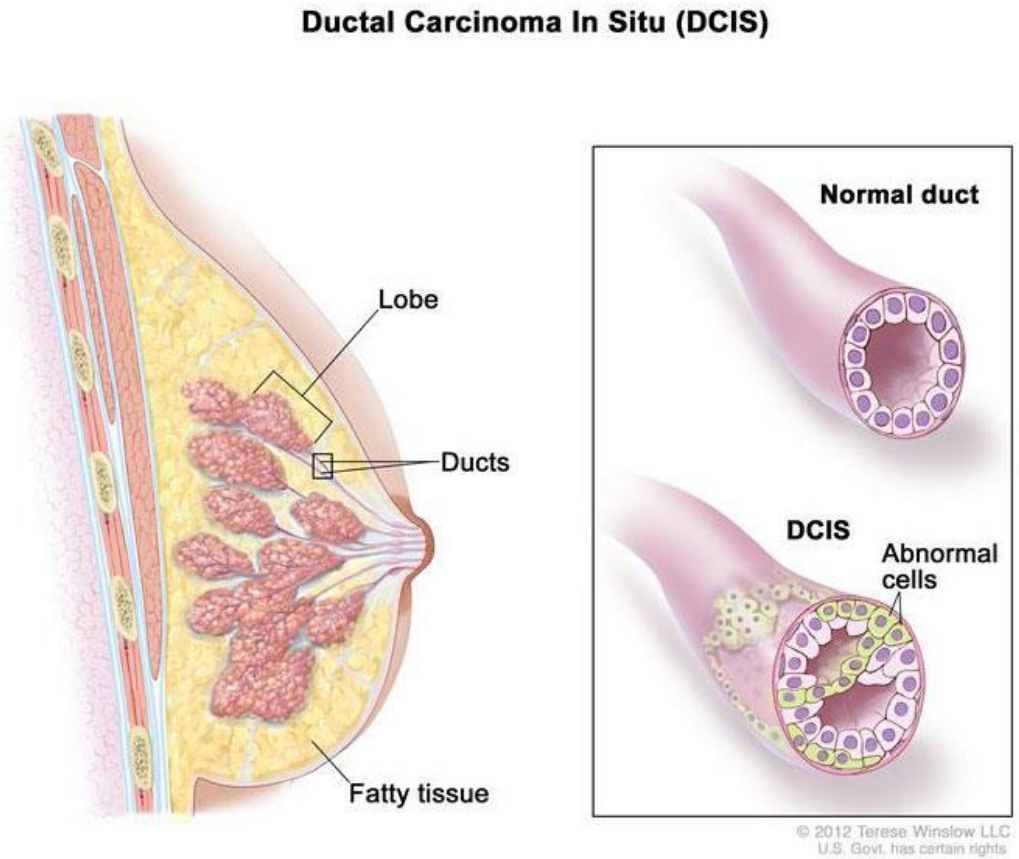


Noninvasive cancer

- Ductal carcinoma in situ (DCIS) is the most common form of non- invasive cancer .
- associated with microcalcifications on mammography

- Lobular carcinoma in situ (LCIS)
- atypical lobular hyperplasia (ALH)

lobular intraepithelial neoplasia (LIN)

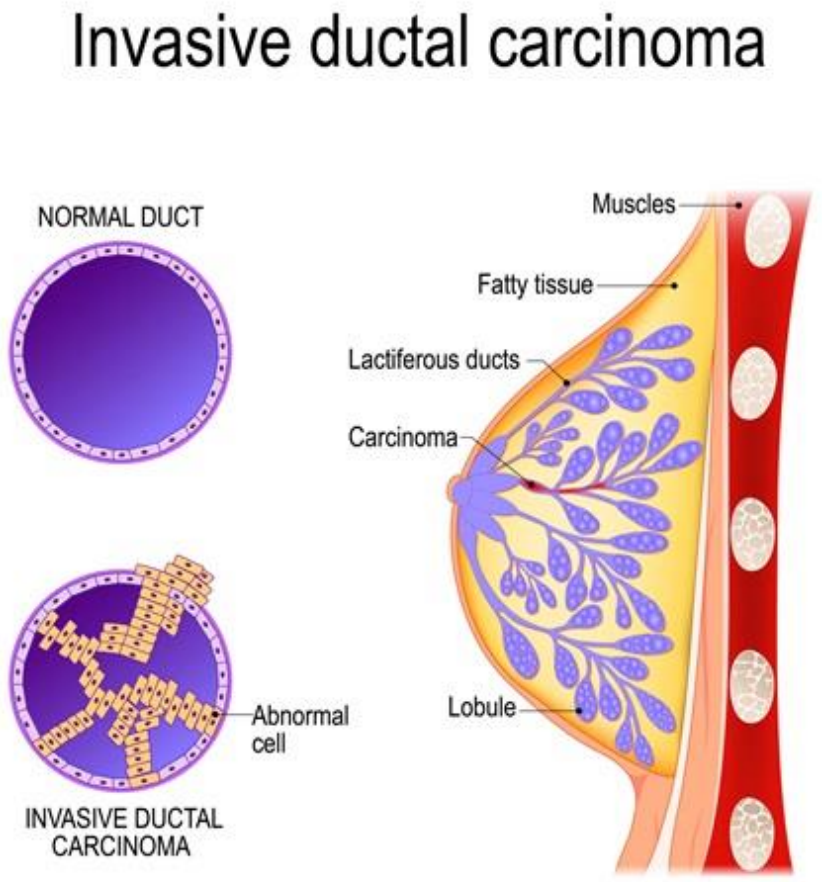


Invasive cancer

- The majority of invasive cancers are of no special type
- lobular, tubular, cribriform, papillary, mucinous and medullary cancers.

Breast cancers can be graded.

- Grade I have the best prognosis
- Grade II have an intermediate prognosis
- Grade III or high-grade cancers have a poorer prognosis than Grade 1 or 2 cancers.



Receptors

Hormone receptors

- The hormones estrogen and progesterone play important roles in breast cancer.
- Estrogen receptors (ER)/progesterone Receptors(PR).

Growth factor receptors

- Growth factors in cancer cells also control cancer growth rate.
- human epi- dermal growth factor receptors (HER).

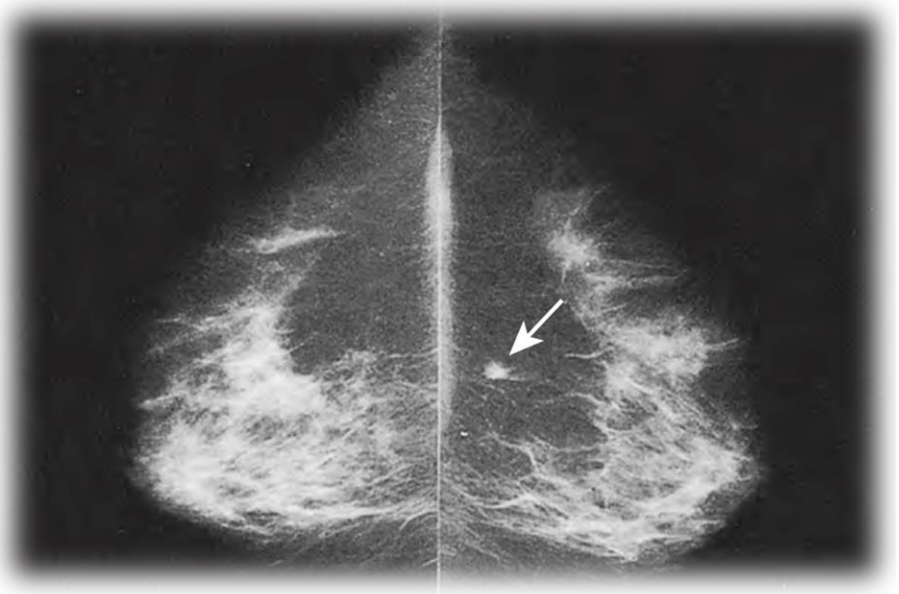
Molecular Classification

Intrinsic subtype	Clinic-pathological definition
Luminal A	ER and/or PR positive, HER-2 negative, Ki67<14%
Luminal B	
Luminal B (HER-2 negative)	ER and/or PR positive, HER-2 negative, Ki67≥14%
Luminal B (HER-2 positive)	ER and/or PR positive, HER-2 positive, any Ki67
HER-2 overexpression	HER-2 overexpression, ER and PR absent
Triple negative	ER and PR absent, HER-2 negative

ER, estrogen receptor; PR, progesterone receptor; HER-2, human epidermal growth factor receptor 2.

Screening and Mammographic Features

- Randomized controlled trials have shown that screening by mammography can significantly reduce mortality from breast cancer by 20% in women aged over 50 years.
- Cancer most commonly appears as a dense opacity with an irregular outline from which spicules pass into the surrounding tissue .



Staging of breast cancer

Stage	Primary Tumor	Nodes	Metastases
Stage 1A	≤ 20 mm	None	None
Stage 1B	≤ 20 mm	Nodal Micrometastases (>0.2 mm <2.0 mm)	None
Stage IIA	≤ 20 mm > 20 mm ≤ 50 mm	N1 None	None None
Stage IIB	> 20 mm ≤ 50 mm > 50 mm	N1 None	None
Stage IIIA	≤ 50 mm > 50 mm	N2 N1 or N2	None
Stage IIIB	Extension to chest wall and/or skin	N0 - N2	None
Stage IIIC	Any size	N3	None
Stage IV	Any size	Any involvement	Detectable

N0 = no regional lymph node metastasis
N1 = 1-3 axillary lymph nodes involved and/or internal mammary nodes with metastases detected by biopsy
N2 = 4-9 axillary lymph nodes involved or clinically detected internal mammary nodes in the absence of axillary nodal involvement
N3 = ≤ 10 axillary lymph nodes involved, or infraclavicular lymph nodes, or clinically detected mammary lymph nodes with axillary involvement, or > 3 axillary nodes with internal mammary nodes detected by biopsy, or in ipsilateral supraclavicular lymph nodes

American Joint Committee on Cancer 7th Edition. *Breast Cancer Staging*.

Presentation of breast cancer

- The most common presentation of cancer is with a breast lump or lumpiness, which is usually painless.
- Nipple discharge
- dry scaling or red weeping appearance of the nipple
- palpable axillary nodes or with signs or symptoms of distant metastatic disease

Management of operable breast cancer

In situ Breast Cancer

- Localized disease is treated by wide local excision to clear margins .
- All patients other than those at low risk of recurrence should be considered for adjuvant radiotherapy to the breast .
- Tamoxifen reduces recurrence following wide excision, but is not in widespread use because of its side effects .
- Large areas of DCIS are usually treated by mastectomy/ reconstruction.

Invasive Cancer / Operable breast tumors

Local Therapy

- Surgical :
  - Breast Conserving Surgery. } Breast
  - Mastectomy (SSM / NSM). }
  - Axillary Dissection . } Axilla
  - Sentinel Lymph node Biopsy . }
- Radiotherapy .

Systemic Therapy

- Chemotherapy :
  - Adjuvant / Neoadjuvant .
- Hormone Therapy :
  - Oophorectomy .
  - Tamoxifen.
  - Aromatase inhibitors .
- Anti-Her2 Therapy .

Complications of Treatment

Surgery :

Hematoma , Infection , Nerve Injury , Frozen shoulder , Lymphoedema .

Radiotherapy :

Erythematous skin reaction , Fibrosis around shoulder.

Chemotherapy :

Hair Loss , Fatigue , lethargy , Nausea , Vomiting , Cardiac failure .

Hormone Therapy :

Hot flushes , Vaginal dryness or discharge , Loss of lipido .

Male Breast

- Gynecomastia :
  - the growth of breast tissue in males to any extent in all ages

- Male Breas Cancer :
  - Less than 0.5% of all breast cancer .
  - Genetic mutations .
  - Similar to female breast cancer investigations and treatment .

Questions