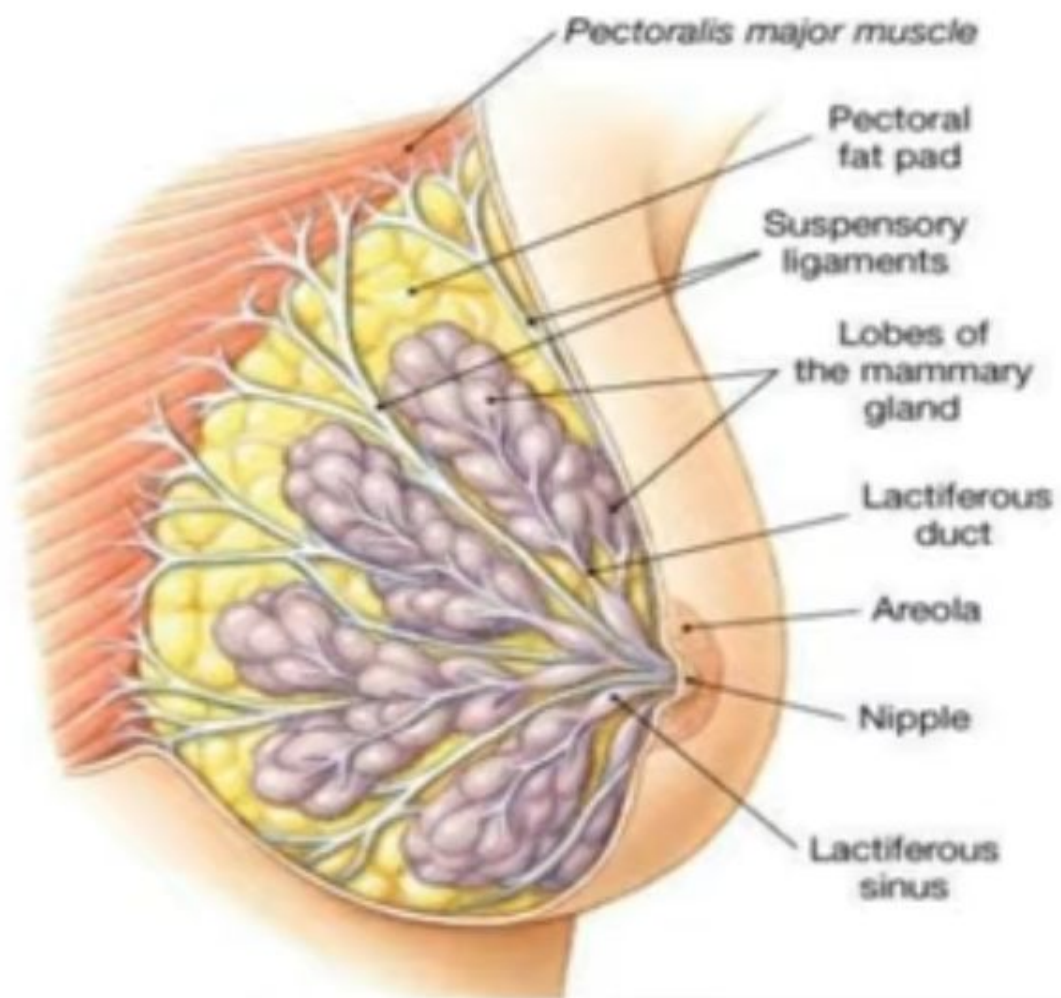


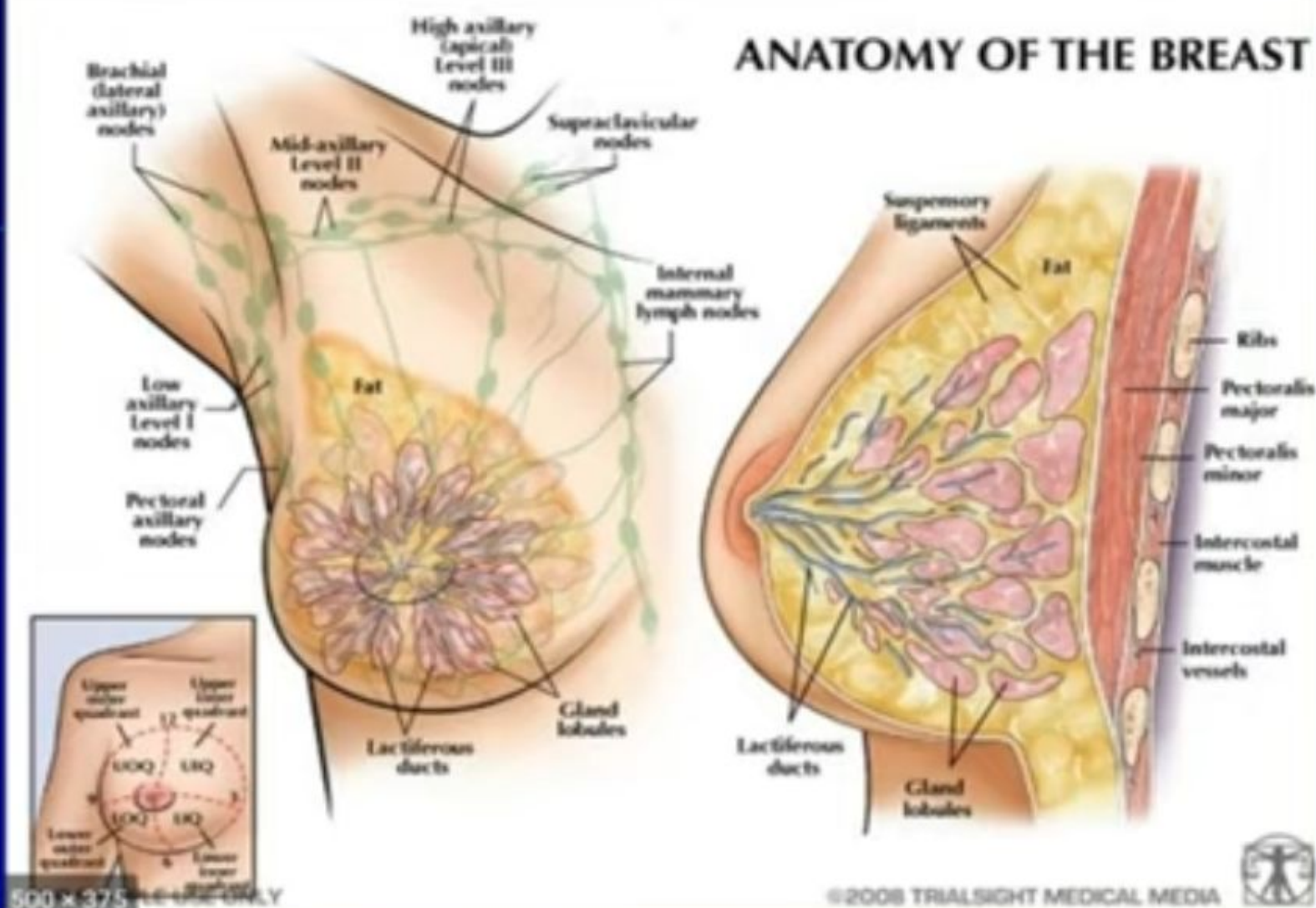


Lobes
Lobules
Ducts
sinuses

Breast cancer

- Is the most frequently diagnosed non skin cancer in women 25% .
- 2nd commonest cause of death in women.
- 50 % of all cancers in women between 40-55 y.
- 1 million case diagnosed annually in the world.
- 70% of women have no risk factor.
- One fifth of breast cancer occur in women less than 50y.
- Now 5 y survival rate is around 90%.

ANATOMY OF THE BREAST



Etiology and risk factors

Hormonal influence

- Age of menarche, and menopause.
- Number of pregnancies, age of first pregnancy.
- Nulliparity.
- Breast feeding history?.
- Oral contraceptive pills, and HRT.
- Oophorectomy.

- Age
- Obesity ,alcohol , lack of exercise.
- Socioeconomic status.
- Dietary influence.
- Family history:Inherited susceptibility 10%
- Early age of onset .
- Bilateral disease.
- Multiple primaries in the same lady.
- Two or more first degree relatives affected
- BRCA I , BRCAII, P53, HER2, ER.

	BRCA1	BRCA2
Breast Cancer, in unaffected women (up to age 80)	60-90%	45-85%
Lifetime risk of a new cancer in the other breast in woman who have already had a breast cancer in one breast	50% 5 year risk of new breast cancer 10%	50% 5 year risk of new breast cancer 5-10%

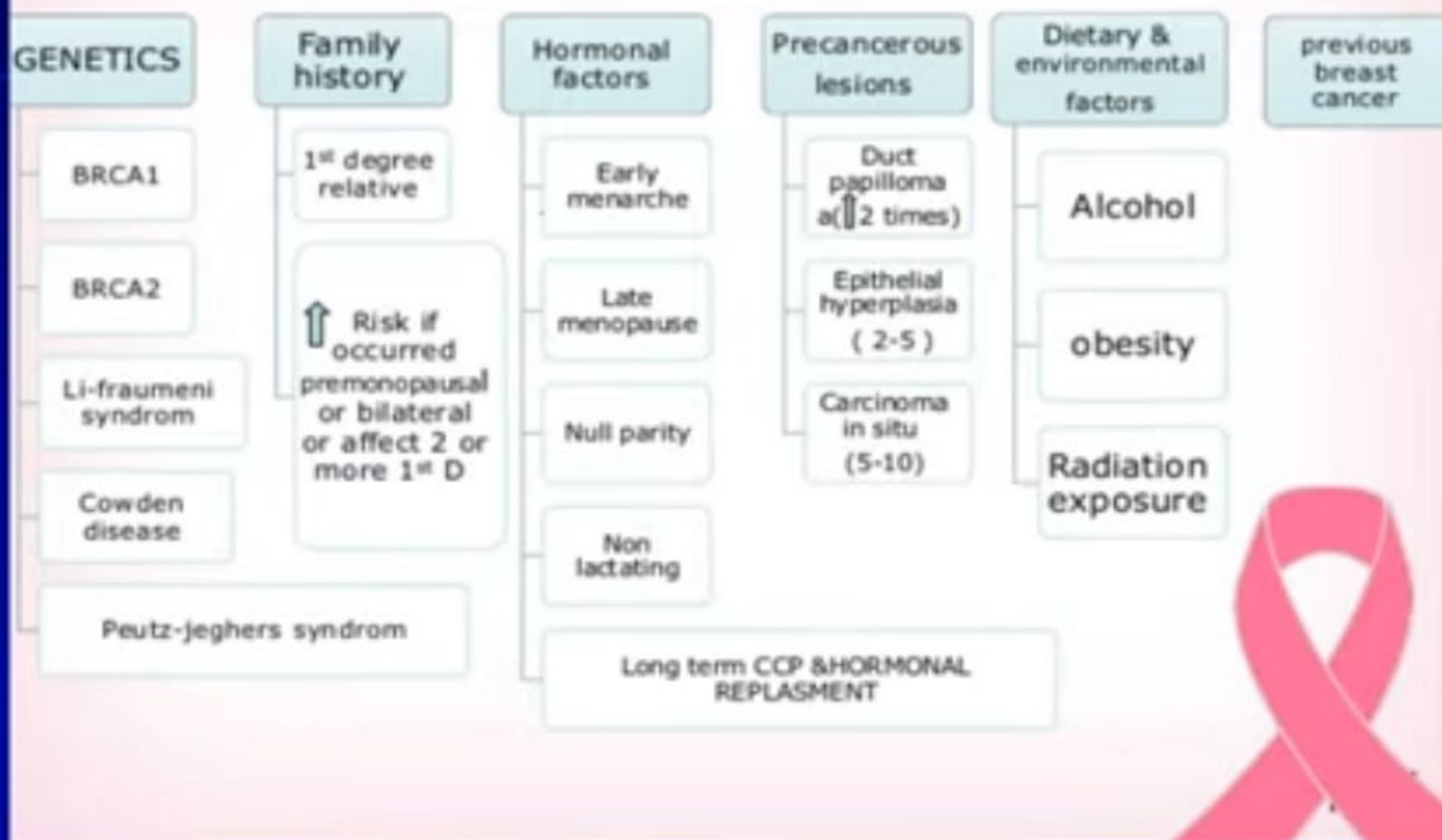
Who Should be Tested for BRCA Mutations?

You should consider genetic testing

for *BRCA1 and BRCA2 mutations* if any of the following factors are present on either side of your family history:

- Anyone in the family with Ovarian Cancer.
- Two or more first-degree relatives (mothers, sisters, daughters) with a history of breast cancer.
- Any first-degree relative diagnosed with breast cancer at or before age fifty.
- Three or more first and second-degree (grandmothers, aunts) relatives who develop breast cancer.
- Any first-degree relative with a history of cancer in both breasts.
- Any first or second-degree relative with a history of both breast and ovarian cancer.
- Breast cancer in any male relative

Risk factors



Risk Factors for Breast Cancer

- @ Obesity
- @ Diet: Fat
Alcohol
- @ Lack of Physical Activity ; Stress
- @ Radiation Exposure
- @ History of cancer: breast, uterus, cervix, ovary
- @ Hormones: estrogens in Hormone replacement therapy & Birth control pills
- @ Genetics : certain conditions that are inherited

> 70% have no risk factors



Prevention

Breast Cancer Risk Factors

THAT CAN BE CONTROLLED



Factors that increase risk



■ **Family History**

• **Lifestyle**



• **Personal History**

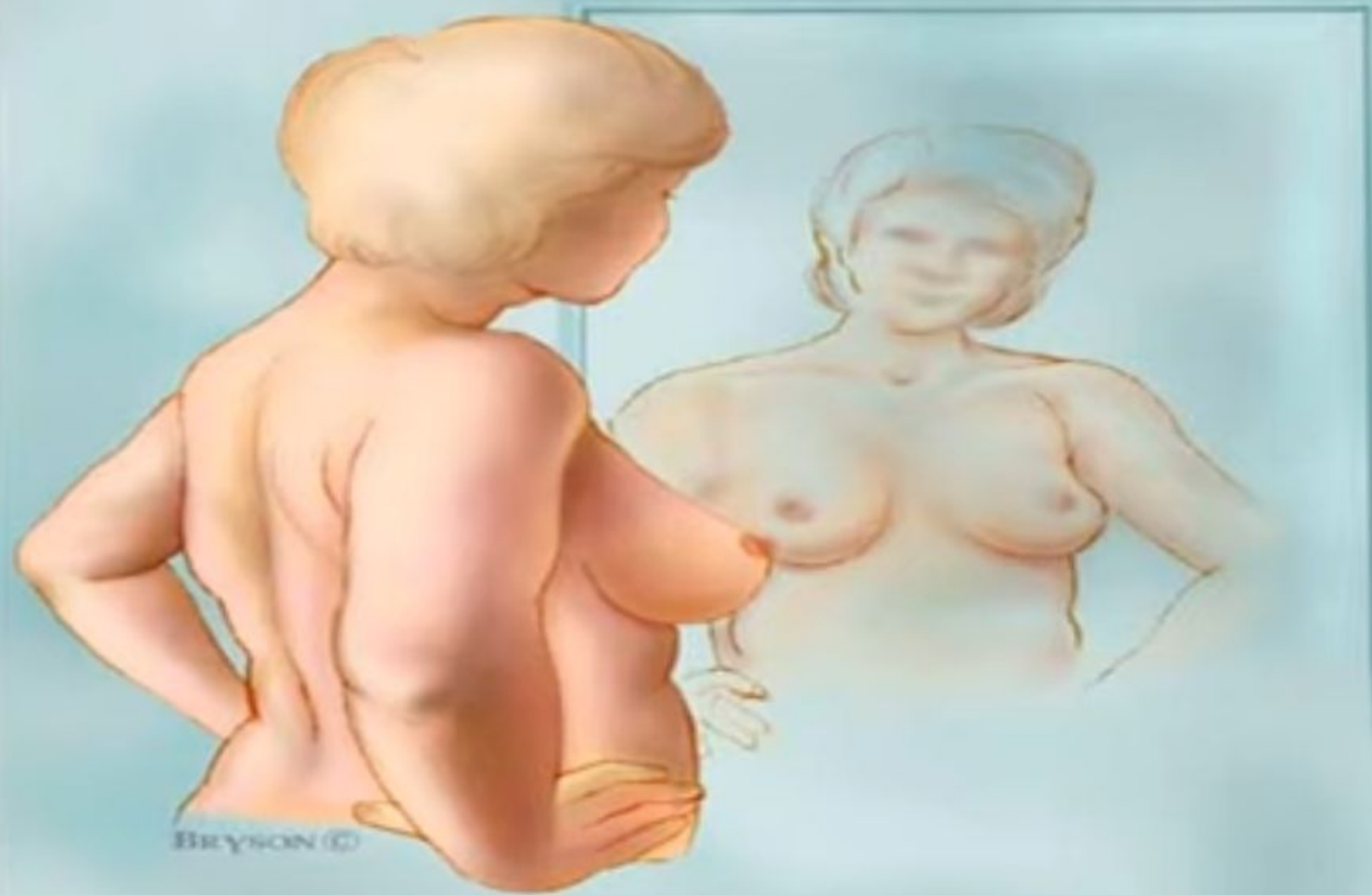


Breast screening

- BSE + CBE
 - 2/3 OF female discover their cancer.

Mammograms

- Reduce risk of death from breast cancer in women 50-65 y by 30% .
- Every 1-2 years .
- Two views cranio caudal, and oblique .
- Tumors are usually , small , well differentiated ,
- Node negative.
- 10-15% of breast cancer are not seen in mammograms .





BRYSON ©





© NIOSH/NIH

Clinical Breast Examination

- Performed by doctor or trained nurse practitioner
- Annually for women over 40yrs
- At least every 3 years for women between 20 and 40 yrs
- More frequent examination for high risk patients



Diagnosis and investigations

- History + **BSE**
- Clinical examination CBE : Both breasts, Lymph nodes , Axilla and Supraclavicular region.

- **Imaging of breast disease**

- Ultrasound

- Below 35 y .
- Tumor size, and margins supplementary to mammo as screening modality.
- Solid or cystic (simple-complex)
- Single or multiple.
- Localize lesions us guided biopsy.
- Sensitivity of US for DCIS is low compared to mamos

WHAT TO LOOK OUT FOR...

THE EARLIER BREAST CANCER IS FOUND, THE BETTER THE CHANCE OF BEATING IT. SO LOOKING OUT FOR ANY CHANGES AND GETTING THESE CHECKED BY YOUR GP IS VERY IMPORTANT.



VISIBLE LUMP ON ARMPIT



A LUMP IN THE BREAST



DIMPLED OR DEPRESSED SKIN



SWELLING OF ALL OR PART OF BREAST



NIPPLE CHANGES INVERSION



REDNESS & HEAT

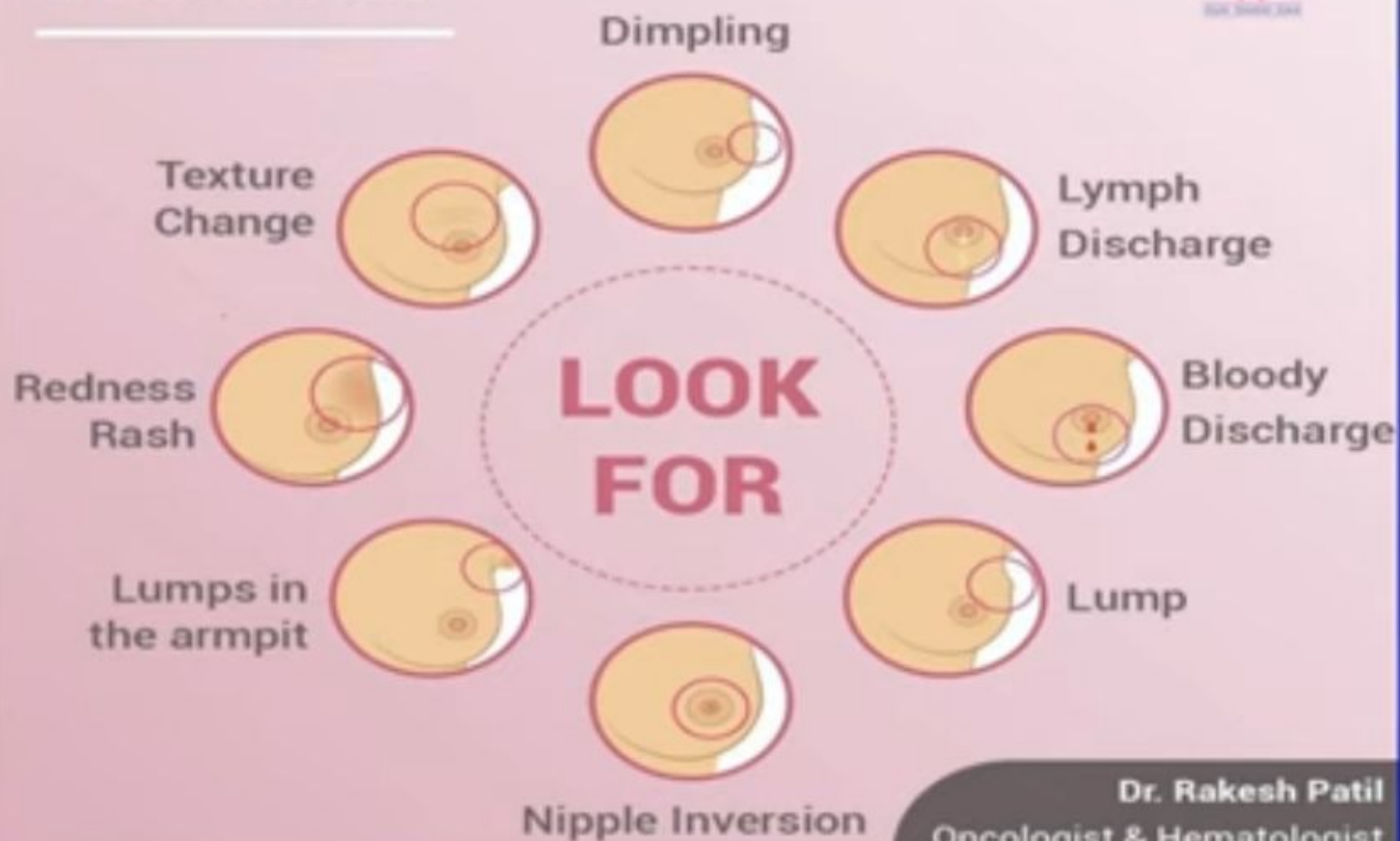


SKIN IRRITATION OR TEXTURE CHANGE



BLOODY DISCHARGE

BREAST CANCER SYMPTOMS



Dr. Rakesh Patil
Oncologist & Hematologist

Symptoms



Symptoms and signs

What do I look for?

Don't think of a breast self-exam as a hunt to find cancer, but to understand the normal landscape of your breasts. This involves both looking and feeling.

Look in the mirror with your arms up, then again with your hands on your hips. Stand to the side and then face forward. Check for any changes that look like these signs below.

What does a cancerous lump feel like?

A cancerous lump often feels hard and immovable, like a lemon seed. 80% of lumps are not cancerous, but the only way to know for sure is to examine the cells inside. If you feel a lump ask a doctor to investigate it with you. When breast cancer is caught at early stages the cure rate is over 90%!

When should I do it?

From the age of twenty onwards, do self-exams at least once a month to stay ahead of your health!

The best time to check your breasts is a few days after your period ends when hormones are the most normal and you're least tender (which is also an ideal time to have a doctor's breast exam and mammogram).

If you don't have a period anymore pick any day.

A dozen signs of breast cancer, revealed.

Clinical Breast Exams

begin at age 20 with your doctor every 3 years until you are 40, then go every year. Higher risk patients may visit more, ask your doctor about your risk type.



Mammograms

usually begin when you're 40. It feels like getting your blood pressure taken. Form a screening plan with your doctor to suit your risk type. If you're too young for a mammogram and suspect something, ask about an ultrasound or biopsy, don't wait it out.

Want to calculate your risk? www.lemonland.org

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Breast cancer with
associated puckering
and nipple retraction



Edema and peau d orange



Infiltration ulceration



Erythema



- **Mammography**
- Not below 35y,two views+ magnification views.
- Most guide lines recommend start mammo screening at 45 Y annually until 55Y then biannually till 74 y.
- High risk start at 40Y.

Classification of radiological appearance

Parenchymal distortion, poorly defined mass,
speculated micro-calcifications

R1 normal

R2 benign

R3 indeterminate

R4 probably malignant

R5 malignant

R6 Biopsy proven malignancy

Screening



Average-size lump found by woman practicing occasional breast self-exam (BSE)



Average-size lump found by woman practicing regular breast self-exam (BSE)



Average-size lump found by first mammogram

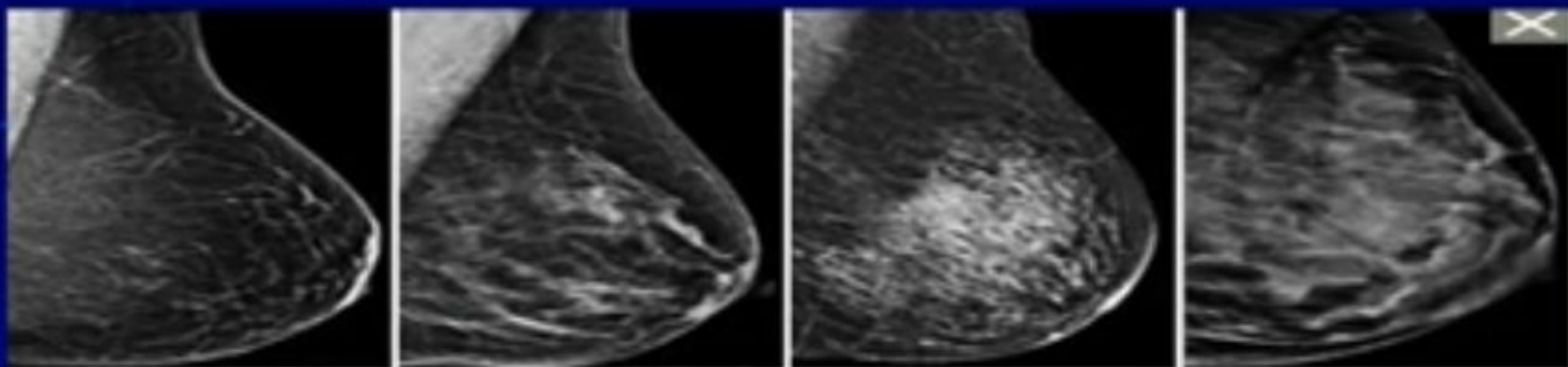


Average-size lump found by getting regular mammograms

BIRADS

Category		Management	Likelihood of Cancer in the Mammographic Finding
0	Need additional imaging or prior examinations	Recall for additional imaging and/or await prior examinations	
1	Negative	Routine screening	
2	Benign	Routine screening	Essentially 0
3	Probably benign	Short interval follow-up (6 months)	>0 but $\leq 2\%$
4	Suspicious	Tissue diagnosis	4a. Low suspicion for malignancy (>2% to $\leq 10\%$) 4b. Moderate suspicion for malignancy (>10% to $\leq 50\%$) 4c. High suspicion for malignancy (>50% to <95%)
5	Highly suggestive of malignancy	Tissue diagnosis	$\geq 95\%$
6	Known, biopsy-proven malignancy	Surgical excision when clinically appropriate	

Breast density



The breasts are almost entirely fatty

There are scattered areas of fibroglandular density

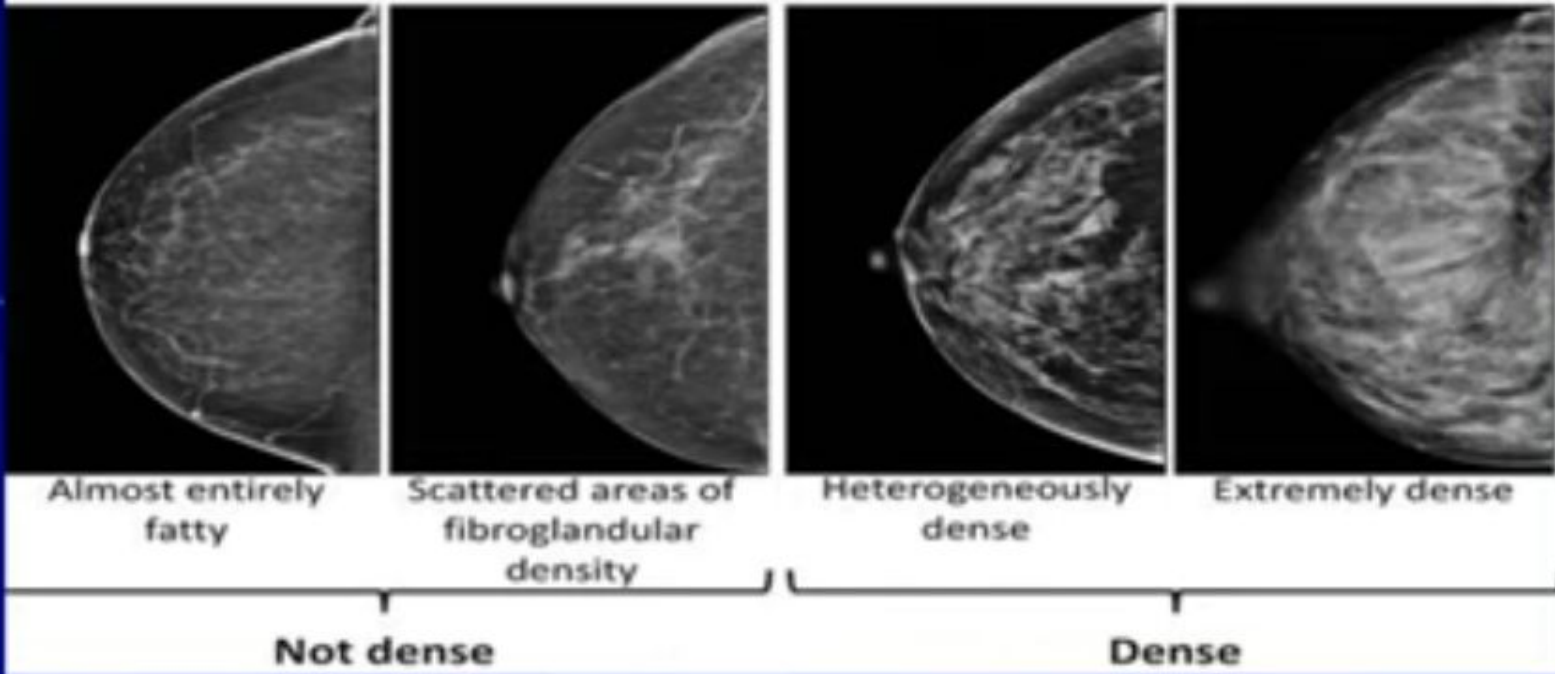
The breasts are heterogeneously dense, which may obscure small masses

The breasts are extremely dense, which lowers the sensitivity of mammography

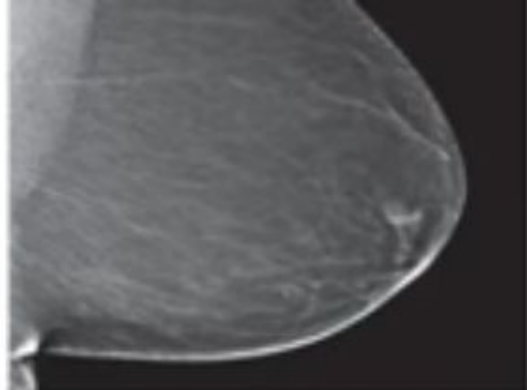
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Breast density — The four levels

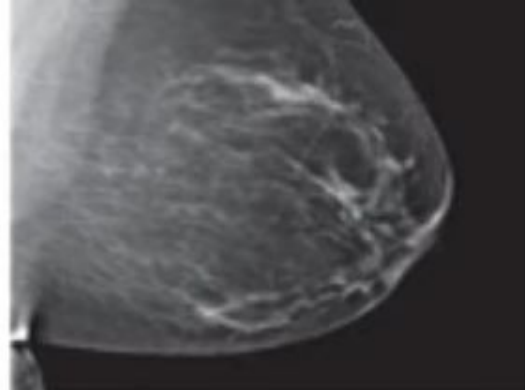
Breast tissue is composed of milk glands, milk ducts and supportive tissue (dense breast tissue) and fatty tissue (nondense breast tissue). Radiologists use mammogram images to grade breast tissue based on the proportion of dense to nondense tissue. According to the BI-RADS reporting system, the levels are (from left to right) almost entirely fatty, scattered areas of fibroglandular density, heterogeneously dense and extremely dense.



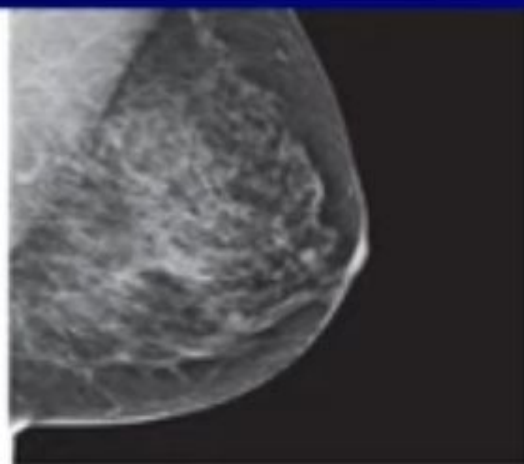
A	B	C	D
Category A	Category B	Category C	Category D
Almost Entirely Fatty 	Scattered areas of fibroglandular density	Heterogeneously dense 	Extremely dense 
10 % of women	40 % of women	40 % of women	10 % of women



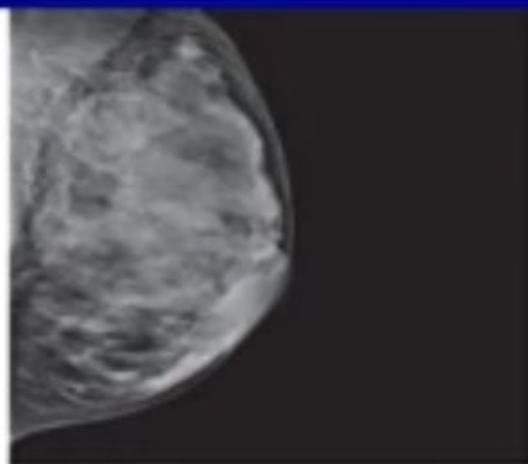
Breasts are almost all fatty tissue.



There are scattered areas of dense glandular and fibrous tissue.



More of the breast is made of dense glandular and fibrous tissue (described as **heterogeneously dense**). This can make it hard to see small tumors in or around the dense tissue.



Breasts are **extremely dense**, which makes it hard to see tumors in the tissue.

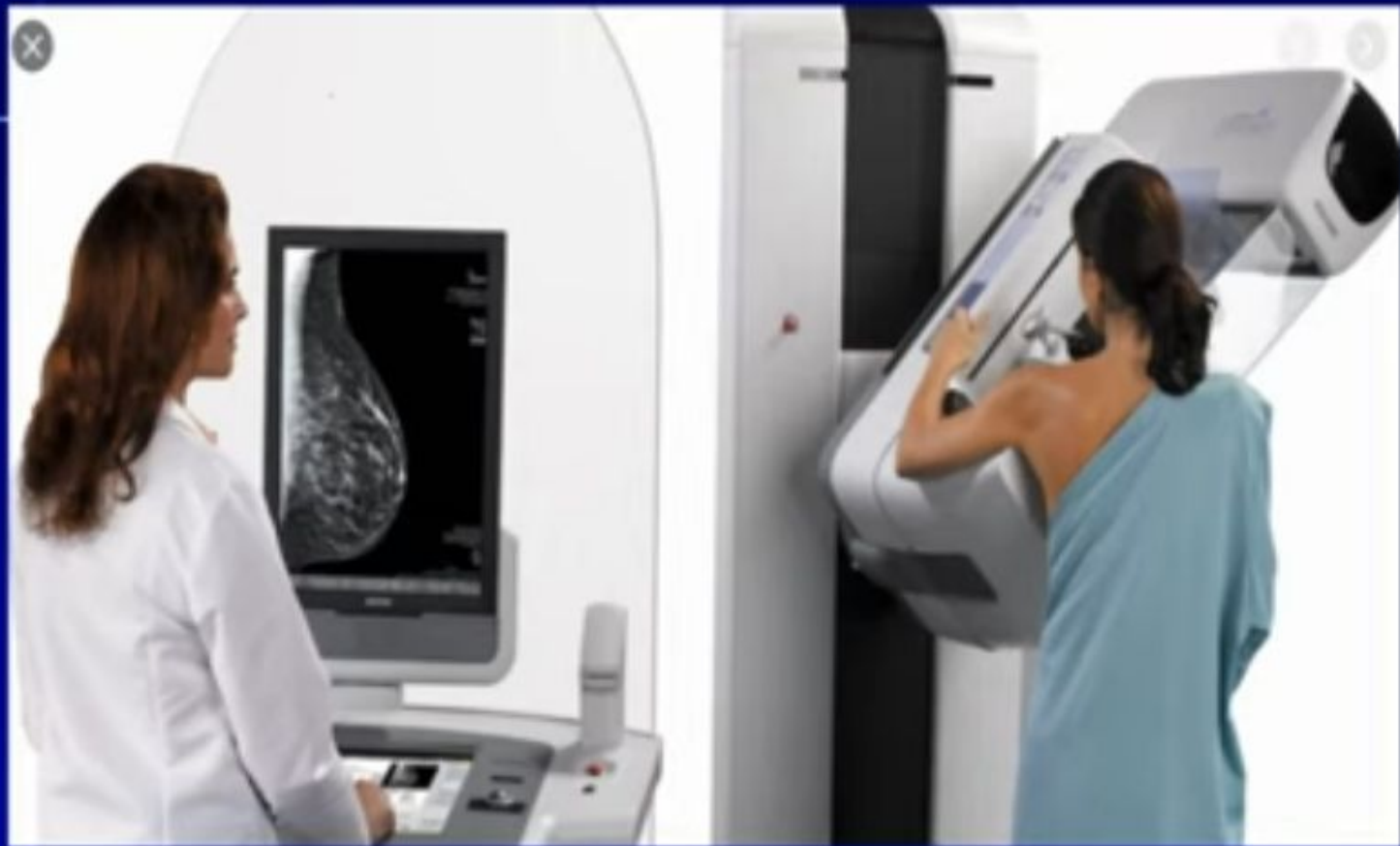
Two views mammograms

Cranio-caudal CC

Oblique



Tomosynthesis 3D mammo





1960's
Industrial film
mammography



1970's
Xero-
mammography



1980's
Film screen
mammography

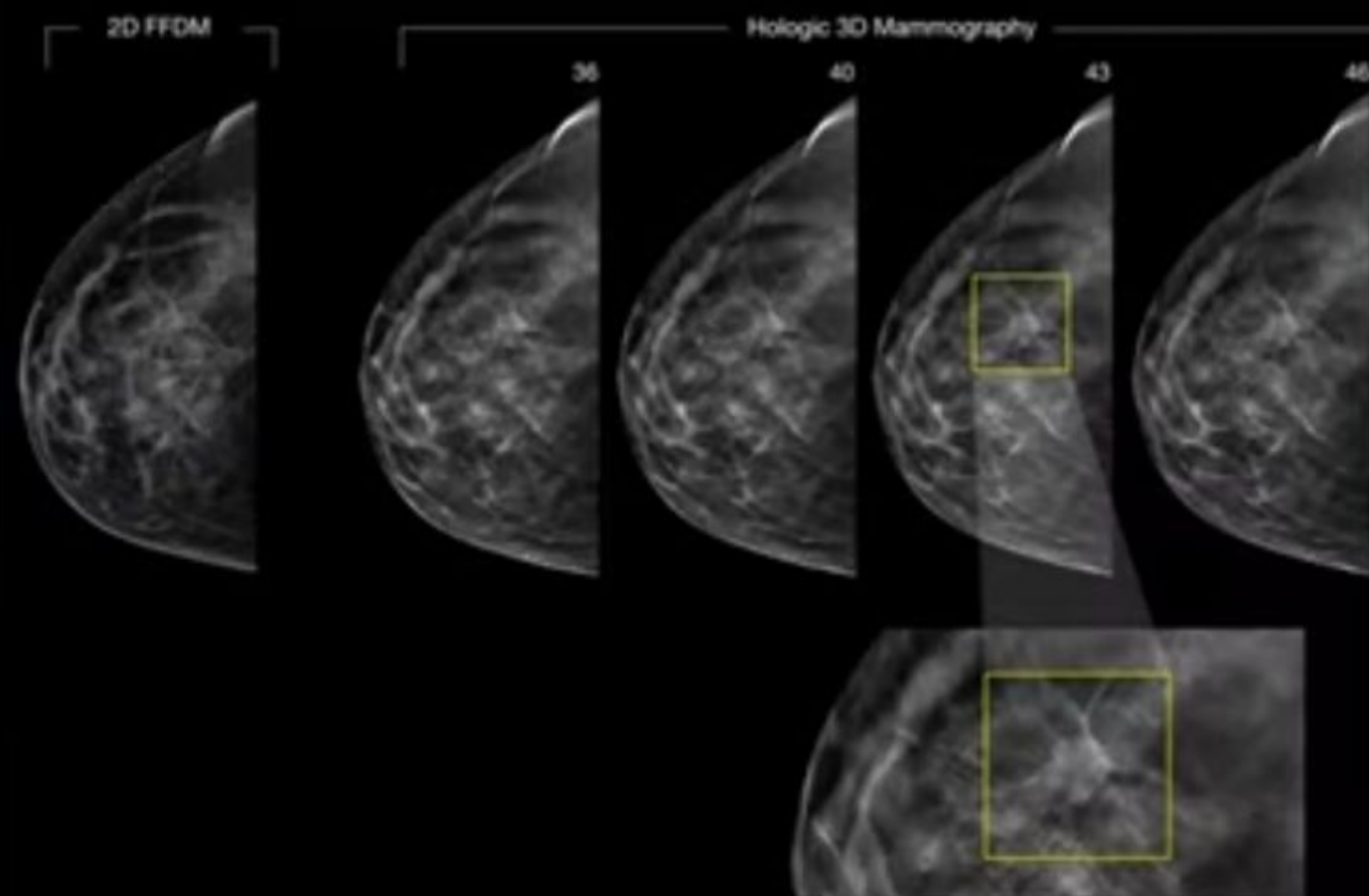


2000's
Digital
mammography



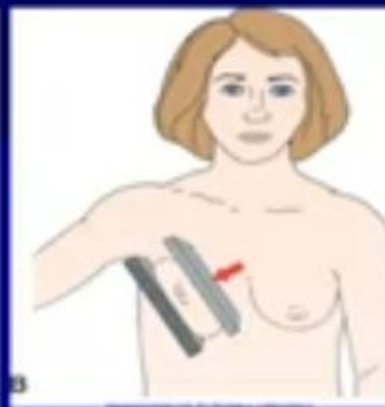
Present
Digital breast
tomosynthesis

A malignancy easily missed with conventional 2D mammography
was clearly seen with Hologic 3D Mammography

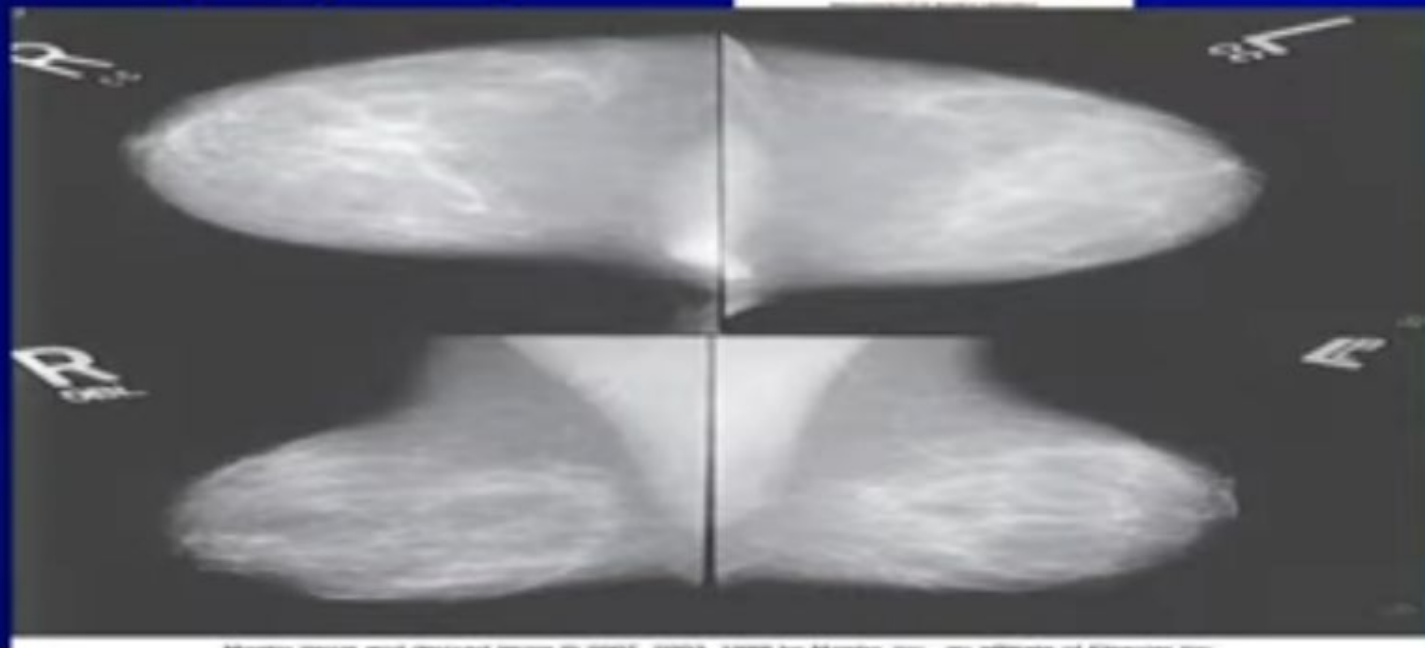


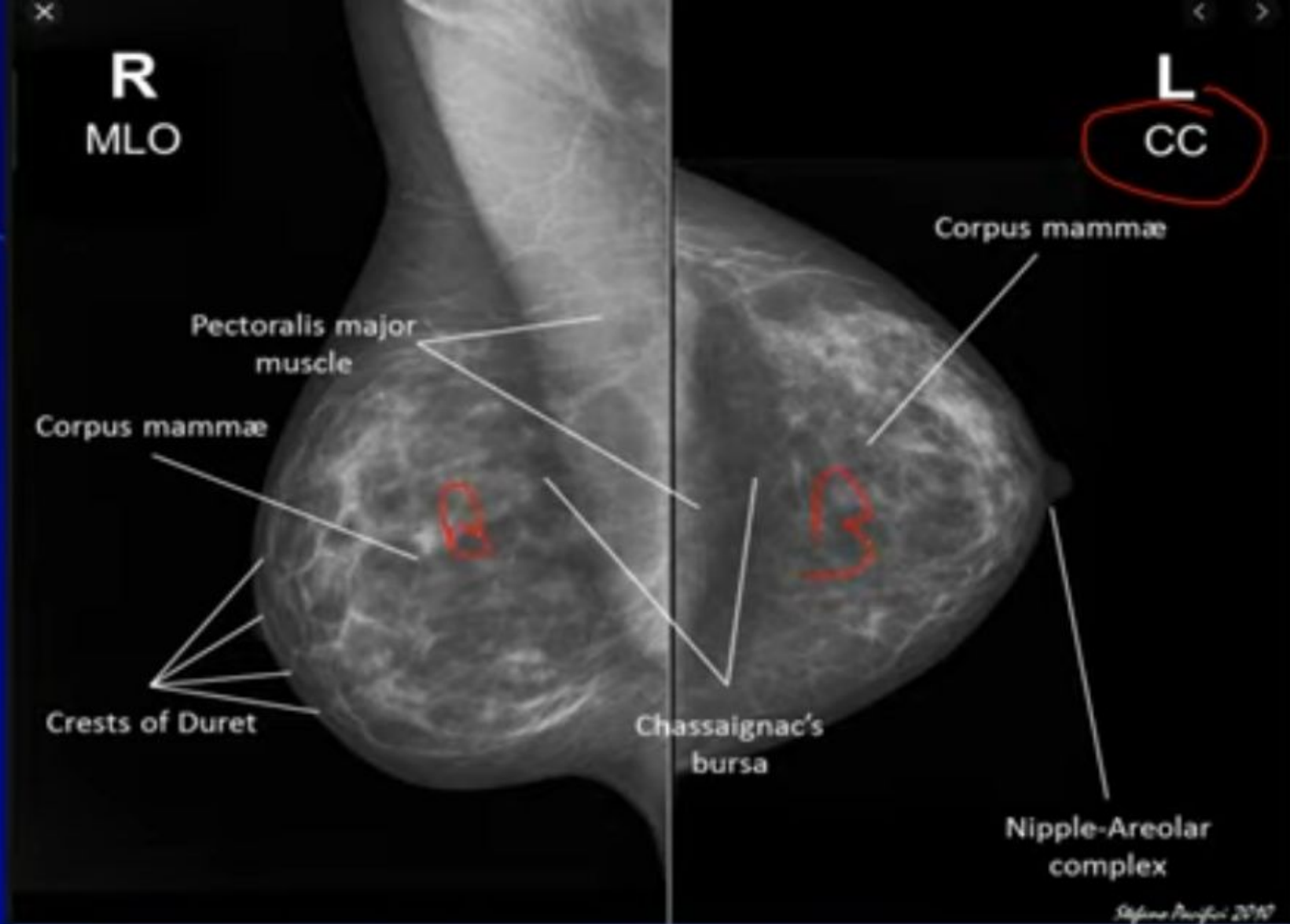
Routine mammography Views

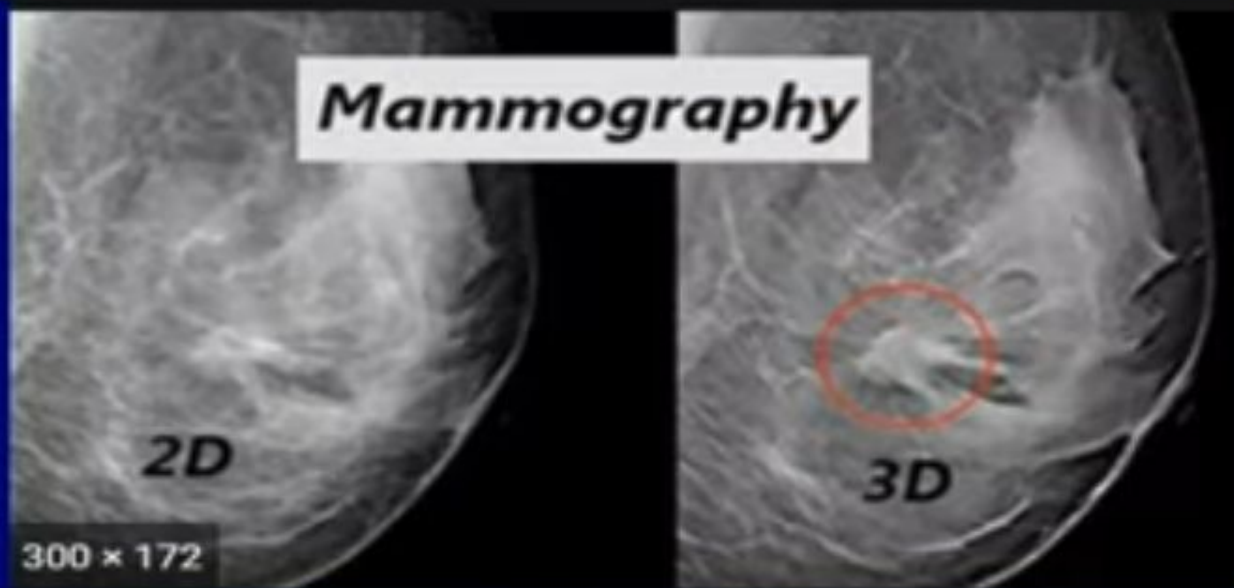
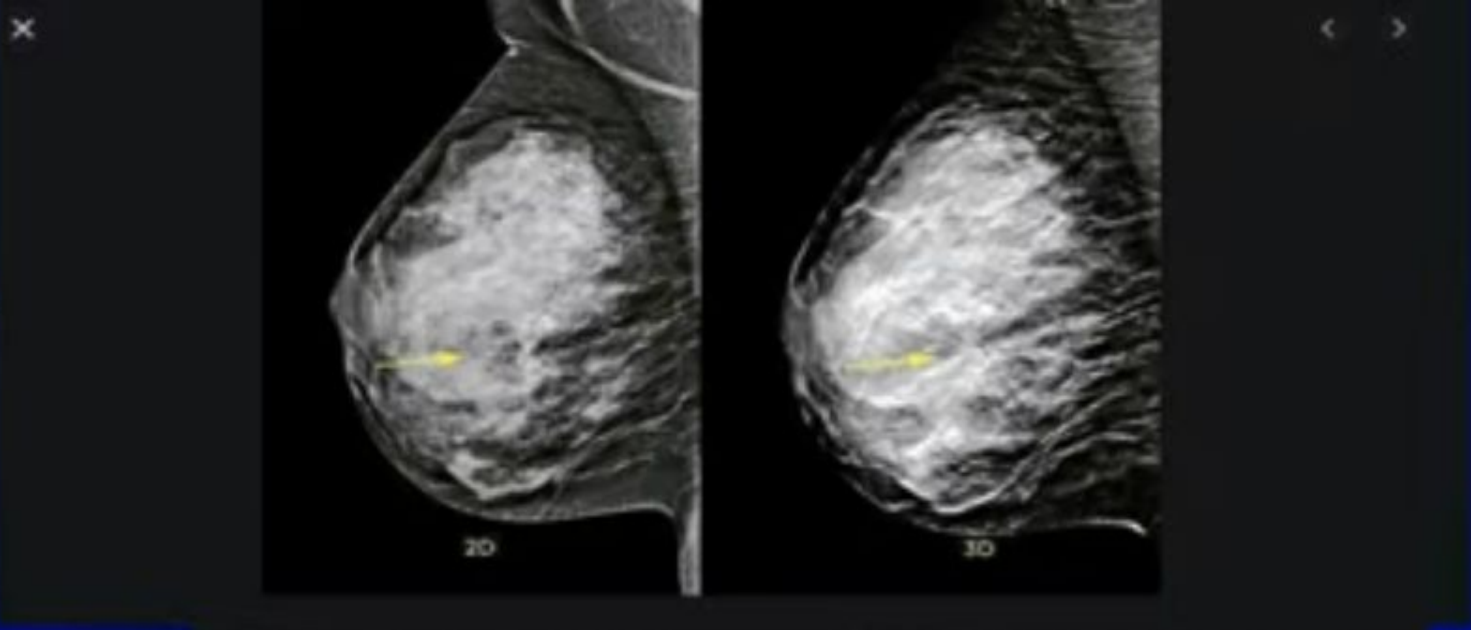
I. Cranio-caudal (CC)



II. Medio-lateral oblique (MLO)







■ Cytology/pathology in Diagnosis of Breast Cancer

■ **FNA cytology scale (0-5)**

➤ Sensitivity 95% , Specificity 95% .

■ Core biopsy.

■ Open biopsy.

■ MRI , PET.

■ Tumor markers CEA , CA 15.3, bone scan .

■ **MRI**

■ High sensitivity 95% for IDC less DCIS..

■ High risk population.

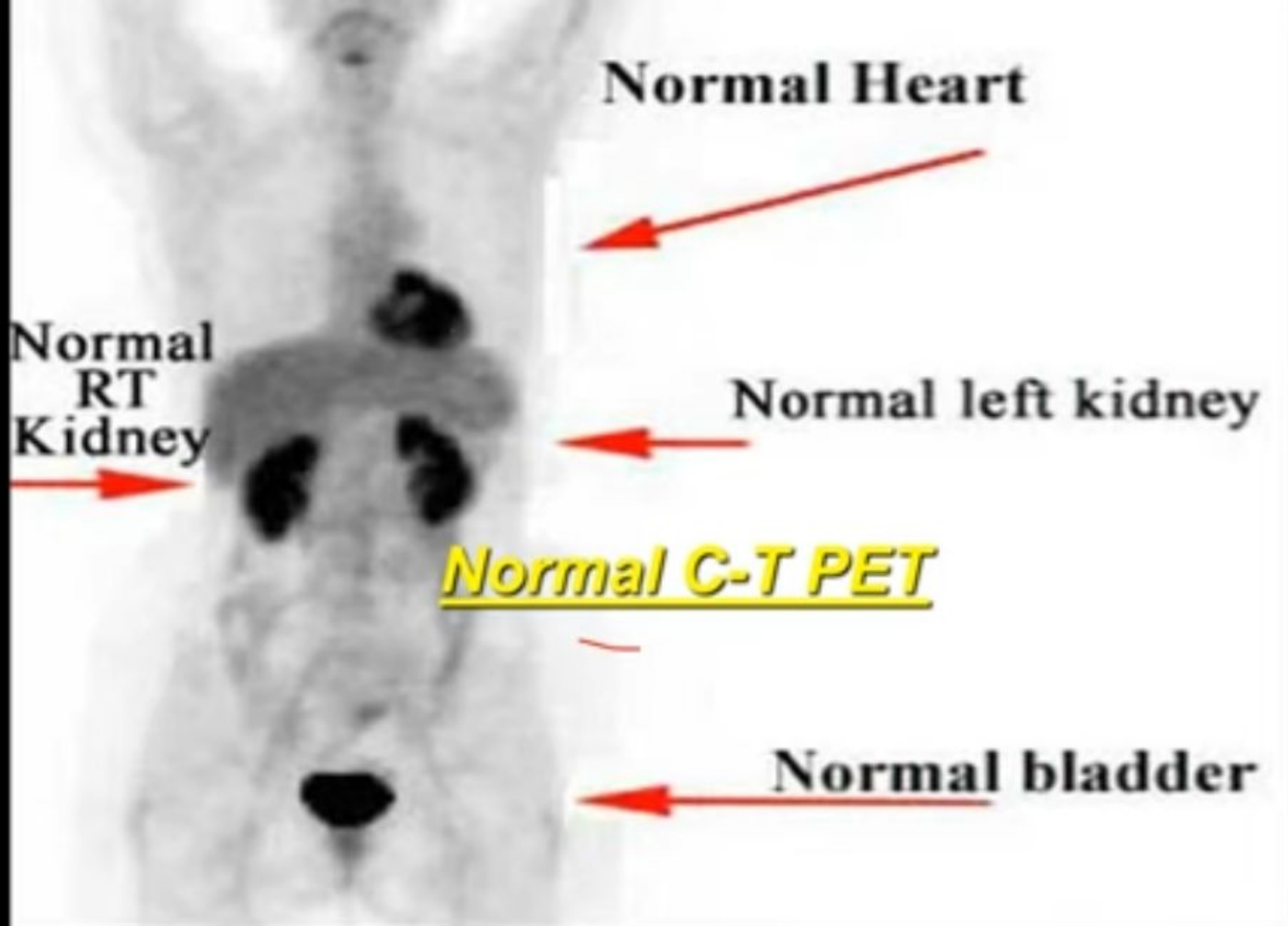
■ Low specificity.

■ Dense breasts.

■ **PET CT Scan.**

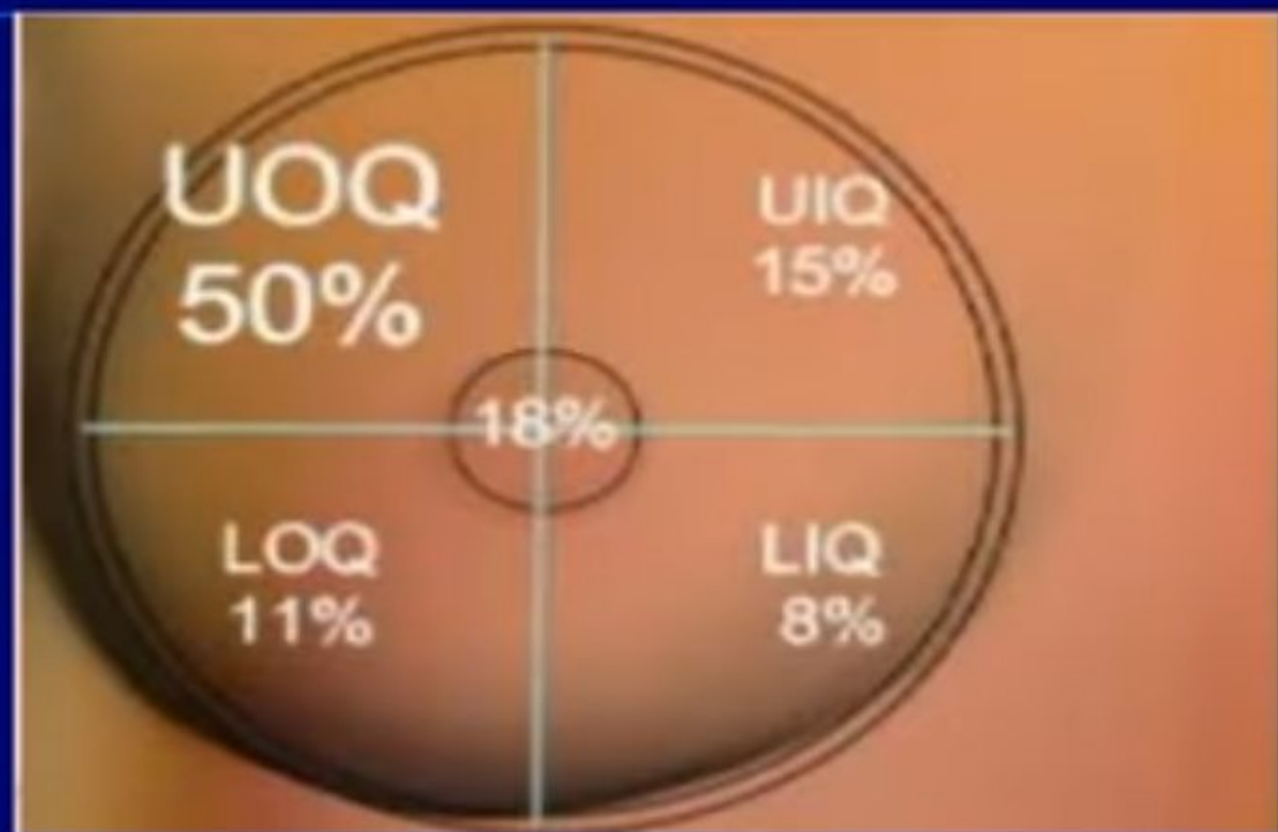
Other investigations

- CBC , LFTS
- Chest X-Ray .
- Serum calcium ESR Bone profile.
- Liver US.
- CEA,CA15.3 CA 125.



Pathology

- **Breast cancer arise from terminal duct-lobular unit.**
- **Localized to basement membrane are in situ DCIS , LCIS .**
- **Invasive cancer**
- **80% are No Special Type (NST).**
- **10% are Lobular**
- **5% Medullary , Mucoid, Papillary.**





Pathology of breast cancer (foot & stewart classification)

Breast cancer I

W.H.O. Classification of Carcinoma of the Breast

Noninvasive carcinoma

Ductal carcinoma *in situ*

Lobular carcinoma *in situ*

Paget's disease of the nipple (without mass)

Invasive carcinoma

Invasive ductal carcinoma -- 80%

Invasive lobular carcinoma -- 10%

Mucinous carcinoma -- 2%

Medullary carcinoma -- 5%

Papillary carcinoma -- 1%

Tubular carcinoma -- 1%

Adenoid cystic carcinoma

Secretory (juvenile) carcinoma

Apocrine carcinoma

Carcinoma with metaplasia (metaplastic carcinoma)

Inflammatory carcinoma



48:52 / 55:58



Pathology report

- Size of tumor.
- Type and grade (bloom –Richardson).
- Clearance of resection margins.
- Presence of tumor multi-focality.
- Lympho - vascular invasion.
- DCIS around tumor.
- Axillary lymph nodes.
- Hormone receptor status ER PR.

HER2

TNM CLASSIFICATION

- Primary tumor
- **Tis** Carcinoma in situ .
- **T1a** Tumor less than 0.5cm .
- **T1b** Tumor less than 1 cm .
- **T1C** Tumor less than 2 cm .
- **T2** Tumor 2-5 cm .
- **T3** Tumor more than 5cm .
- **T4** Tumor extension to chest wall and skin.

T.N.M. Staging

T (Tumor size):

Tx → Primary tumor can not be assessed & not palpable clinically (previous excision biopsy or unplanned resection)

T0 → No evidence of primary tumor

Tis → Carcinoma in situ

T1 → < 2cm (in greatest dimension)

Tmic → microinvasion ≤ 1mm

T1a → ≤ 0.5cm

T1b → 0.5 - 1cm

T1c → 1-2cm

T2 → 2-5 cm

T3 → > 5cm

T4 → any size with:

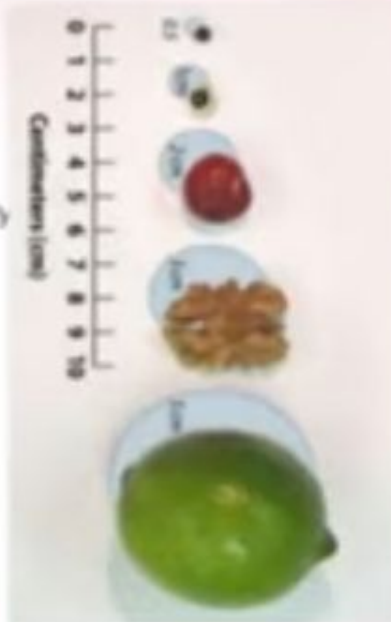
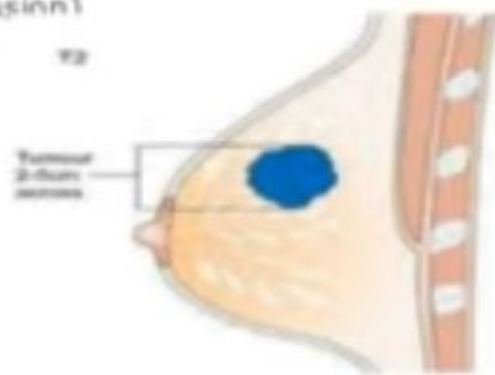
T4a → fixation to chest wall (ribs, pectoralis, intercostal muscles)

T4b → Skin involvement

peau d'orange - ulceration - fungation -satellite nodules

T4c → a & b

T4d → mastitis carcinomatosa



Continue

Regional lymph nodes N

- **No:** No lymph nodes
- **N1:** Mobile ipsi-lateral lymph nodes
- **N2:** Fixed ipsi-lateral lymph nodes
- **N3:** Metastasis to internal mammary, infra and supra clavicular lymph nodes .

Distant Metastasis M

- **M0:** No distant metastasis.
- **M1:** Distant metastasis.

N (L.N. status):- All → Ipsilateral

N_x

Regional L.N. cannot be assessed (previously removed)

N_0

No regional L.N. metastasis

N_1

Ipsilateral **mobile axillary** L.N.

N_2

Ipsilateral **fixed axillary** L.N. (fixed to one another or to other structures)

N_3

Ipsilateral **infraclavicular** L.N.

ipsilateral **internal mammary with axillary** L.N.

Ipsilateral **supraclavicular** L.N.

M (Metastasis):-

M_0 → No evidence of metastasis

M_1 →

Distant metastasis (Lung, Bone, Liver, Brain) .

Contralateral breast or L.Ns. .



Staging and prognostic factors

<u>Clinical staging</u>		<u>5 y survival</u>
<u>Stage I</u>	Tumor < 2cm T1N0M0 No LN metastasis	85%
<u>Stage II</u>	Tumor < 5 cm T1-2 N1 Nodes not fixed	66%
<u>Stage III</u>	Tumor > 5 cm Invasion of skin Supraclavicular LN	41%
<u>Stage IV</u>	Distant metastasis	10%

T.N.M. Staging

Stage 0

carcinoma in situ .

Stage I

T < 2 cm, no nodes .

Stage II

T 2 to 5 cm, +/- nodes .

Stage III

locally advanced disease, fixed lymph nodes and variable tumor size

Stage IV

distant metastases (bone, liver, lung, brain)

Stage 1

Early disease: tumour confined to the breast (node-negative)



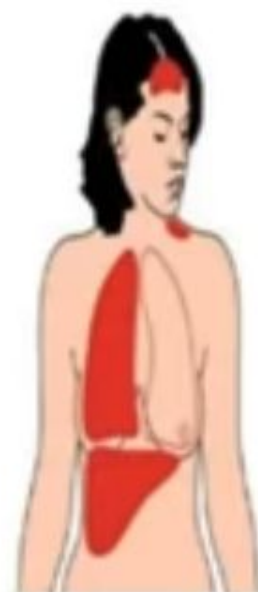
Stage 2

Early disease: tumour spread to movable ipsilateral axillary node(s) (node-positive)



Stage 3

Locally advanced disease: tumour spread to the superficial structures of the chest wall; involvement of ipsilateral internal mammary lymph nodes

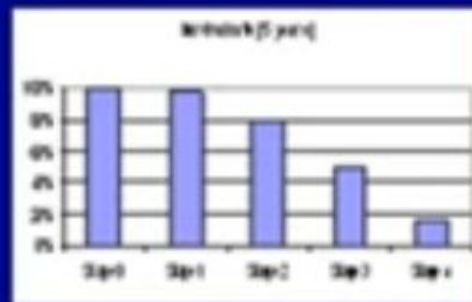
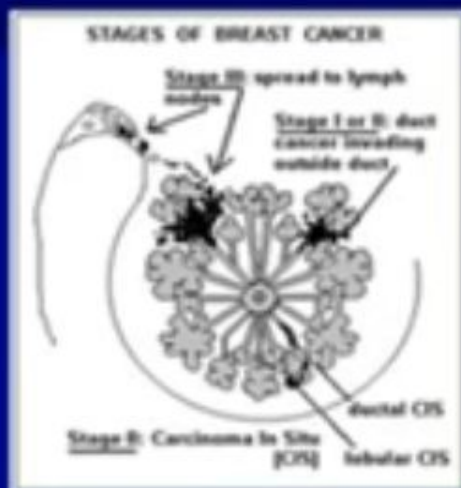


Stage 4

Advanced (or metastatic) disease: metastases present at distant sites, such as bone, liver, lungs and brain and including supraclavicular lymph node involvement

Stages of breast cancer

Stage	Tumor (T)	Node (N)	Metastasis (M)
Stage 0	Tis (LCIS, DCIS, Paget) P1	N0	M0
Stage I	T1 0-2	N0	M0
Stage IIA	T0	N1	M0
	T1	N1	M0
	T2-5	N0	M0
Stage IIB	T2	N1	M0
	T3-5	N0	M0
Stage IIIA	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1, N2	M0
Stage IIIB	T4	any N	M0
	any T	N3	M0
Stage IV	any T	any N	M1



Types of breast biopsy

- **FNAC.**
- **Tru Cut Core Biopsy.**
- **Stereotactic needle biopsy.**
- **Excision biopsy .**
- **Punch biopsy.**

Types of breast biopsy

- **FNAC.**
- **Tru Cut Core Biopsy.**
- **Stereotactic needle biopsy.**
- **Excision biopsy .**
- **Punch biopsy.**

III- Biopsy

FNAC (Fine Needle Aspiration)

.Can be done for non-palpable masses.

.FNAC takes individual cells

Does not show architecture

C0 No epithelial cells

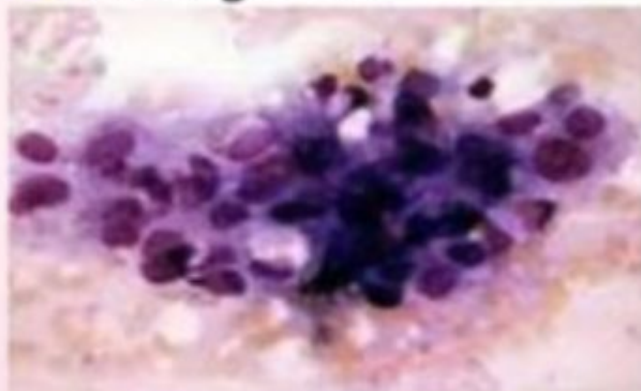
C1 Inadequate

C2 Benign

C3 Atypia

C4 Suspicious

C5 Malignant



❑ Fine Needle Aspiration Cytology (FNAC)

- e.g FNA of breast, thyroid, LN, Mass.



FNAC

FNAC

- It is done with 23gauge needle and material is collected on a slide ; a smear is made using 100% alcohol
- Minimum 6 aspirations are done
- Giemsa , pap, H&E stains are used

	FNAC	Mammography
Sensitivity	90-98%	90%
Specificity	98-100%	90%
False negative	2-10%	7%
False positive	Near 1-5%	10%

	FNAC Scoring
C ₀	No epithelial cells
C ₁	Scanty epithelial cells , benign
C ₂	Benign cells
C ₃	Atypical cells
C ₄	Suspicious cells
C ₅	Malignant cells

Cytological Diagnosis



- ▶ **C5: Malignant**
 - High nuclear to cytoplasmic ratio
 - Variable shape



- ▶ **C4: Suspicious for malignancy**
 - ▶ Atypical cells with a high nuclear to cytoplasmic ratio and moderate pleomorphism
 - ▶ benign groups and bipolar bare nuclei in the background



- ▶ **C3: Atypical**
 - Mild anisonucleosis and nuclear crowding may represent hyperplastic change
 - differential includes an atypical ductal or low grade *in situ* lesion

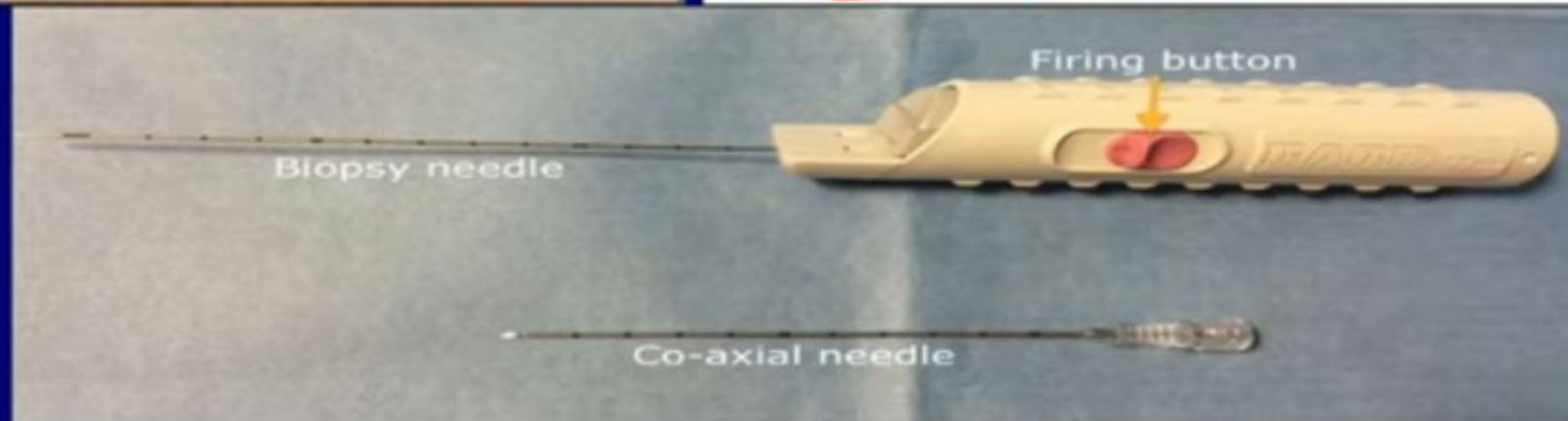
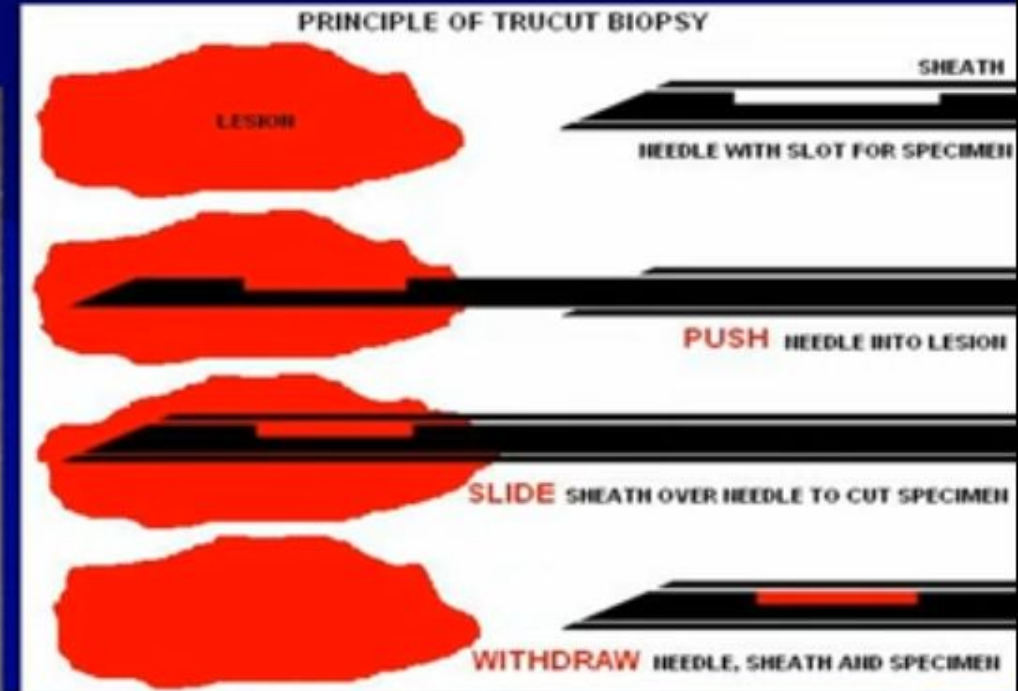


- ▶ **C2: Benign**
 - Benign group of ductal epithelial cells



- ▶ **C1: Inadequate**
 - Low cellularity specimen with blood and fragments of adipose tissue
 - At least 6 epithelial cell groups are required for C2 classification

Tru-cut biopsy



Tru-cut (Core Biopsy) Needle

Used for

- $T \geq 3$ cm
- operable cases candidate for mastectomy

B1 Normal tissue / unsatisfactory

B2 Benign

B3 Lesion uncertain malignant potential

B4 Suspicion of malignancy

B5a In situ malignancy

B5b Invasive malignancy

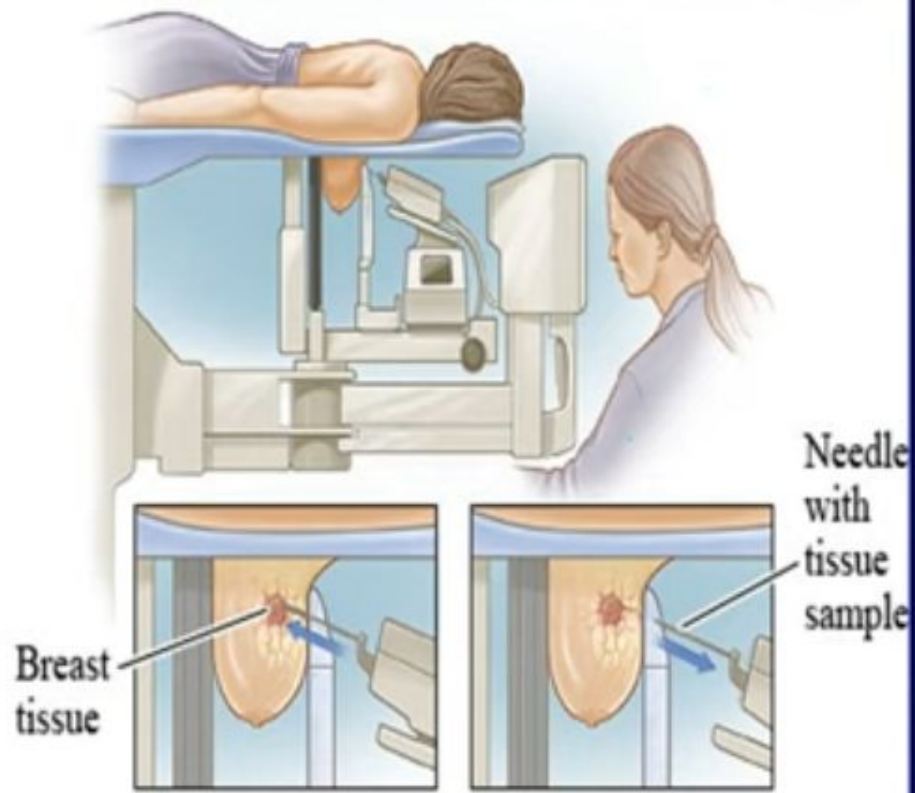


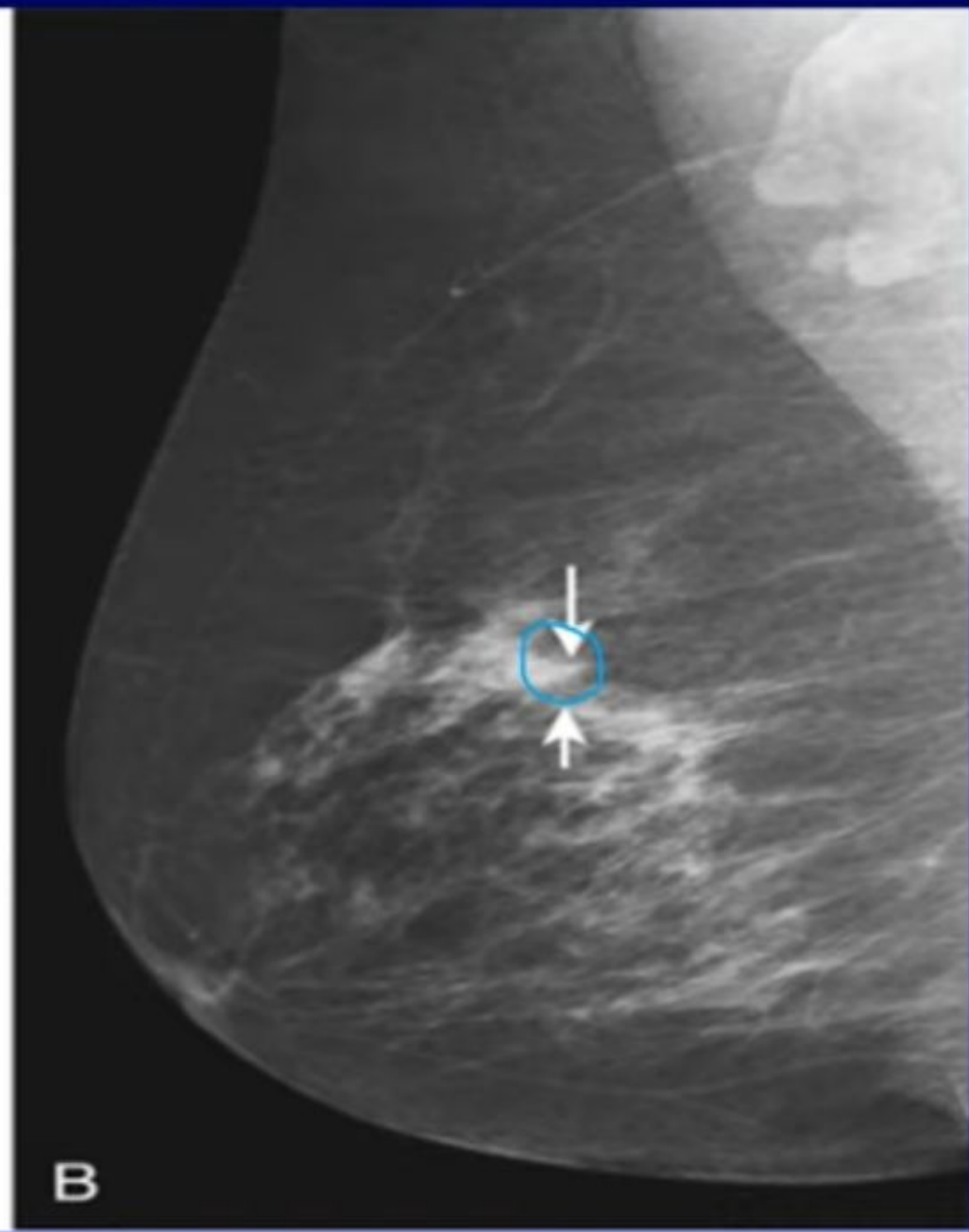
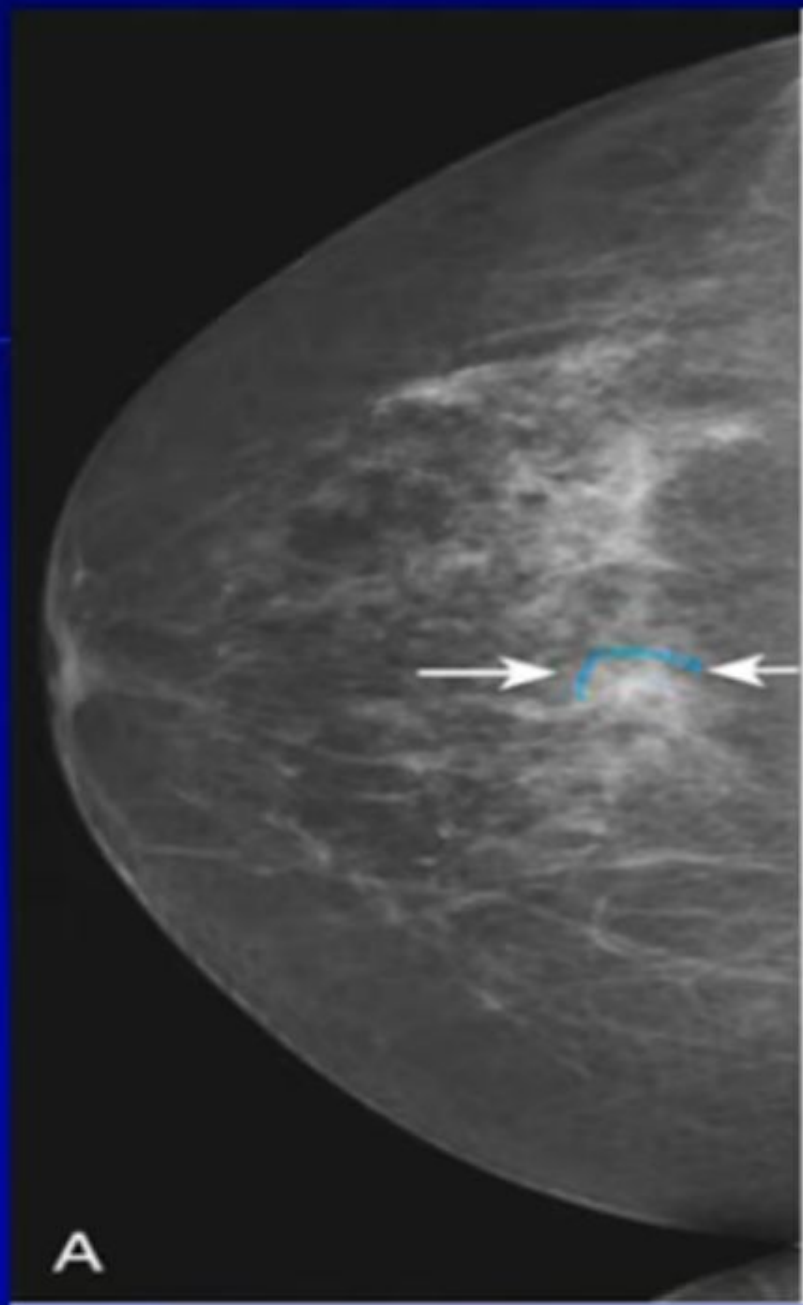
(a)



(b)

Stereotactic needle biopsy





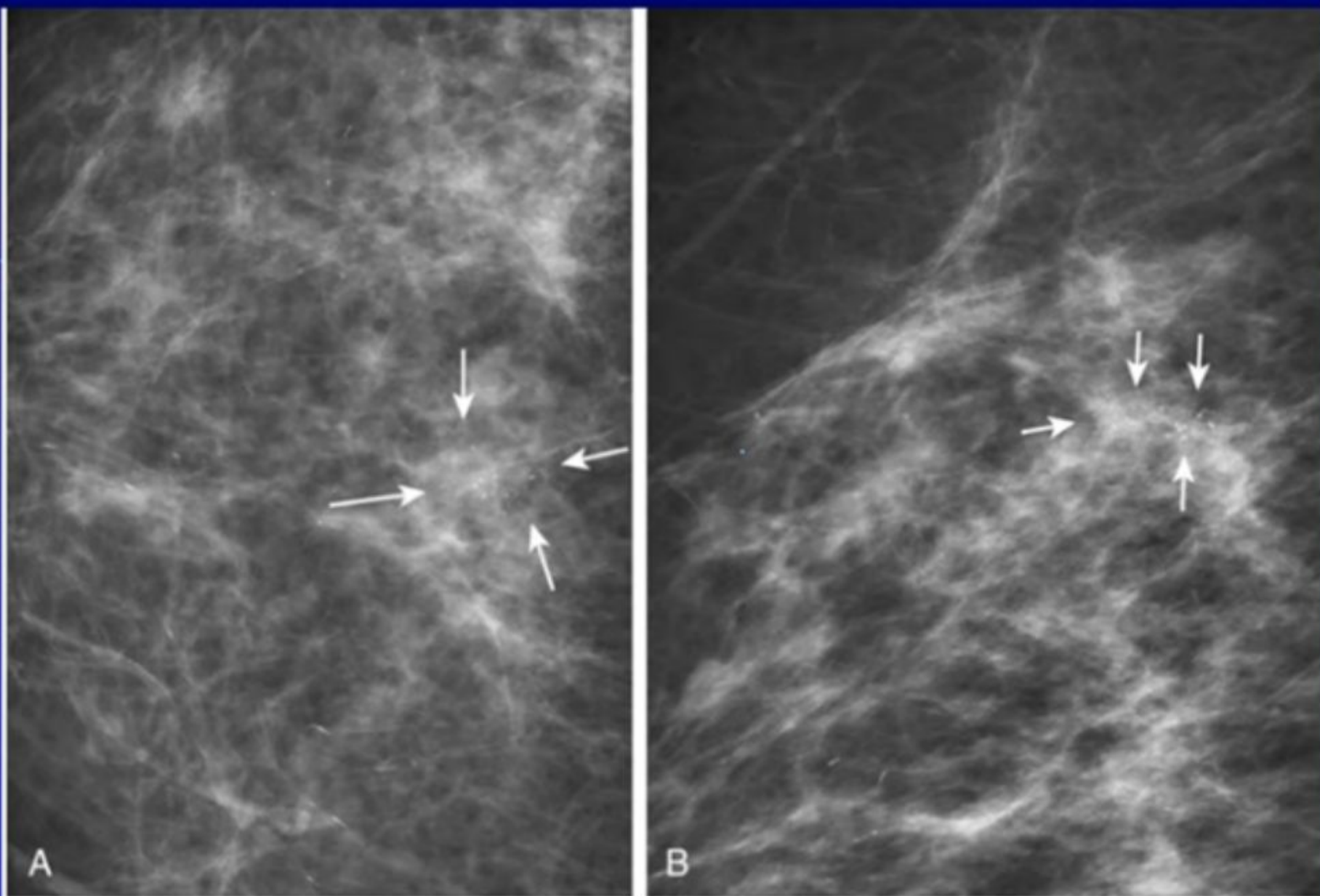


FIGURE 2  Right magnification mammogram views (craniocaudal [A] and lateral [B])—r...

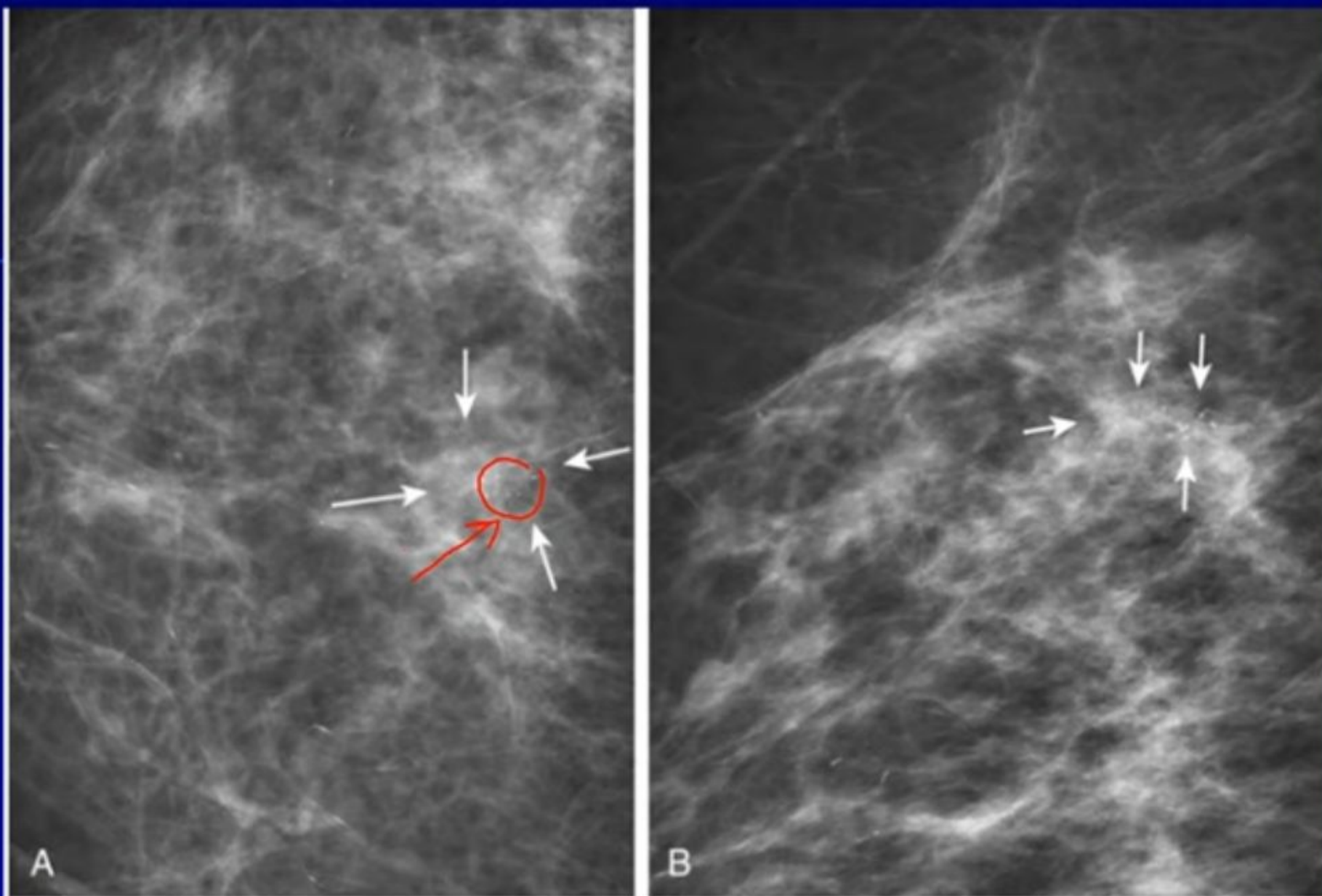


FIGURE 2  Right magnification mammogram views (craniocaudal [A] and lateral [B])—r...

Carcinomas in situ

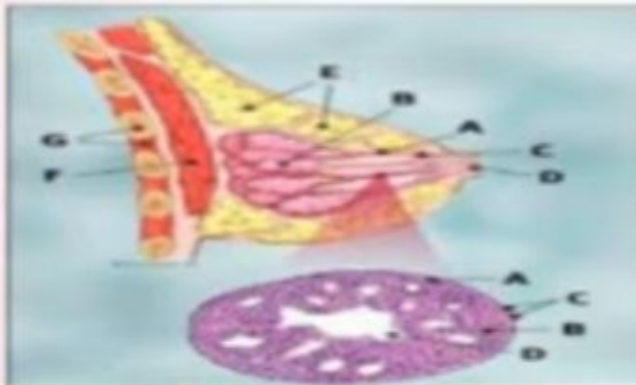
- *DCIS* 70 - 75 %
- *LCIC* 25 %
- Paget's disease of nipple without mass 1-2 % .

Carcinoma in situ

(doesn't penetrate the basement membrane)

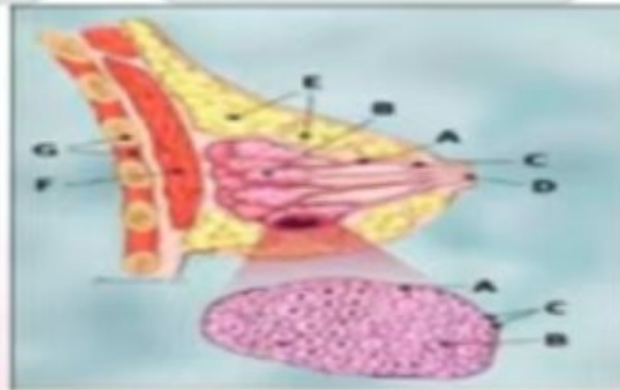
Ductal carcinoma in situ

- originat from terminal duct lobular units
- C/P: mass . pain . discharge
- ipsilateral
- common(25-70%)



Lobular carcinoma in situ

- no clinical sign
- no microcalcifications by mammogram
- bilateral
- less(25-35)



paget disease

- Affecting nipple and areola
- Eczema like condition
- female >40
- 1-2% of breast cancer



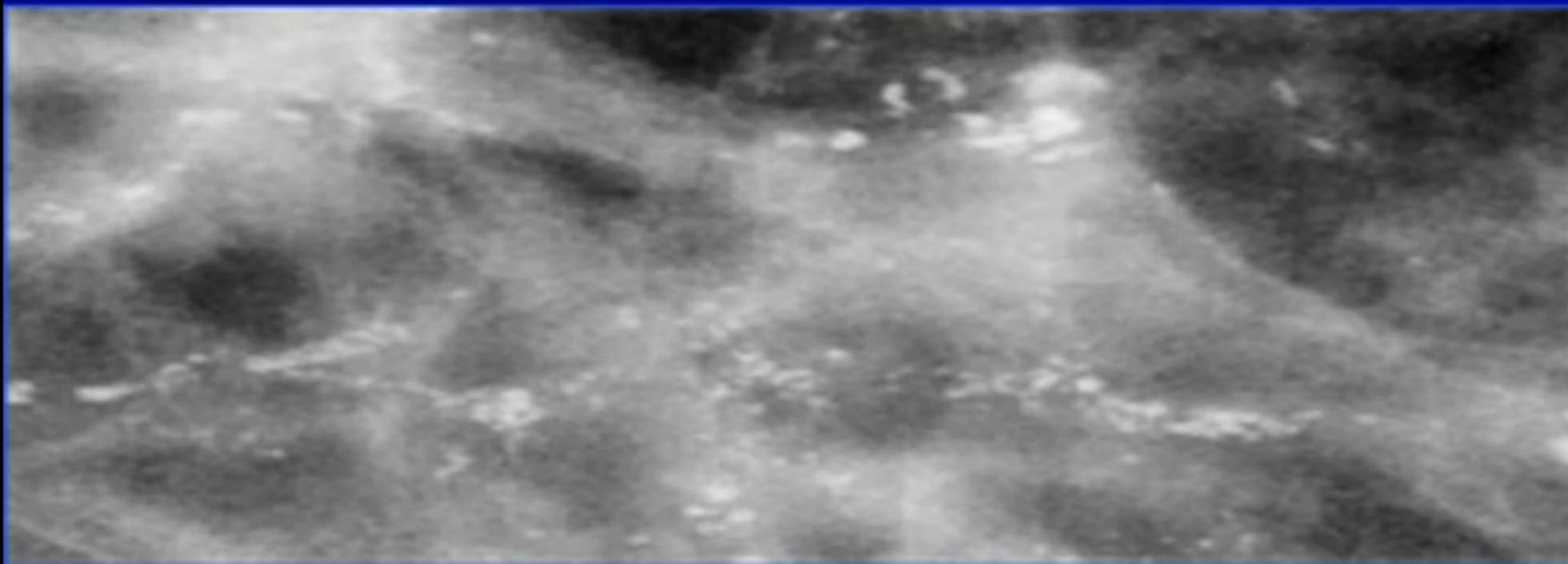
Carcinomas in situ

LOBULAR CARCINOMA IN SITU

- Not true malignancy.
- Cancer risk is 1%.
- 2/3 in Ipsilateral breast.
- Bilateral in 30%, multifocal in 50%.
- Monthly BSE, Biannual CBE ,Annual Mamo.
- 5 Years prophylactic tamoxifen.
- No rule for local excision, chemo-radiation.

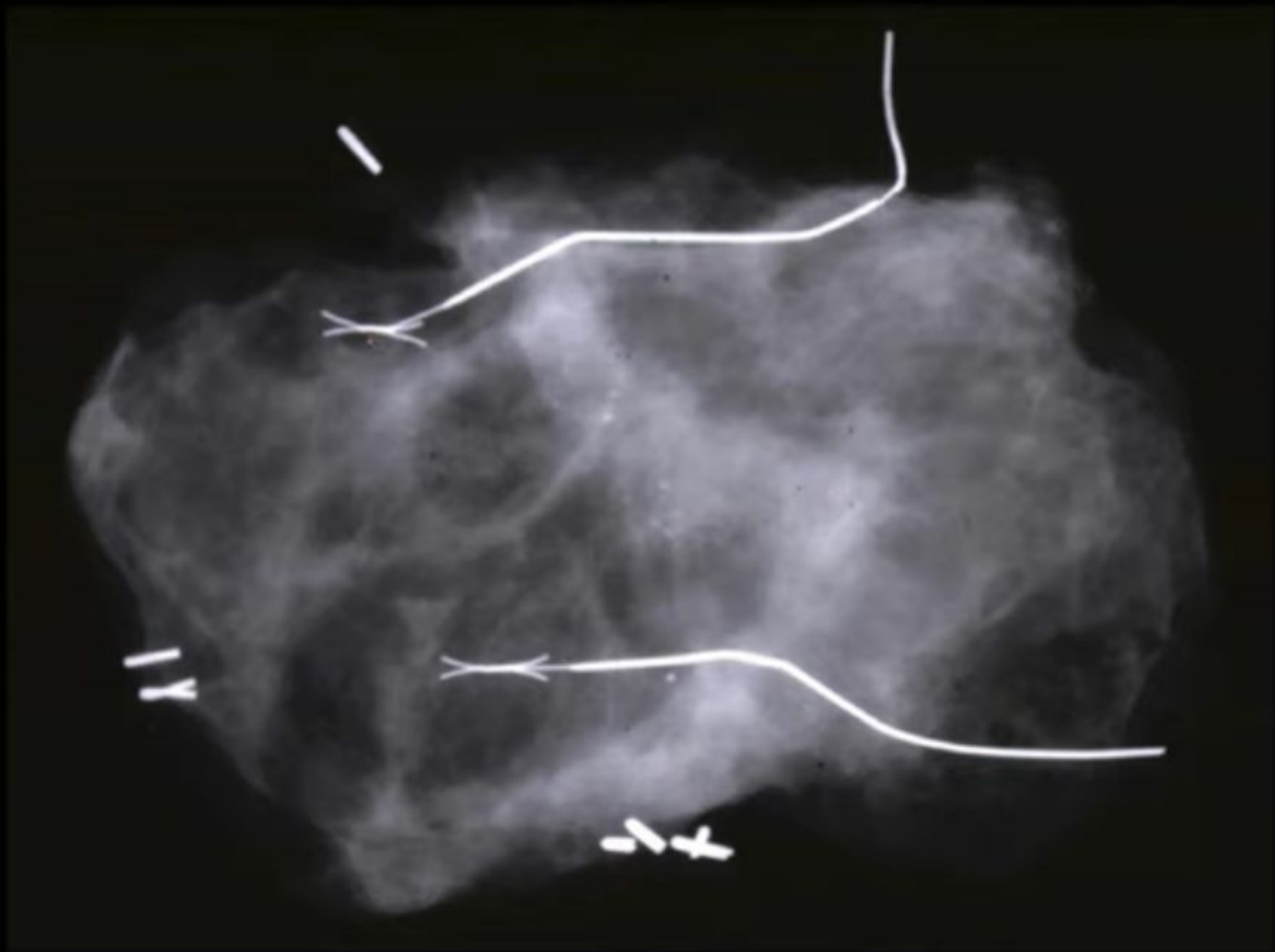
DCIS

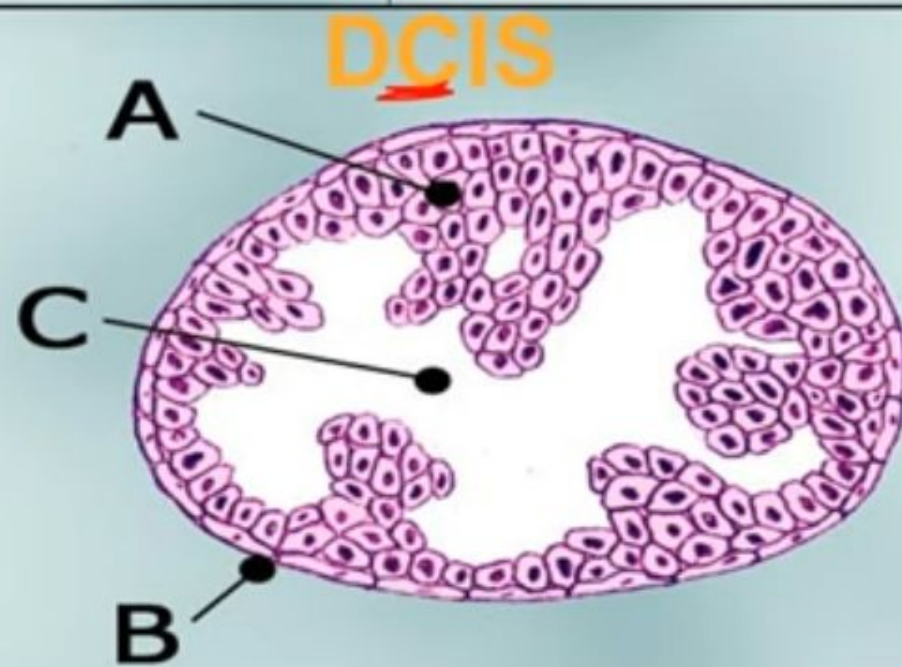
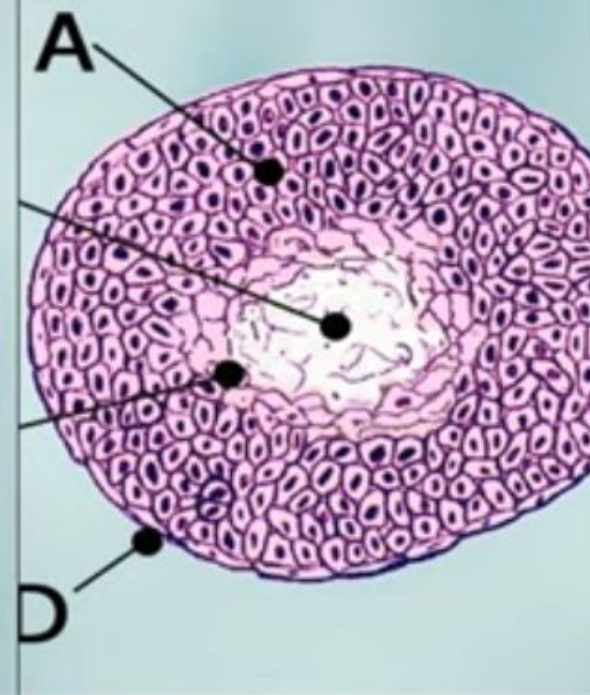
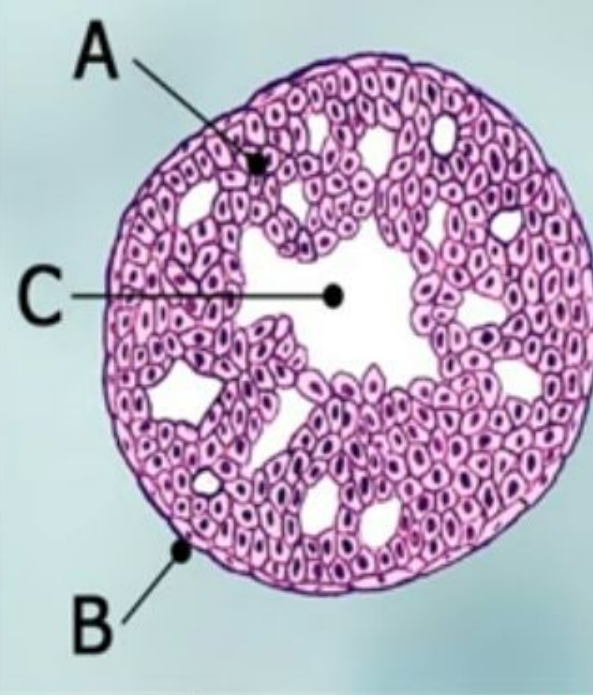
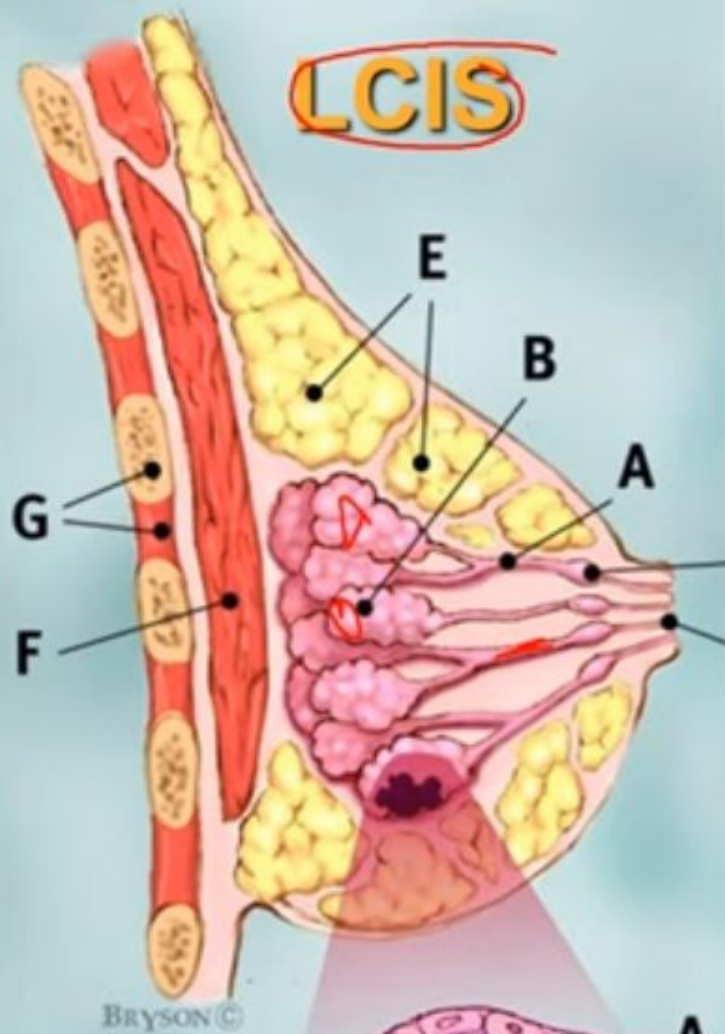
- Impalpable disease .
- Majority asymptomatic .
- 75%-85% present as micro - calcification .



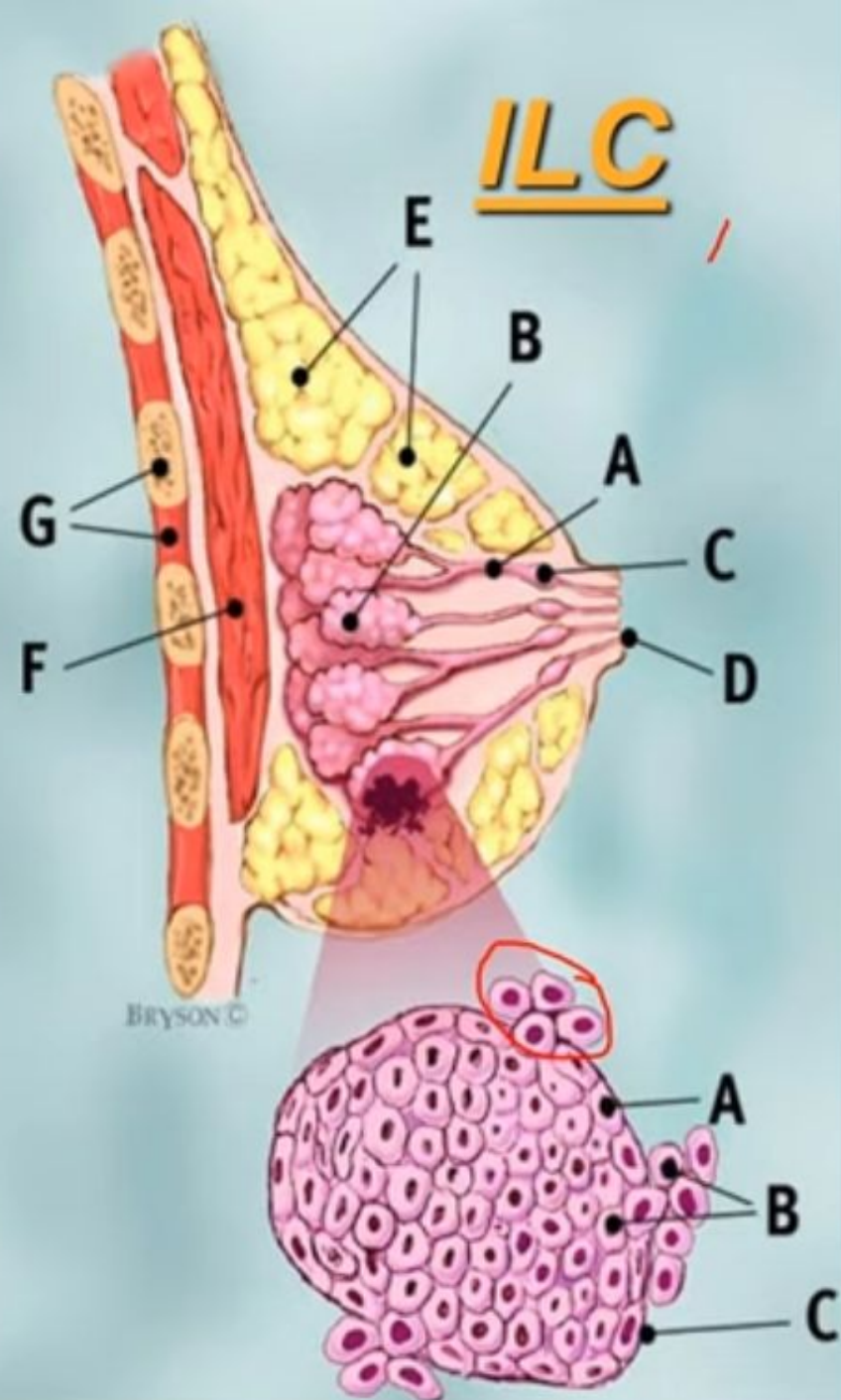
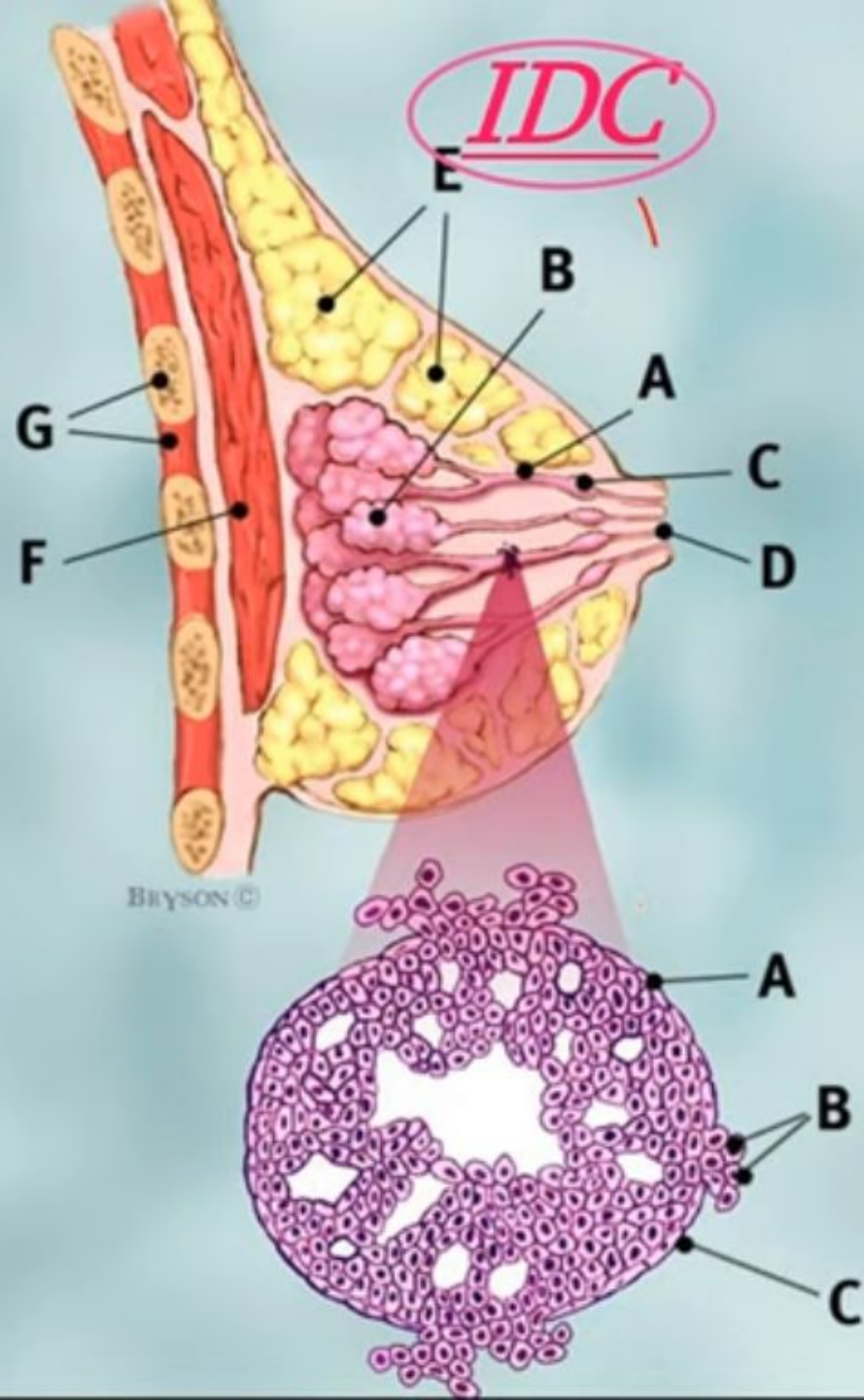
Ductal carcinoma in situ

- **M cells in Ductal system, no stromal invasion.**
- **Abnormal calcification in Mammos .**
- **Lymph node Mets < 1% .**
- **BCS , RT, AND ,Tamoxifen .**
- **Estrogen receptor status is important .**





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Van Nuys Prognostic Index (VNPI)

	SCORE GIVEN		
PROGNOSTIC INDICATOR	1	2	3
Size of lesion (mm)	< or = 15	16-40	> or = 41
Margin width (mm)	> or = 10	1-9	<1
Pathological Classification	Non high grade without necrosis	Non high grade with necrosis	High grade with necrosis

Modified Van Nuys Prognostic Index

<u>Score</u>	<u>1</u>	<u>2</u>	<u>3</u>
Size (cm)	≤ 1.5	1.6 - 4.0	≥ 4.1
"Group"	- necrosis	+ necrosis	G3
Margins (mm)	>10	1 - 9	<1
Age	>60	40-60	<40

Total Score

4 - 6	lumpectomy alone
7 - 9	lumpectomy + XRT
10 - 12	mastectomy

Problems

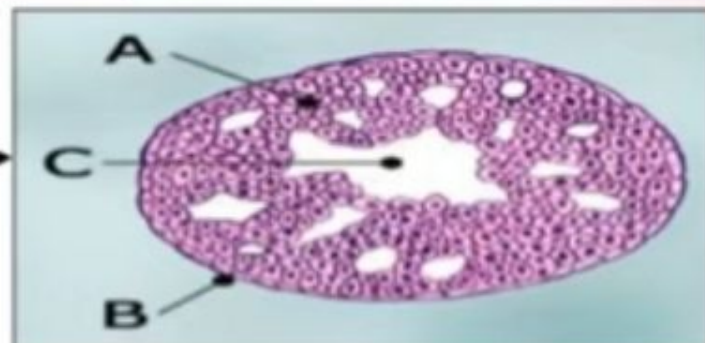
- Not validated on external datasets
- Model revisions have likely resulted in over-fitting on the training dataset
- Only a small minority of all DCIS patients fall at either extreme

DCIS TYPES

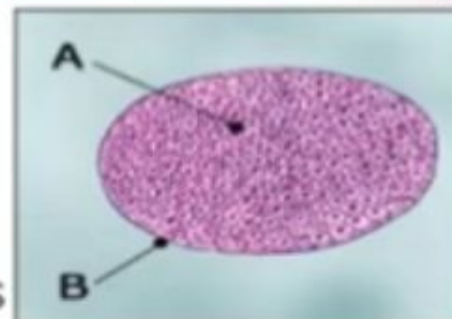
Papillary Subtype



Cribiform Subtype

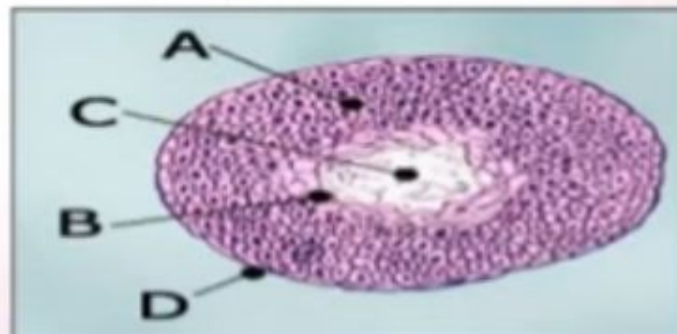


Solid Subtype



Comedo Subtype

More malignant than non-comedo subtypes
(40% progress to invasive type)

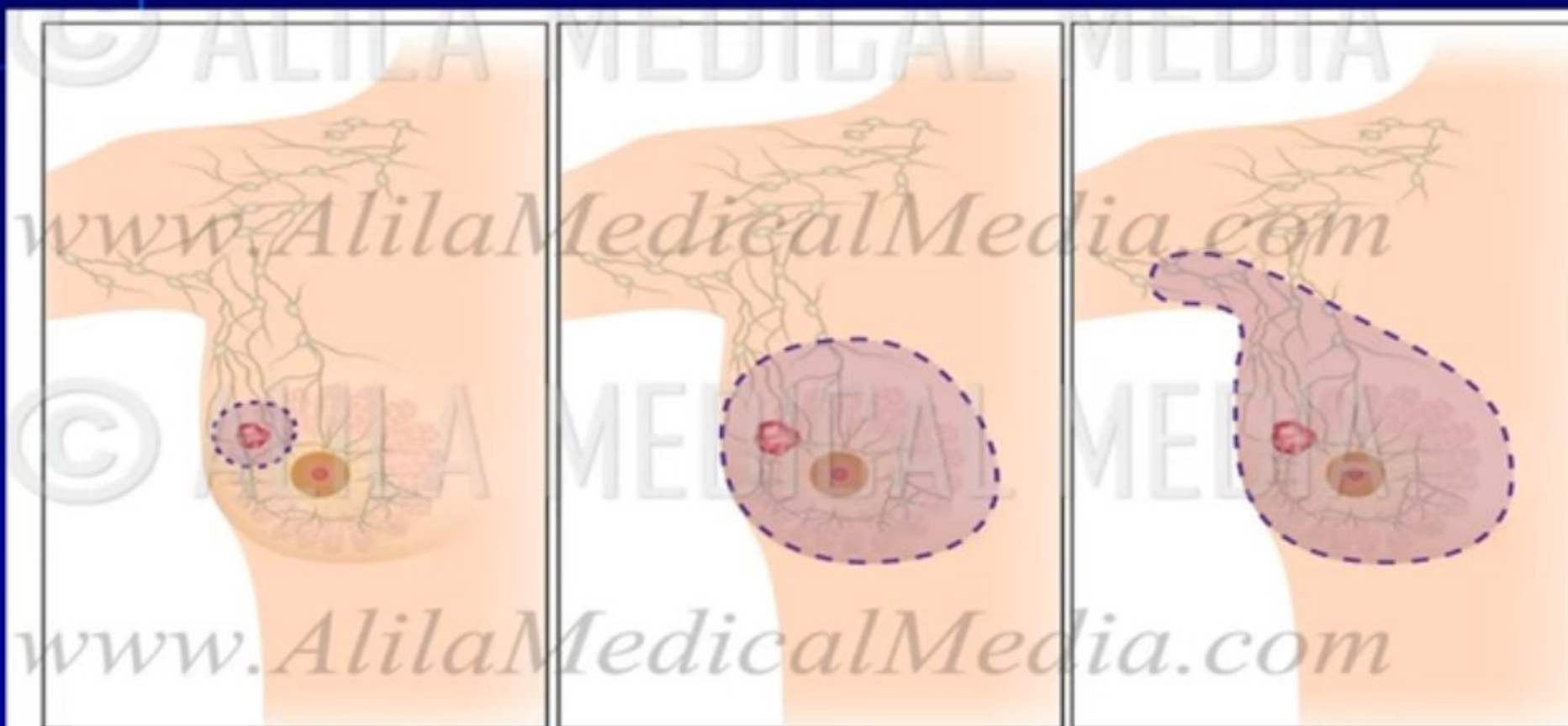


Management options

Surgery : *is crucial element in multi-disciplinary treatment of breast cancer.*

- *Main benefit is to achieve loco-regional control of existing disease.*
- *Reduce the risk of loco-regional recurrence.*
- *Combination with chemo-radiotherapy less aggressive surgery is needed on breast and axilla.*

Types of mastectomy



Lumpectomy

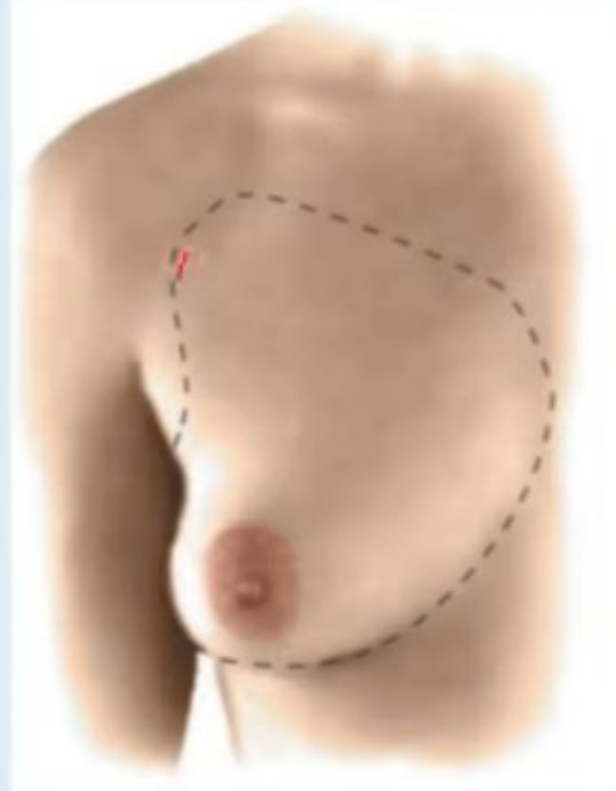
Total Mastectomy

Modified Radical
Mastectomy

Types of mastectomy

1. Total or simple mastectomy:

- Removal of the entire breast tissue,
- No dissection of lymph nodes or removal of muscle.
- Sometimes adjacent lymph nodes are removed along with the breast tissue.

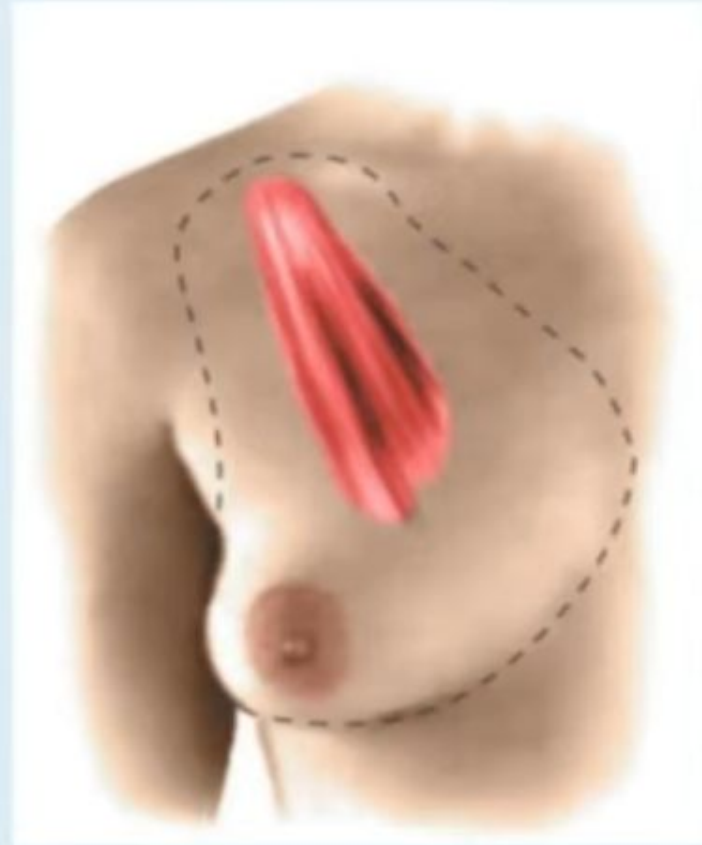


Types of mastectomy

2. Modified Radical

Mastectomy (MRM):

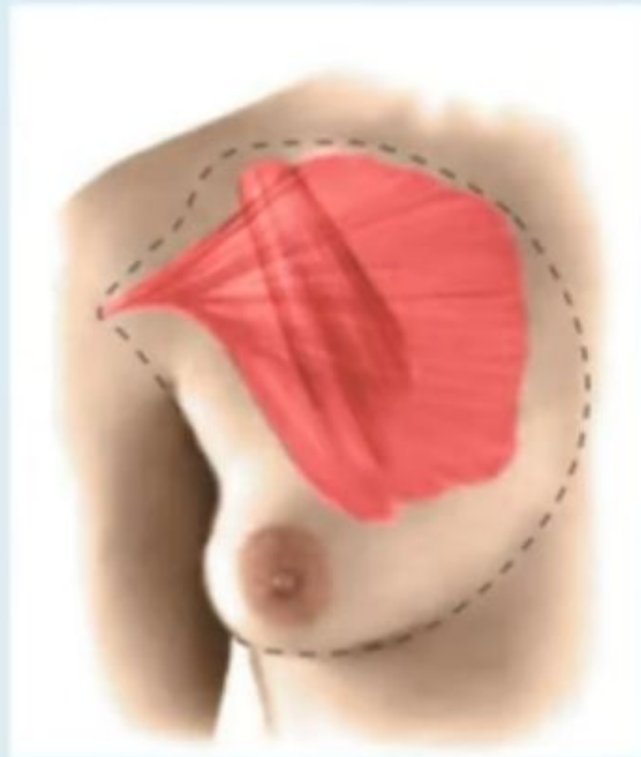
- Removal of breast tissue and axillary lymph nodes.
- No removal of pectoral muscle.
- 3 modifications:
 - a. Patey's
 - b. Scanlon's.
 - c. Auchincloss.



Types of mastectomy

3. Halsted's Radical Mastectomy:

- Most extensive type.
- Breast tissue, axillary lymph nodes and pectoral muscles are removed.
- Disadvantages:
 - Bad scars and unacceptable deformity.
 - Reduced range of mobility of shoulder



Breast conservation:

- **Small tumor 4-5 cm large breast.**
- **Peripheral location.**
- **No multi-centricity.**
- **No extensive LN involvement no Metz.**
- **Removal of tumor with one cm of surrounding normal breast tissue.**
- **Axillary lymph node clearance.**
- **Post op radiotherapy.**
- **Post op chemotherapy.**



Types of Skin-Sparing Mastectomy Incisions



Round Periareolar



Small Elliptical Periareolar



Small Elliptical Periareolar



Periareolar with Lateral Extension

Methods / Techniques of Breast Cancer Surgery

Breast-Conserving Surgery



Lumpectomy



Wide Excision



Quadrantectomy

Breast Removal



Mastectomy

5. BREAST CONSERVATIVE SURGERIES

1. *Wide Local Excision (WLE)/ Partial Mastectomy*

Removal of unicentric tumour with 1cm clearance margin.

Incision: Over tumour + Axillary Dissection + RT

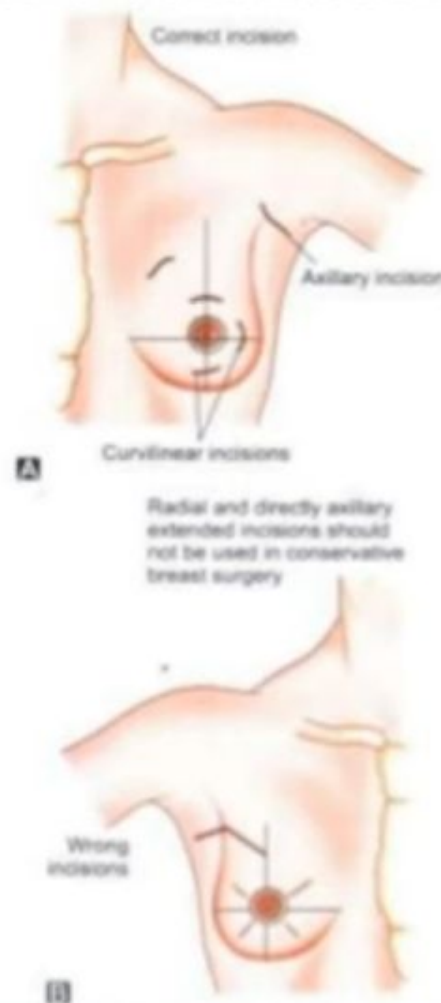
2. *Quadrantectomy:*

Removal of entire quadrant with ductal system with 2-3cm normal breast tissue clearance. Part of QUART Therapy (Quadrantectomy + Axillary dissection + RT)
Not advocated now.

3. *Skin Sparing Mastectomy*

4. *Lumpectomy (=WLE)*

Term rarely used



Figs 8.84A and B: Curvilinear incision should be placed in conservative breast surgeries. Never place wrong radial incisions because if conversion to total mastectomy is needed then placement of incision will be difficult. In conservative breast surgery for axillary dissection separate incision in the axilla should be advised.

Mastectomy

A. Traditional Non Sparing Mastectomy

1. Super (Extended) radical (Urban)
2. Radical mastectomy (Halstedt)
3. Modified radical mastectomy
 - Patey's operation
 - Auchen-closs operation
4. Total mastectomy
5. Simple mastectomy
6. Toilet mastectomy

B. Sparing Mastectomy

1. Skin sparing mastectomy (S.S.M)
2. Nipple sparing mastectomy (**N.S.M**)
3. Subcutaneous mastectomy



Subtype	Characteristics	Markers
Luminal A	Low grade High ER ~40% of all breast cancer Good prognosis	ER+, PR+, HER2- Low Ki-67 (<14%)
Luminal B	Higher grade Lower ER ~20% of all breast cancer Poorer prognosis than luminal A	ER+, PR+/-, HER2+/- High Ki-67 (>14%)
HER2-enriched	High grade Often node positive <i>P53</i> mutations ~10%-15% of all breast cancer	ER-, PR-, HER2+
Basal-like	High proliferation <i>BRCA</i> dysfunction ~15%-20% of all breast cancer Poor prognosis	ER-, PR-, HER2- CK5/6 Or EGFR+

Continue

Patey mastectomy(modified radical mastectomy)

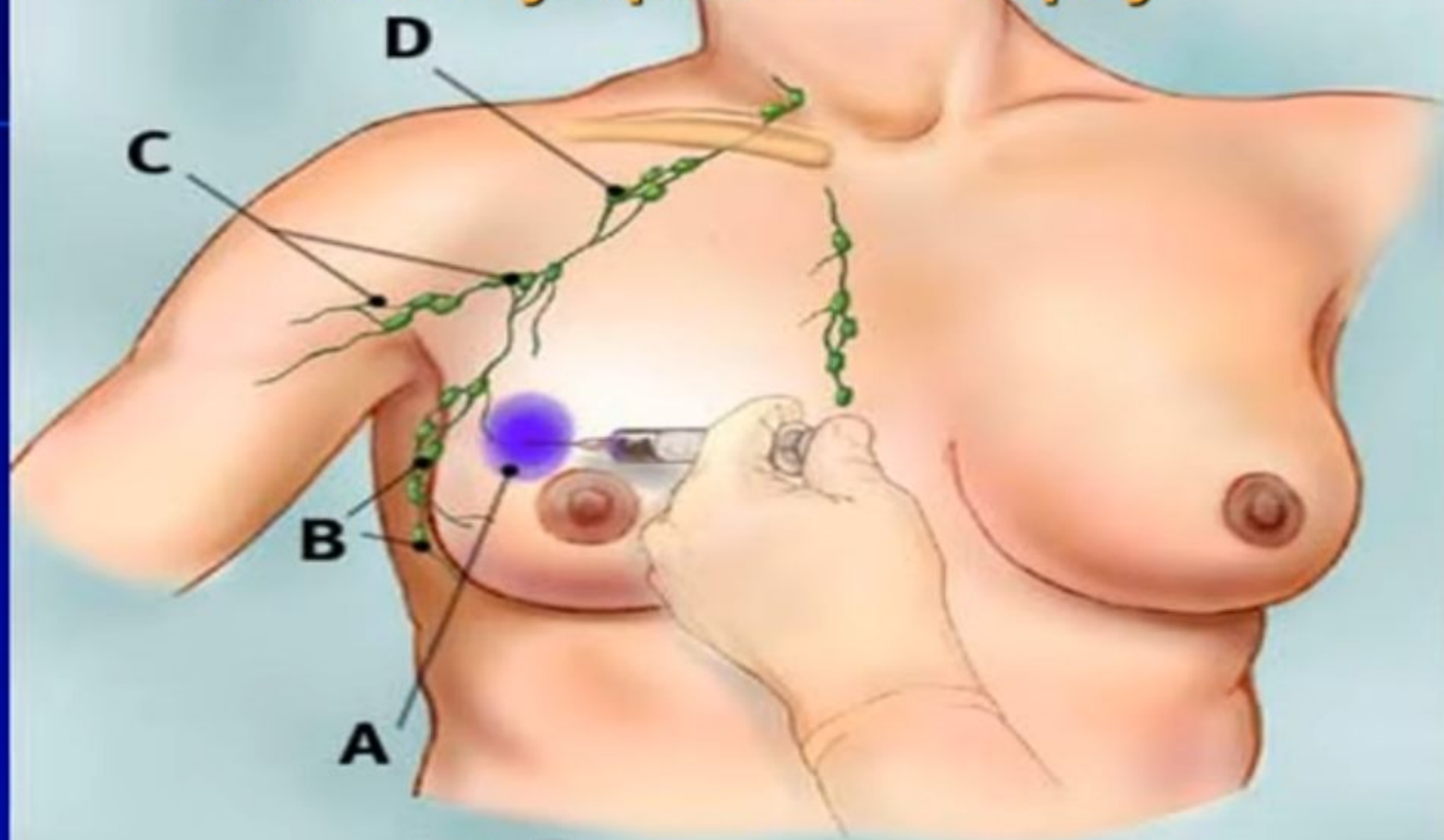
- Multifocal disease Large tumor more than 4-5 cm
- Central lesion.
- Small breast.
- Patient wish.
- Nipple involvement.

Axillary dissection

Level of Axillary dissection

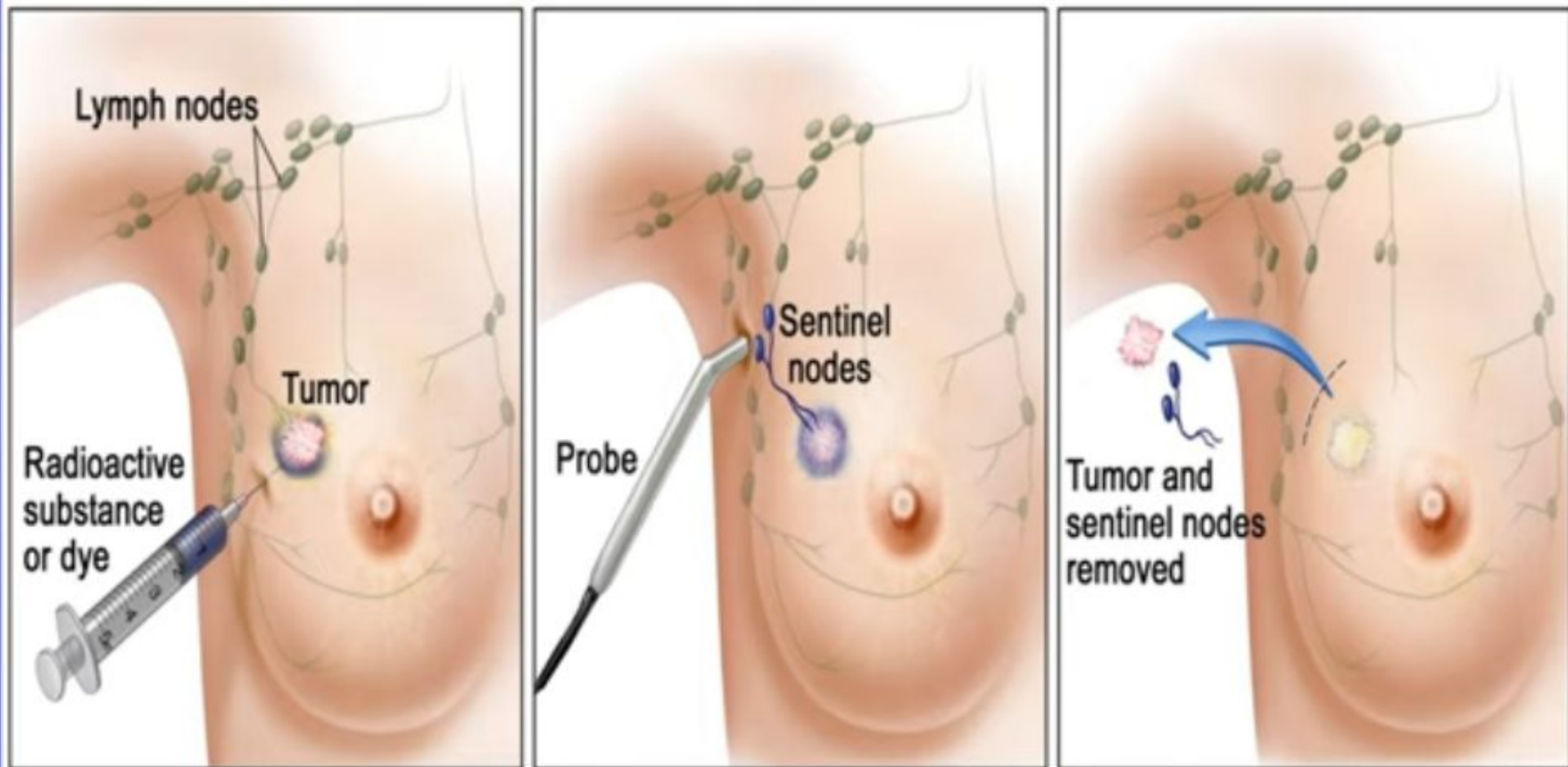
- Level I : Lateral to pectoralis minor
- Level II Behind pectoralis minor
- Level III Medial to pectoralis minor(apex)
- Sentinel lymph node biopsy 95%
- Axillary node sampling
- Axillary node clearance
- Internal mammary lymph 5%

Sentinel lymph node biopsy

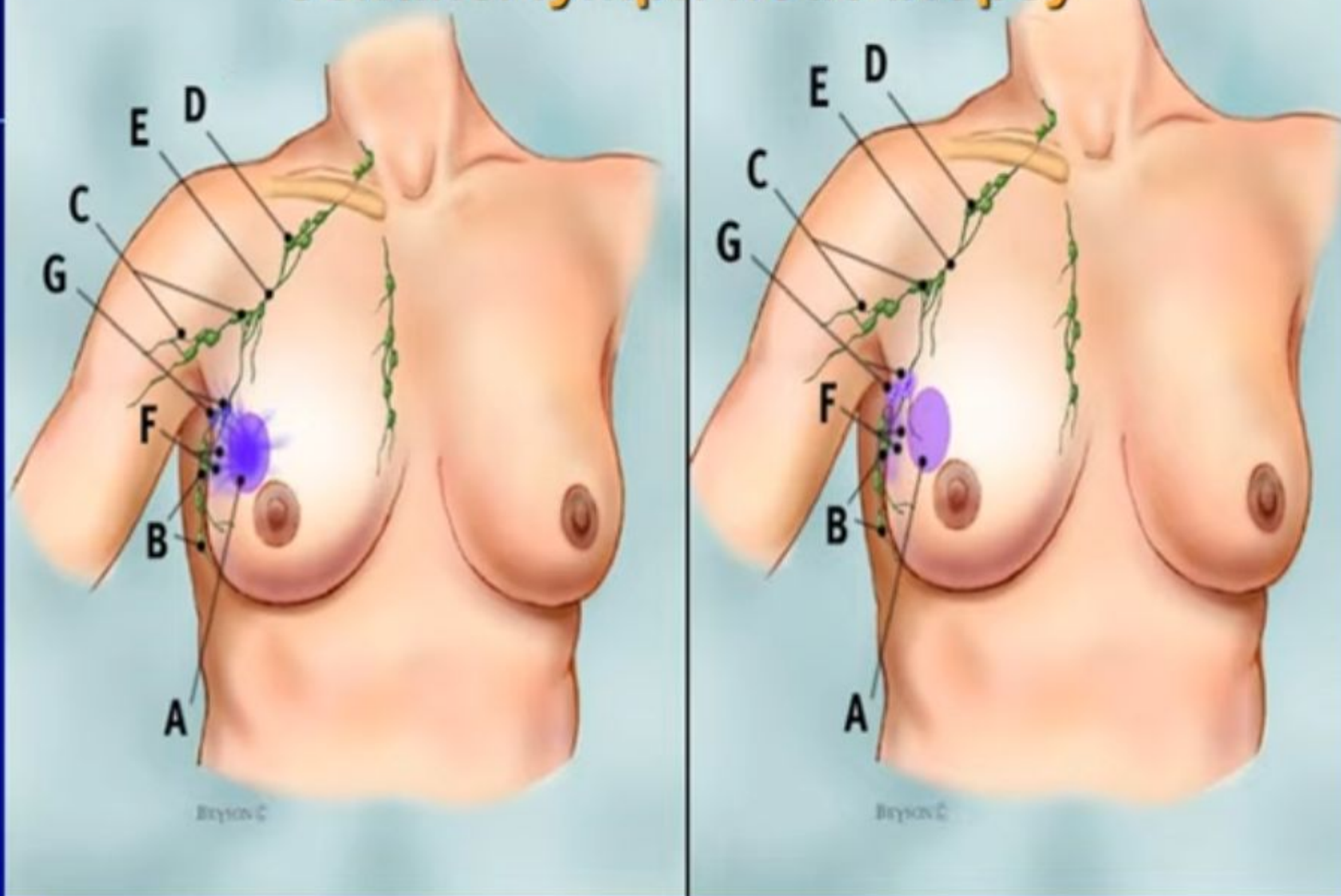


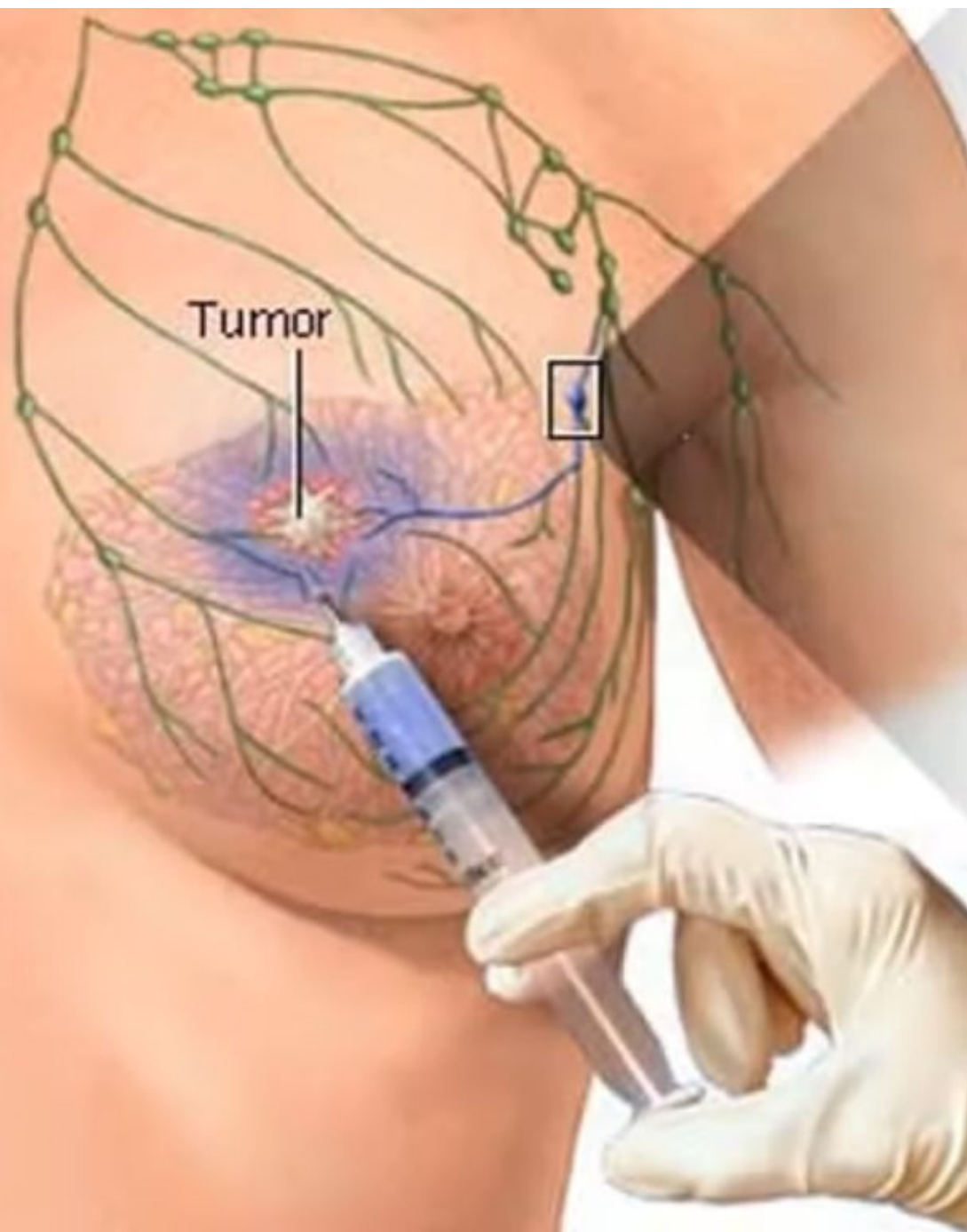
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SLNB



Sentinel lymph node biopsy





Valves allow
fluid to flow in
one direction
only

Box 1

American Society of Clinical Oncology Guidelines: Indications for Sentinel Lymph Node Biopsy, 2005 and 2015

T1, T2

Unicentric or multicentric

Ductal carcinoma in situ with mastectomy

Any age

Any body mass index

Male or female

Prior excisional biopsy

Before or after neoadjuvant therapy

May omit axillary dissection for patients with one or two positive sentinel lymph nodes

ALND Is Not Required for Patients Who Meet All of the Following Criteria:

T1 or T2 tumors

Clinically node negative (even if ultrasound node positive)

One or two positive SLNs without evidence of significant extracapsular extension

Patient agreement to complete whole **breast** radiation therapy

Patient agreement to complete adjuvant systemic therapy (cytotoxic, hormonal, or both)

ALND May Be Required for Patients Who:

Have T3 tumors

Have more than two positive SLNs

Have been identified as having matted axillary nodes or preoperatively palpable nodes

Are receiving neoadjuvant chemotherapy

ACOSOG, American College of Surgeons Oncology Group; *ALND*, axillary lymph node dissection; *SLN*, sentinel lymph node.

Radiotherapy

- Essential part after breast cancer surgery.
- After wide local excision.
- T3 ,any T 4 , inflammatory breast cancer.
- To breast flaps, for patients with high risk of local recurrence
- Large tumors , node +ve
- Lympho-vascular invasion
- Axillary radiotherapy
- 5 Days a week for 3-5 weeks

Systemic adjuvant therapy

Include

- Hormonal
- cytotoxic chemotherapy

Woman risk of recurrence

- Nodal status
- Tumor size
- Tumor grade

Hormone receptor status

Menopausal status, age

Vascular, neural invasion

Endocrine therapy

SERM

1. Tamoxifen *Steroidal drug*

- Synthetic partial estrogen agonist.
- Anti estrogen , compete with estrogen on its receptors.
- Reduce recurrence rate by 25% and death by 17%.
- Reduce risk of contralateral breast cancer by 50%.
- For estrogen receptors +ve.
- Pre and post menopausal patients
- Preventive agent.

TAMOXIFEN

- **Dose:** 20mg daily for 2-5 years

Side effects

- Endometrial cancer.
 - DVT, PE.
 - Hot flushes weight gain.
 - Loss of libido, vaginal dryness.
 - Hyper-calcaemia.
 - Nausea and vomiting.
2. **Raloxifene evista** 60-120 mg daily
- Antiestrogen on breast and uterus
 - Positive effect on lipid profile,

Aromatase inhibitors

- Prevent conversion of androgens to estrogen in fat and muscle, and breast cells.
- Post menopausal women
- Anastrozole(Arimadex) 1mg daily
- Letrozole (Femara) 2.5 mg daily
- NO side effects of tamoxifen
- Pure antieostrogen
- Fluvestrant (Fasoladex)
- 100 Time affinity of TAM on estrogen receptors
- IM injection 250mg monthly
- No hot flushes , no effect on uterus.

Biological response modifiers

- Bind with certain proteins in breast cancer cell, prevent their growth
- **Trastuzumab(Herceptin)**
- Humanized monoclonal antibody
- In over expression of HER2/neu in one third of breast cancer patients.
- **LHRH agonist**
- **Goserelin acetate (zoladex)** 3.6 mg sc monthly
- Ovarian ablation in premenopausal women
- Reversible

Ovarian ablation

- **Surgical(open, laparoscopic)**
- **Low dose radiotherapy**
- **Medical by LH-RH analogue**
- **Benefit only premenopausal women**
- **Oestrogen receptor +ve women.**

Cytotoxic chemotherapy

- Reduce recurrence rate by 30%
- Reduce mortality by 17%
- Effect decline with age
- Same effect for node+ve and node -ve patients, OR status
- Standard regime was CMF 6 cycles
- Advanced disease CAF 4 cycles
- Taxanes paclitaxel .

Primary systemic chemotherapy

Neoadjuvant chemotherapy

- **Systemic chemo before surgery**
- **Reduce tumor size and lymph node status.**
- **Change your surgical options.**
- **Response in 75-90%.**
- **Pathological response less than 15%**

Locally advanced breast cancer

LABC

- **30% of breast cancer.**
- **30% will have metastasis**
- **Tumor which is not cured by local means**
- **T3-4 NO-2 MO**
- **Measure oestrogen receptors.**
- **Neoadjuvant chemotherapy Surgery, followed by chemo-radiation.**



Inflammatory breast cancer

- Aggressive type LABC stage III 1-6%
- Young age, rapid onset.
- Inflamed, tender breast ,peau d' orange
- Mass, no mass.
- Erythematous ,indurated ,edematous breast
- *Failure of two weeks antibiotic therapy*
- Diagnosis by core biopsy , stage III B-C
- Neo-adjuvant chemotherapy
- Surgery, radiotherapy chemotherapy.
- Bad prognosis.

IBC

- Rapid onset of breast erythema , brawny induration edema and/or peau d'orange, and/or warm breast, with or without an underlying palpable mass.
- Duration of history no more than six months.
- Erythema occupying at least one-third of the breast.
- 75% have palpable axillary LNs.
- Pathologic confirmation of invasive carcinoma by *Dermal lymphatic invasion by tumor cells.*



IBC



Local recurrence

- The best treatment for local recurrence is prevention
- If after breast conservation surgery do completion mastectomy

After mastectomy

- Small recurrence local excision
- Multiple recurrence wide local excision +skin graft
- Radiotherapy if not given
- Chemotherapy
- Bone metastasis

Prognosis

I- Tumor related factors:

- 1- L.N. status:
 - 1) Number of L.N.
 - 2) Size of L.N.
 - 3) Level of L.N
- 2- Tumor size:
- 3- Tumor grade
- 4- T.N.M staging
- 5- Metastasis
- 6- Tumor site
- 7- Histopathologic type
- 8- Biological markers:
 - 1) Hormone receptor status
 - 2) Cathepsin D
 - 3) P53
 - 4) HER-2/neu

II- Patient related factors:

- 1- Age
- 2- Sex
- 3- Pregnancy
- 4- Obesity



Male breast cancer

- **MBC 1% of breast cancer.**
- **Increase estrogen(Cirrhosis ,Obesity).**
- **Decrease testosterone(Infection –Trauma , undescended testicle).**
- **BRCAI , BRCAII.**
- **Most are invasive ductal 95%, HR +VE .**
- **Diagnosis: by Triple Assessment**
- **Treatment is modified radical mastectomy**
- **Radiotherapy**
- **Tamoxifen , LHRH analogue**
- **CMF**

MBC

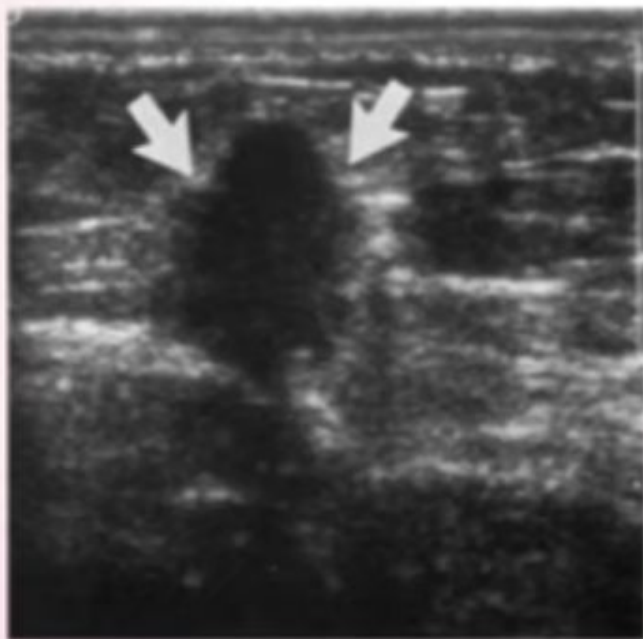


Breast mass during pregnancy (Gestational Breast Cancer)

- 1.5% of women in child bearing period.
- Most common non-gynecological cancer.
- Gestational breast cancer.
- One year delay in 50%.
- Lactational changes should be symmetrical.
- Breast u/s core biopsy.
- Mastectomy: is usually recommended.

Carcinoma

- ill-defined margins,
low-level
- heterogeneous
internal echoes



Solid benign mass



Ultrasound of a non-cancerous
benign fibroadenoma

Cyst

- absence of internal
echoes (anechoic
interior),
- clearly defined
posterior wall, and
enhancement of distal
echoes



