

Breast Cancer Overview

Part 1



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Breast Cancer overview



Objectives:

Students should be able to:

- Assess and realize the significance of risk factors.
- Take relevant focused history.
- Perform standardized breast clinical examination.
- Understanding and practicing triple assessment concept.



Breast Cancer Overview



- **Lecture outlines:**
- Introduction:
- Relevant anatomy and physiology.
- Cancer facts.
- Focused history taking.
- Standardized Examination
- Breast imaging.
- Cytological and histological Examination
- Metastatic workup



Why Are We Concerned ?



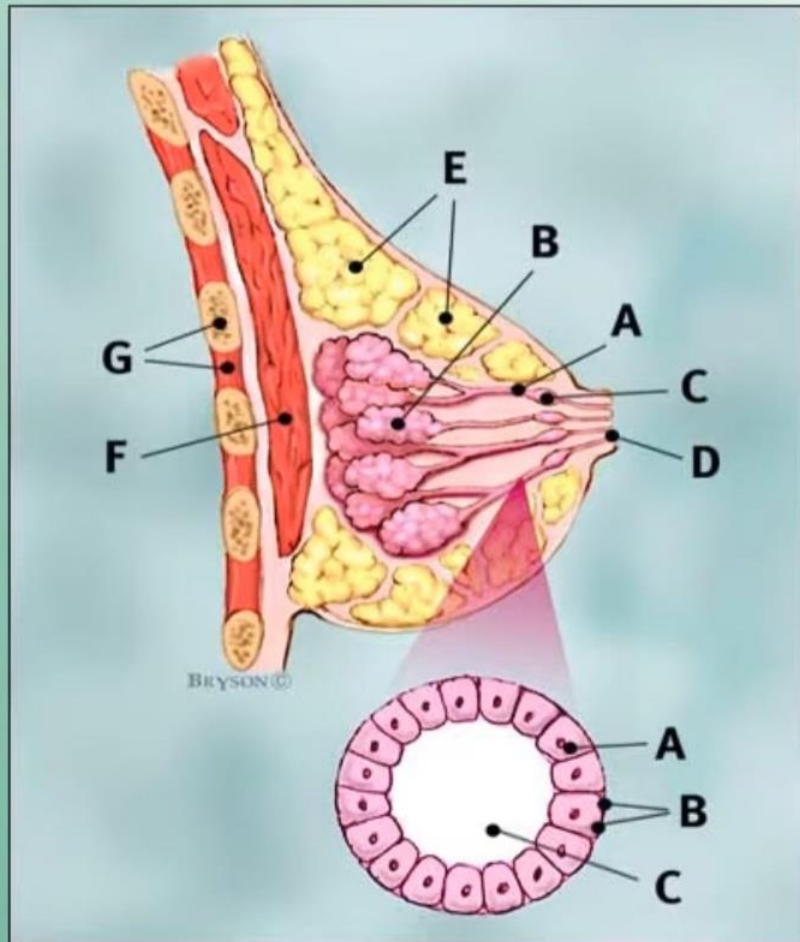
- Body image and wellbeing.
- Positive psychological balance.



breast CA is the most common CA in females



Relevant Anatomy & Physiology



Breast profile:

A ducts

B lobules

C dilated section of duct to hold milk

D nipple

E fat

F pectoralis major muscle

G chest wall/rib cage

Enlargement:

A normal duct cells

B basement membrane

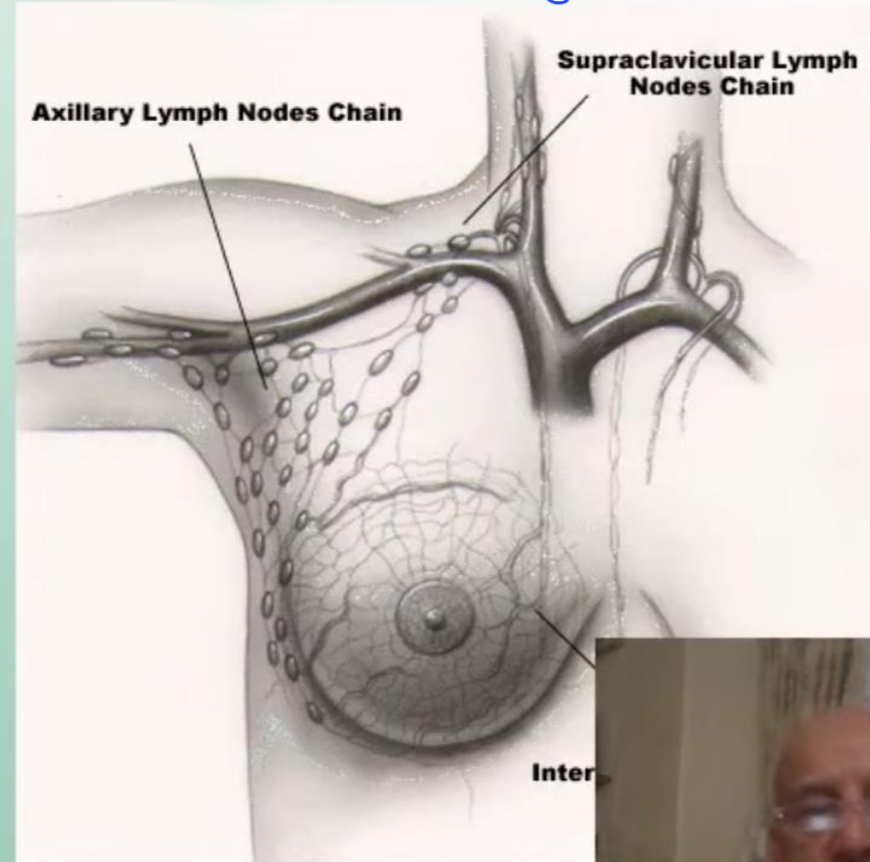
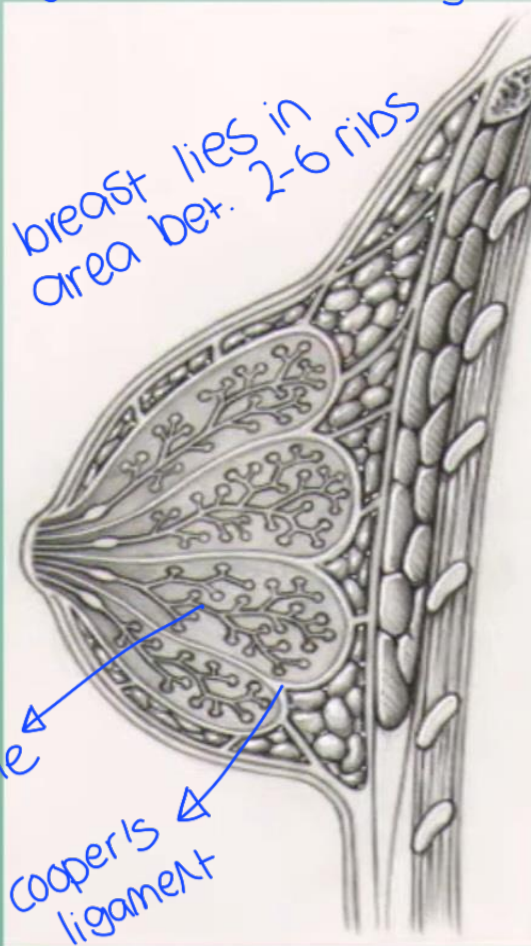
C lumen (center of duct)



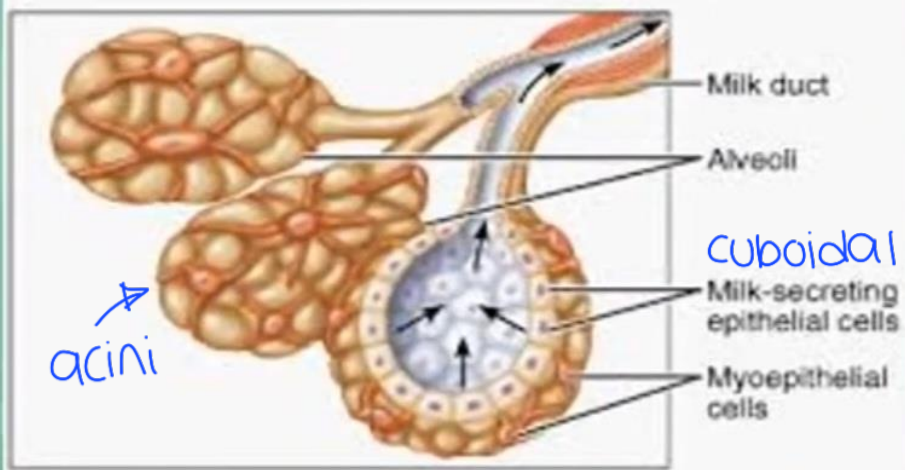
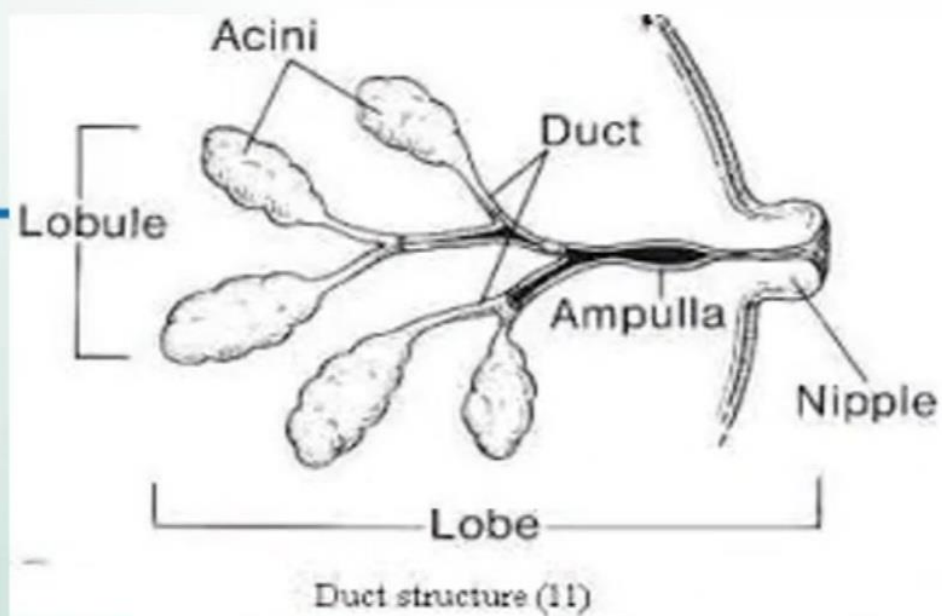
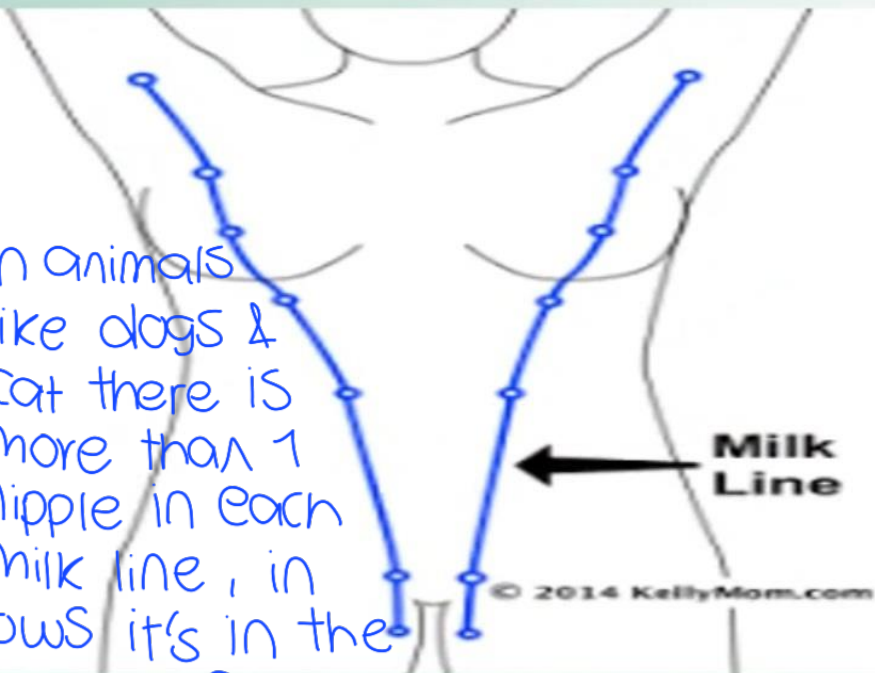
Anatomy of the Breast & Axilla



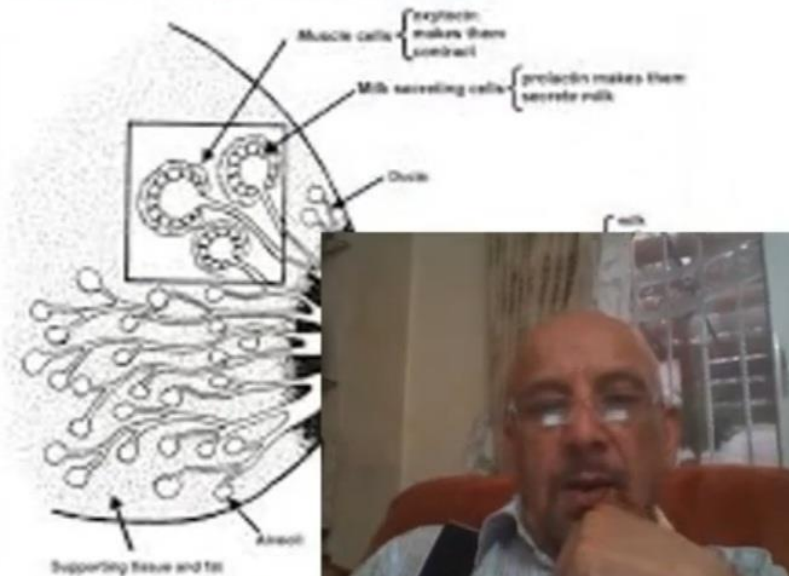
- Cooper's ligament gives strands of fibrous tissue to Pectoralis fascia & surrounding skin holding the breast in its position
- malignant CA invading Cooper's lig. causes skin dimpling



in animals like dogs & cat there is more than 1 nipple in each milk line, in cows it's in the inguinal area



Breast Anatomy - Structure



Triple Assessment



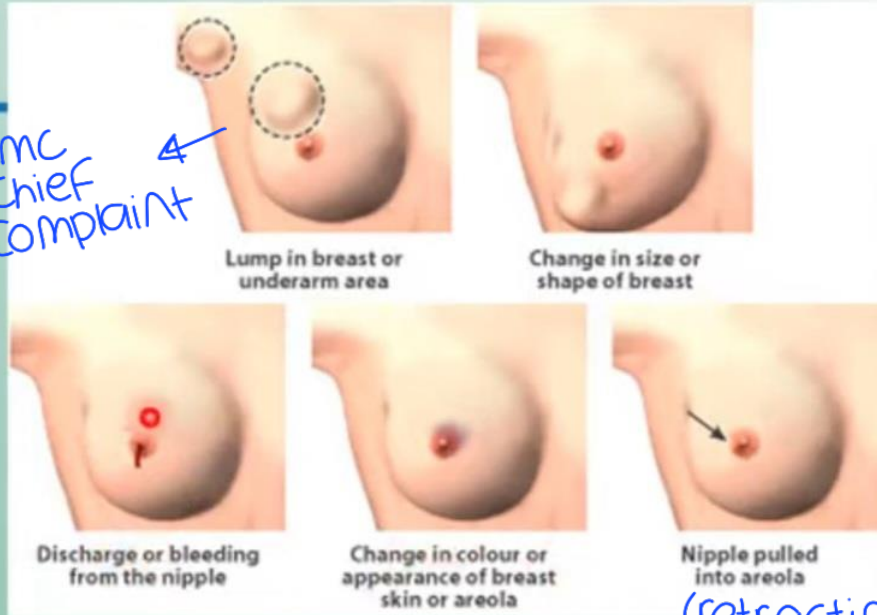
- Clinical Evaluation (history + physical)
- Imaging (ultrasound and/or mammography)
 - ↳ < 35
 - ↳ > 35
- Cytology or Histology
 - ↳ FNA
 - ↳ biopsy

breasts are sensitive to hormonal changes like estrogen, progesterone, prolactin



Symptoms

MC Chief Complaint



Lump in breast or underarm area

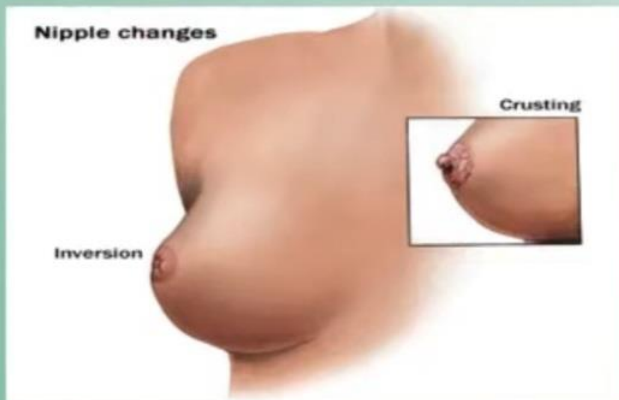
Change in size or shape of breast

Discharge or bleeding from the nipple

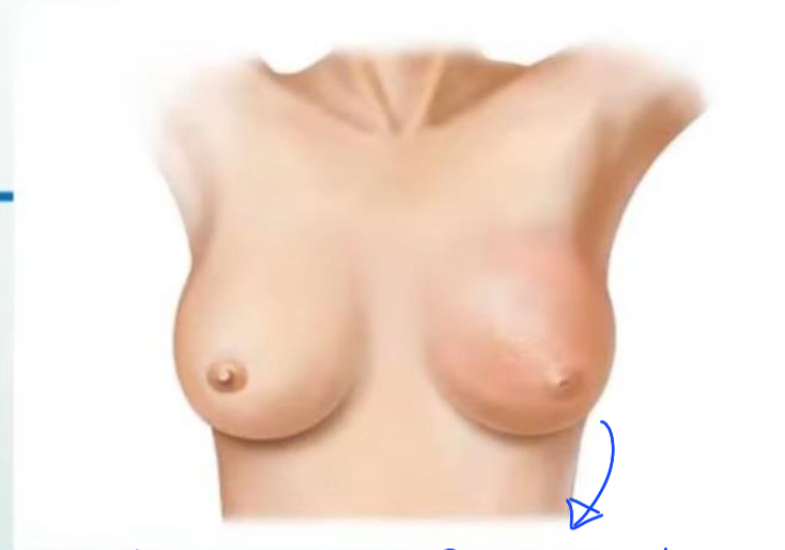
Change in colour or appearance of breast skin or areola

Nipple pulled into areola

(retraction)



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increase in size + red :
2 option :

- ① inflammation
- ② inflammatory carcinoma of breast (poor prognosis)



Risk factors



Age (avg. 52 yo. in Jordan)

Gender (100:1)

White race

Obesity .(BMI >30)

Exogenous hormones (HRT, OCPs)

▪ Reproductive factors. (early menarche, late menopause, late 1st pregnancy, ...)

▪ **previous suspicious breast biopsy**

Personal history of breast cancer

Family history of breast cancer

 one first-degree relative 2x

 2 first degree relatives 3x

Inherited genetic mutations

 only 5-6% of all breast cancers are directly attributable to inheritance of a breast cancer susceptibility gene such as BRCA1, BRCA2, p53 (tumor suppressor genes)

Lifestyle factors

 Alcohol

 Smoking

 Exposure to therapeutic ionizing radiation.

70% of women have no risk factors!

BRCA1 affected women may undergo prophylactic mastectomy





New recommendations on breast cancer screening

The American Cancer Society has updated its guidelines for healthy women with an average risk of getting breast cancer.

Age range	Mammogram		Clinical breast exam	
	Old	New	Old	New
20-39	No	No	Every 3 years	No
40-44	Annual	Optional*	Annual	No
45-54	Annual	Annual	Annual	No
55+	Annual	Every one or two years*	Annual	No

(not useful in detecting small lesions)

*Based on discussion with doctor about benefits and risks of mammography.
NOTE: Screenings should continue as long as a woman has a life expectancy of 10 years and is a good candidate for breast cancer treatment.
Source: American Cancer Society



Standardized breast examination:

- ① permission, privacy, warm & well lit, chaperone
- ② expose upper half
- ③ inspect breast (sitting position)
 - Comment on: changes (asymmetry, size, shape, texture), nipple changes & retraction / scars, dilated vessels / peau d'orange
 - positions of examination:
 - a) arms on sides
 - b) raising hands (to expose lat. sides of breasts & axilla)
 - c) hands on waist (contract pectoralis m_i to make hidden retractions clearer)
 - d) elevate breast to inspect inferior side of breast
 - e) lean forward
- ④ regional LNs (sitting position)
 - ↳ supraclavicular, infraclavicular, axillary (apical, medial, anterior, posterior, lateral)
- ⑤ palpation (supine position & put hand above head)
 - ↳ with your palmar aspect of middle 3 fingers in a "rolling & dipping movement"
 - ↳ apply different pressures (the lump may be deep)

Standardized Breast Examination



arms on sides



raise arms above head



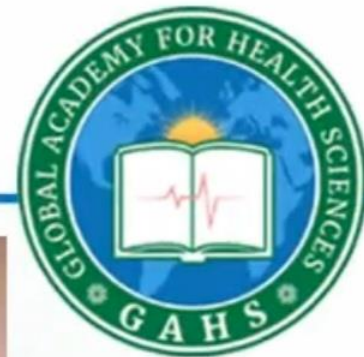
hands on waist



Supraclavicular LNs



Axillary LNs



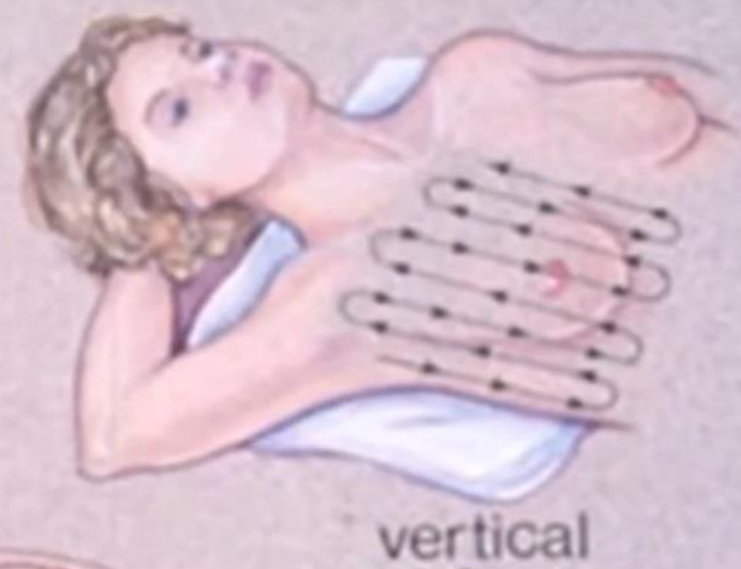


palpation position



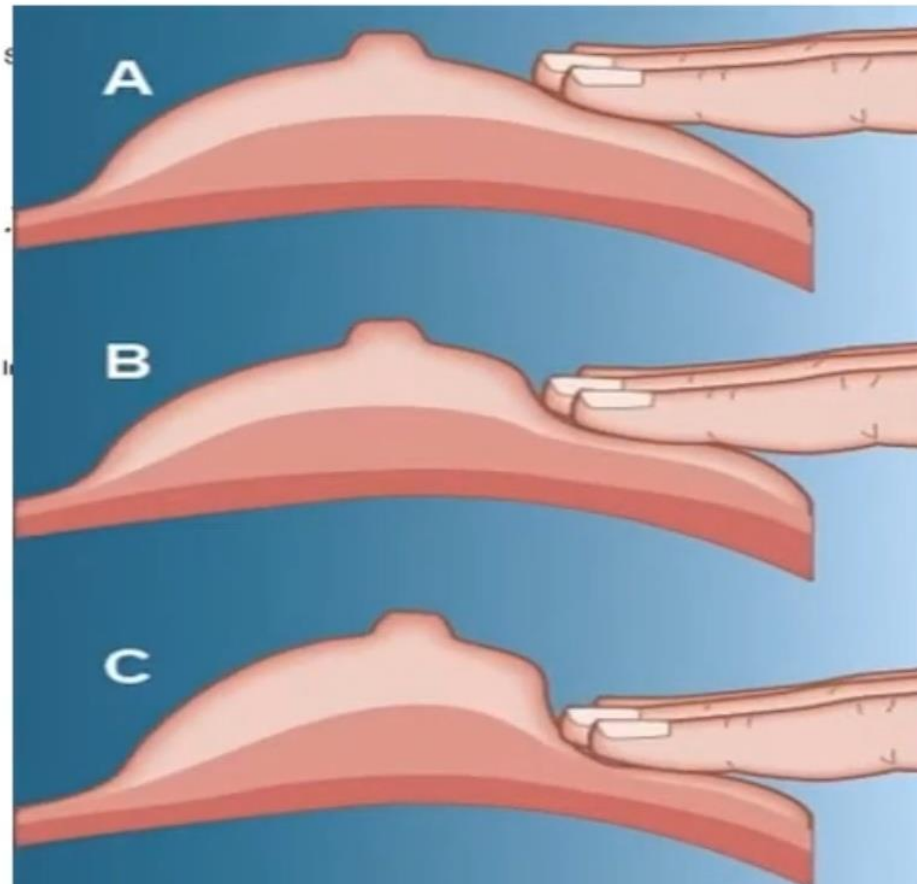
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Breast Palpation Techniques





Levels of Pressure for Palpation of Breast Tissue Shown in a Cross-sectional View of the Right Breast



Malignant Masses



- Hard. → majority of invasive ductal carcinoma cases

- Painless: Malignant masses painful in only 10-15% of patients.

exceptions:

- medullary carcinoma of breast is mostly firm
- inflammatory carcinoma & 2° inflammatory carcinoma of breast is are tender

- Irregular.

- Skin Dimpling.

- Nipple Retraction.

→ rare type of malignancy

- Bloody or Water Discharge.

↳ most common cause is benign duct papilloma

- Possibly fixed to the skin or chest



- each pt has different glandular structure (most young people have a)
- inframammary fold doesn't have glandular structure + it is usually harder due to continuous movement & pressure (trauma)
- no glandular structure in areola



a)



b)



c)



this is glandular structure (don't misdiagnose it as a mass)

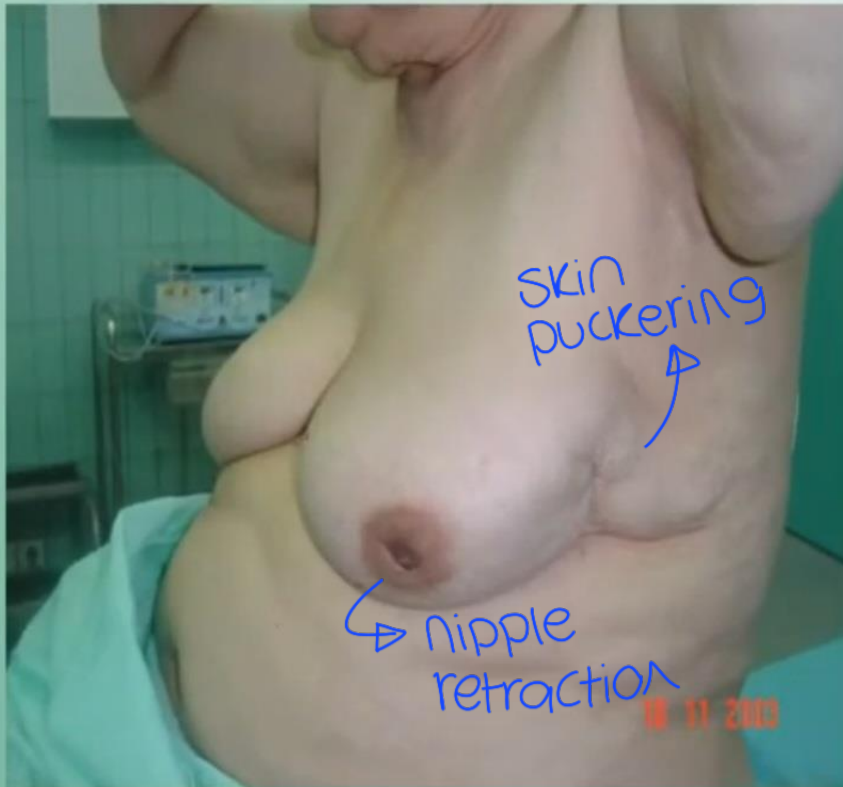
d)



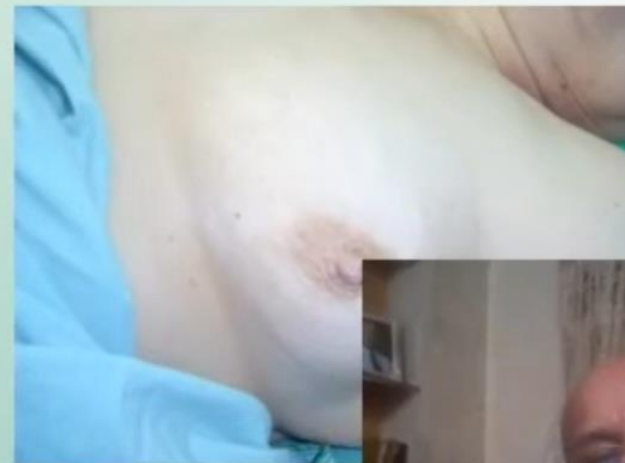
• paget disease of nipple :

- destruction & maceration of nipple / blood or serous discharge / itchy (may be misdiagnosed as eczema)

- diagnosis : incisional biopsy



Single duct bloody discharge: maybe retroareolar duct papilloma or ductal carcinoma





- advanced malignancy
- peau d'orange
- Nipple retraction
- Surgical Scar at lat. Side of Nipple



→ redness & mass shown when elevating arms



→ Accessory nipple in Axilla

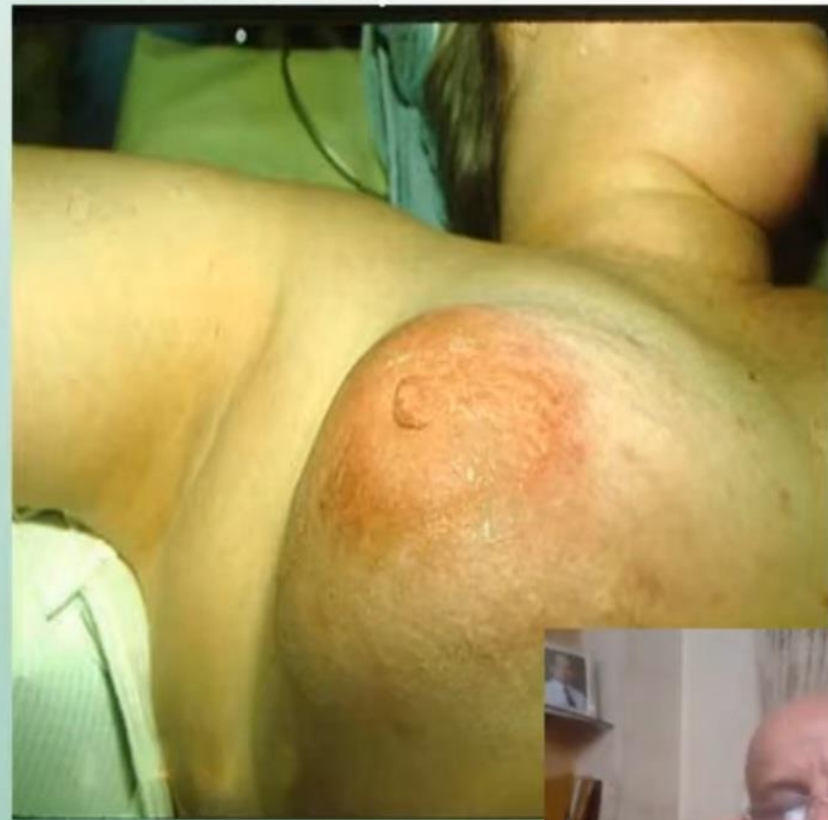
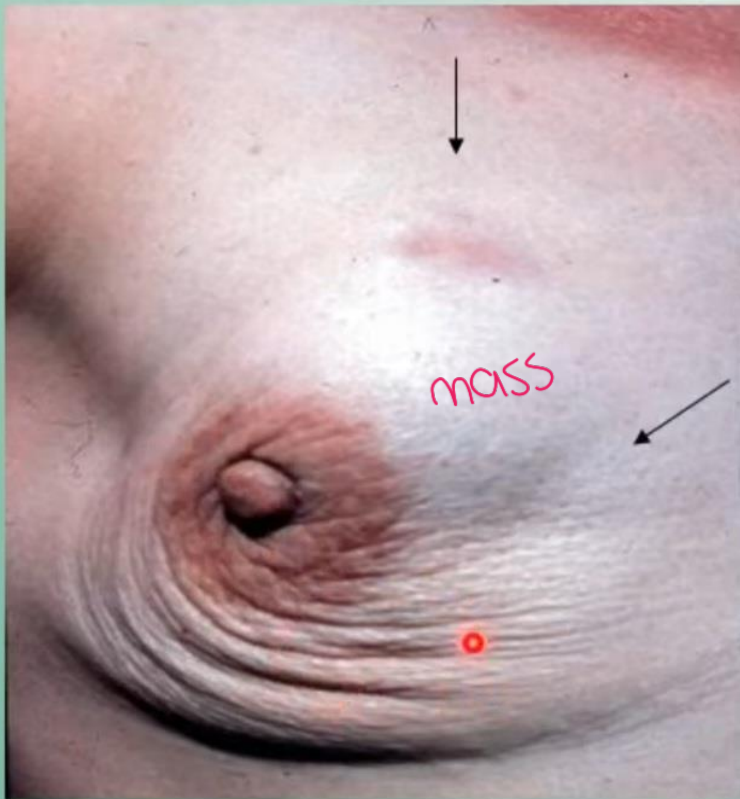


inflammatory
Carcinoma of breast

- red, hot, tender
- Very firm (lymphatic fluid accumulation cuz of \uparrow intramammary pressure)



large mass causing clockwise twist of breast



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nipple is not fully retracted yet



due to obstruction of dermal lymphatics by malignant cells (T₄ lesion)



Peaud'orange



Skin Ulceration



untreated Superficial mass

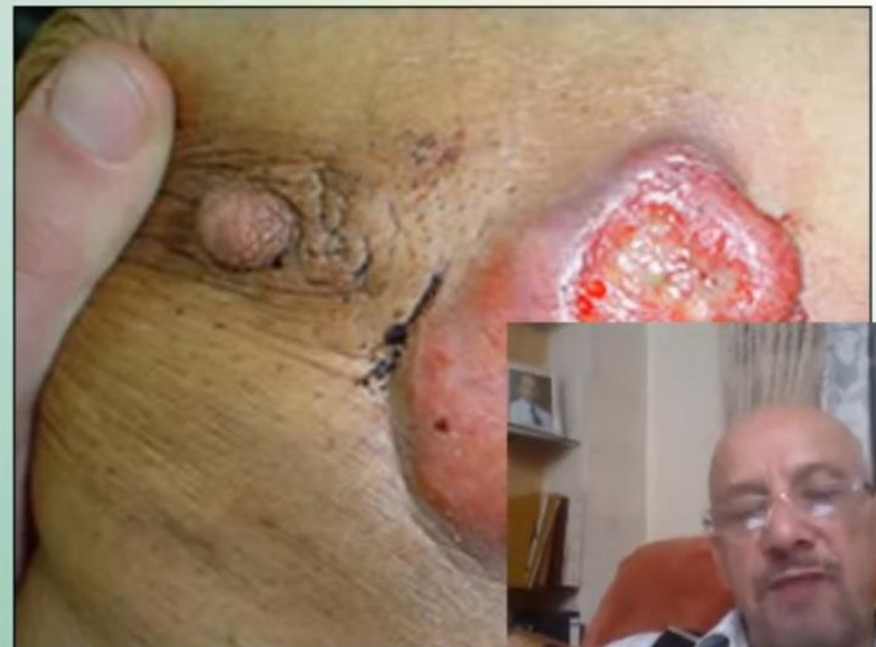


Ulceration



increased TNM Staging:

$T_{1,2} \rightarrow T_4$



Breast Ultrasound



- Ultrasound is useful in the assessment of breast lumps
- Complements mammography and is able to **differentiate solid and cystic** lesions
- Also able to **guide fine needle aspiration and core biopsies**
- Can be used to assess tumour **size and response** to therapy (*neoadjuvant*)
- In the diagnosis of malignancy it has a sensitivity and specificity of 75% and 97% respectively
- Cysts and solid lesions have typical appearances

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Simple cysts can be evacuated by a needle



Breast Imaging

always compare
with other breast
to see the normal



- The breast can be imaged with mammography, ultrasound or MRI.
- Mammography is the **most sensitive** of breast imaging modalities. + detects multifocal & multicentric lesions
- Sensitivity is reduced in young women due to the presence of increased glandular tissue.
- For symptomatic patients, imaging always be performed as part of triple assessment.

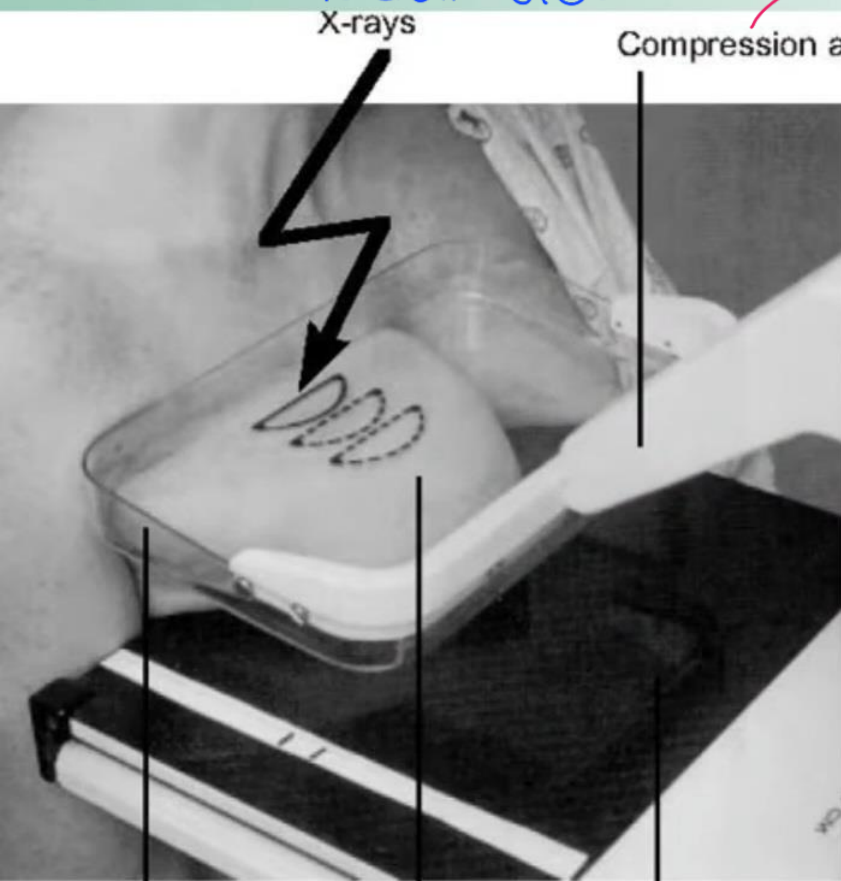




* don't do mammography if pt:
• is premenstrual
• has inflammatory process } cuz it will be more painful

CranioCaudal view

important so we don't miss deep masses



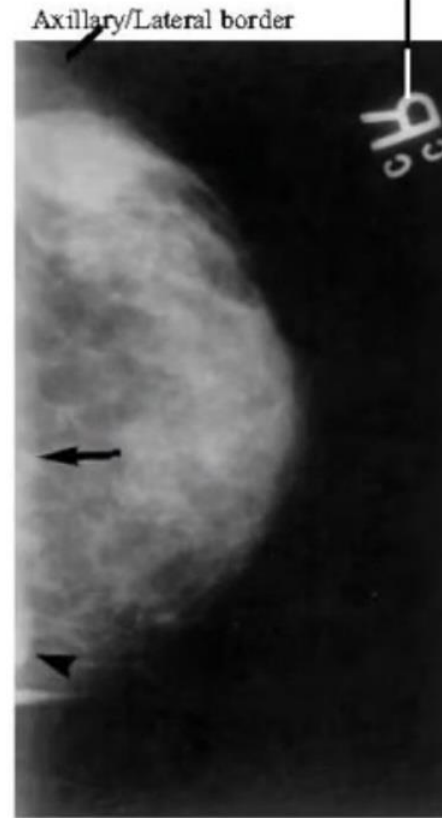
X-rays

Compression arm

Compression paddle

Ouch!
(painful)

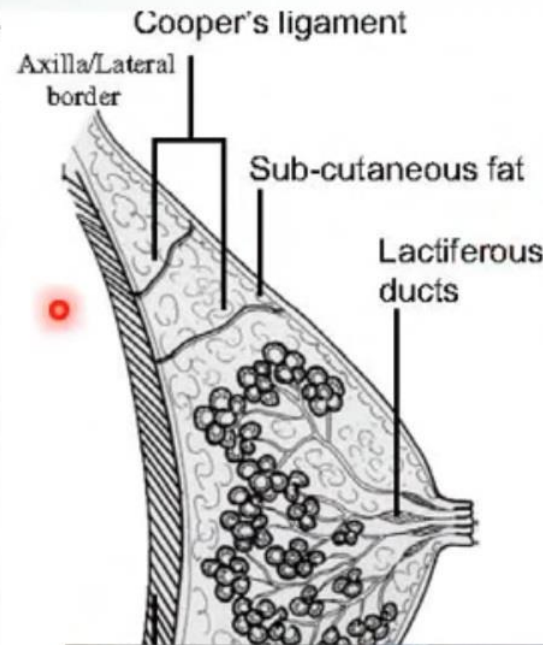
Cassette containing film



Axillary/Lateral border

Marker

Medial border



Cooper's ligament

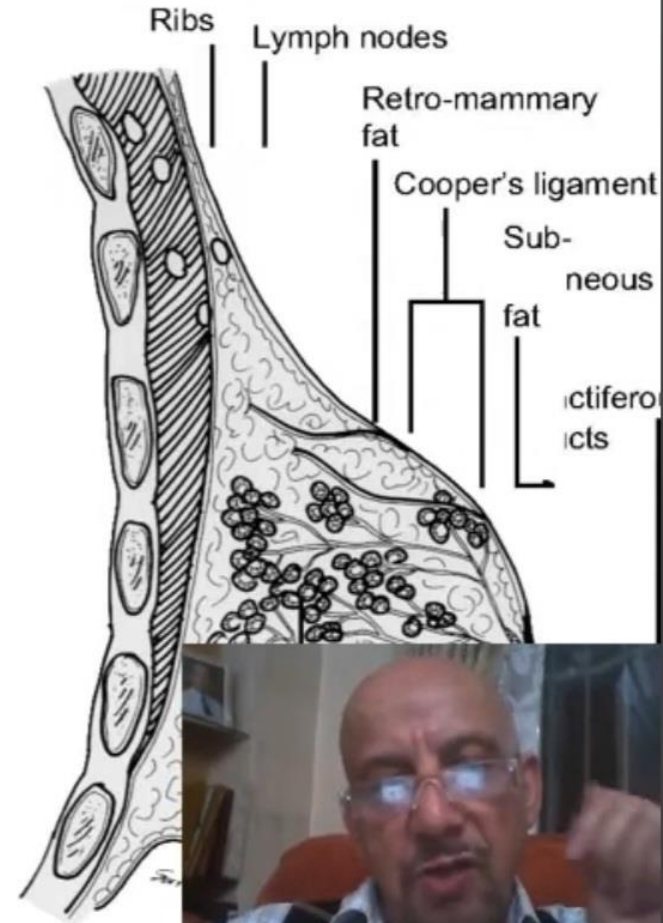
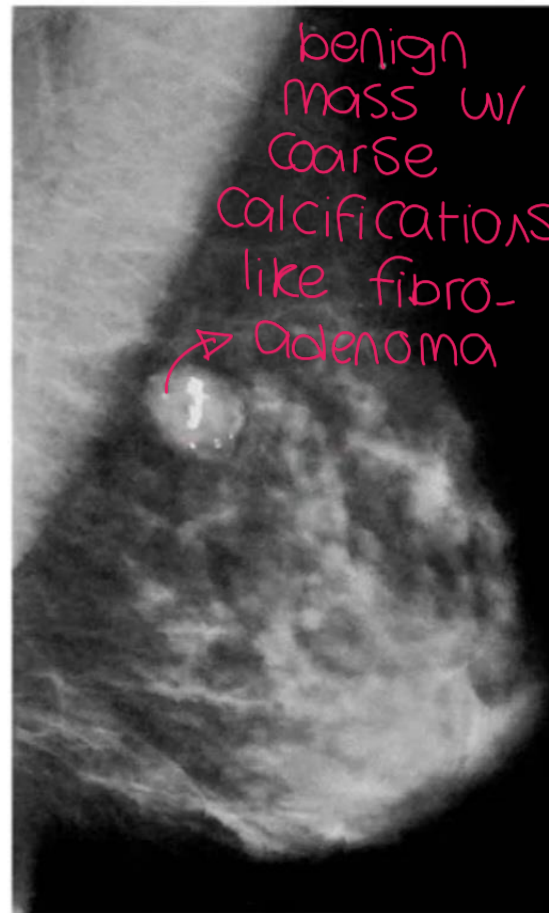
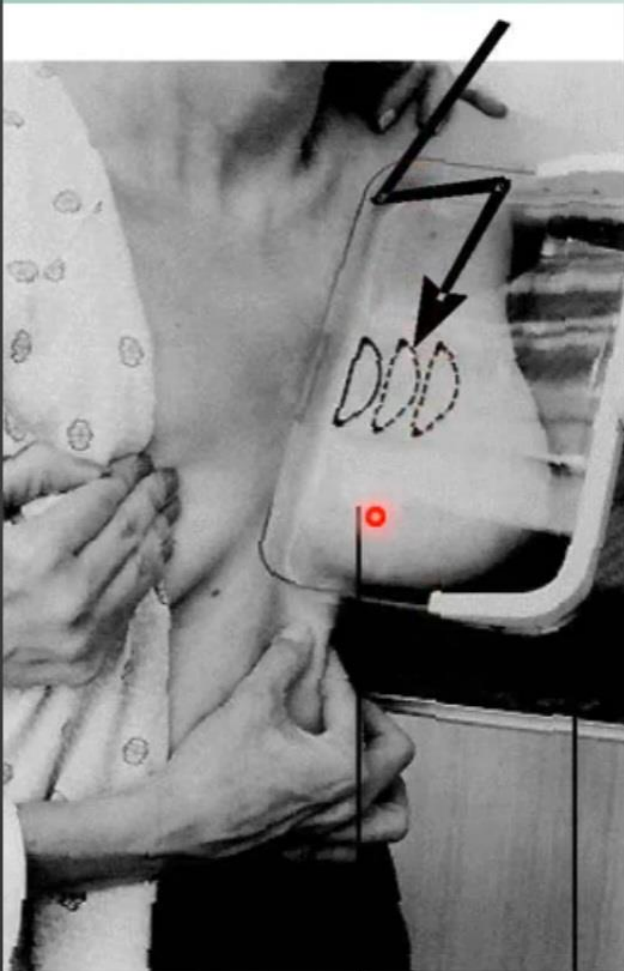
Axilla/Lateral border

Sub-cutaneous fat

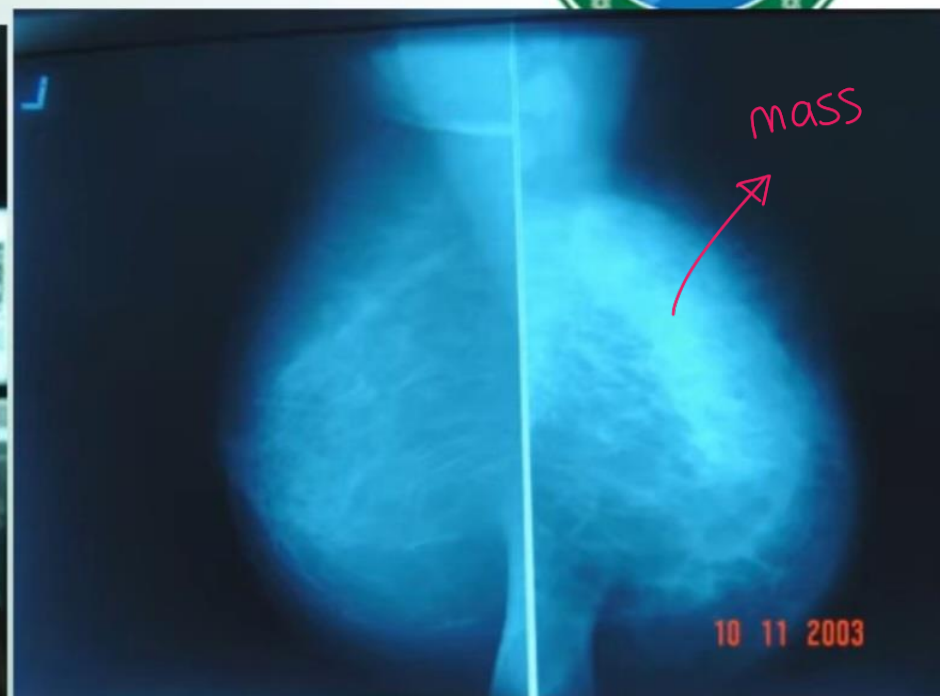
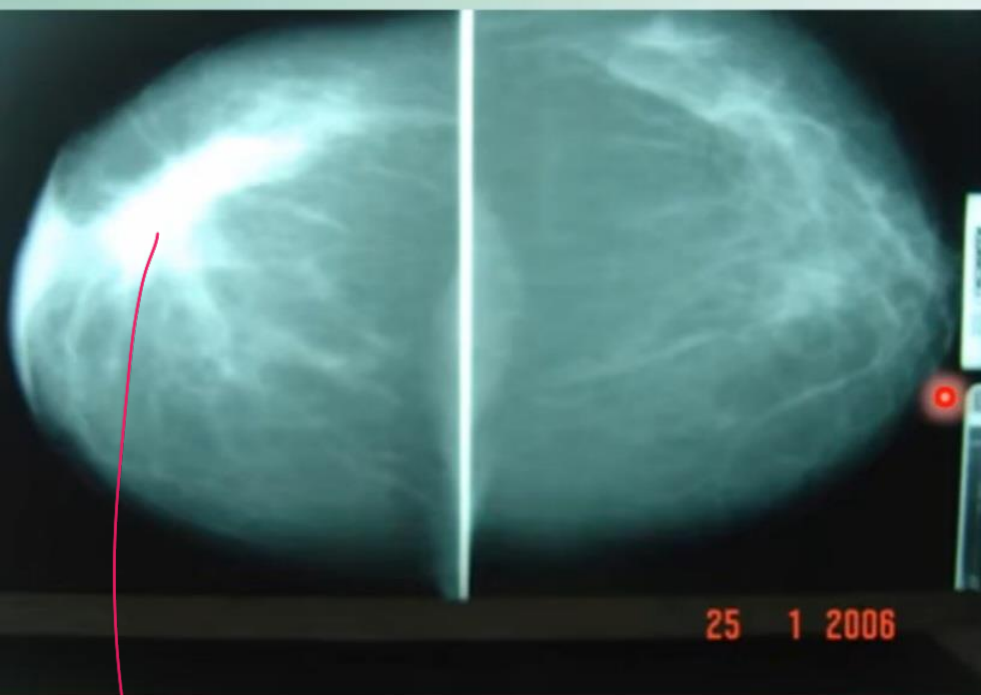
Lactiferous ducts



Oblique view → make Axillary area Clear



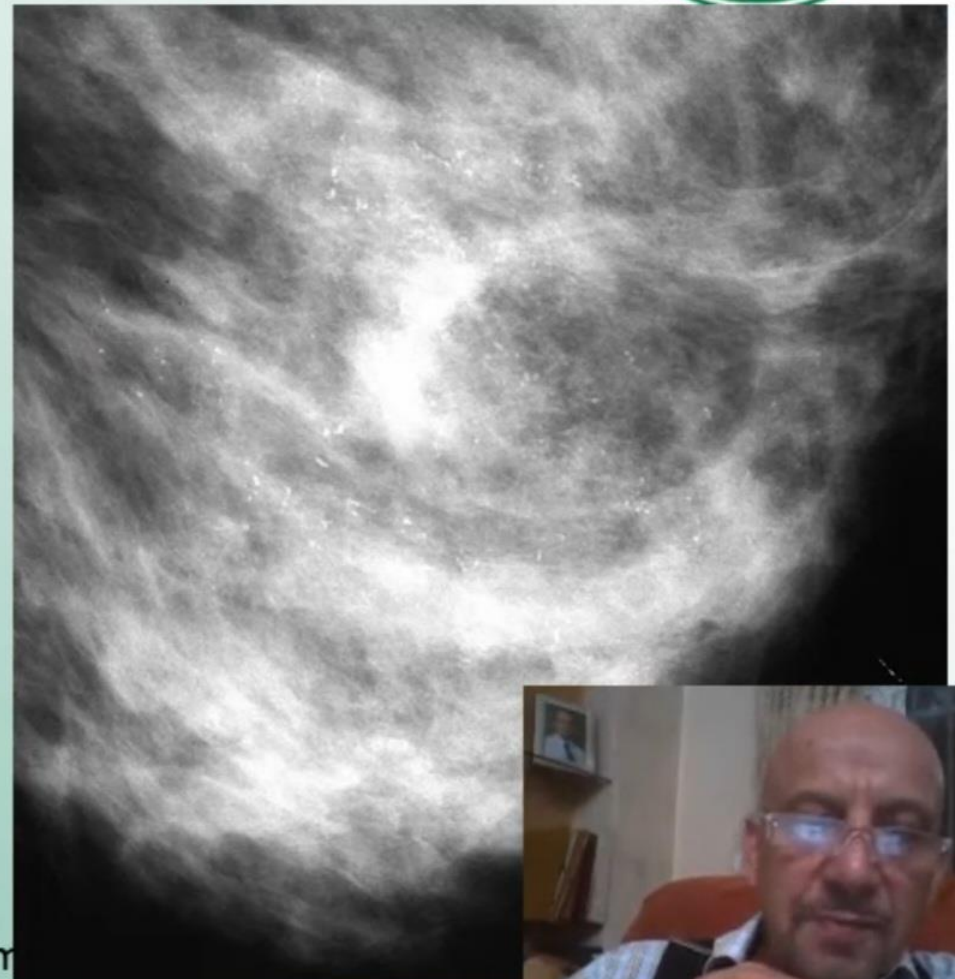
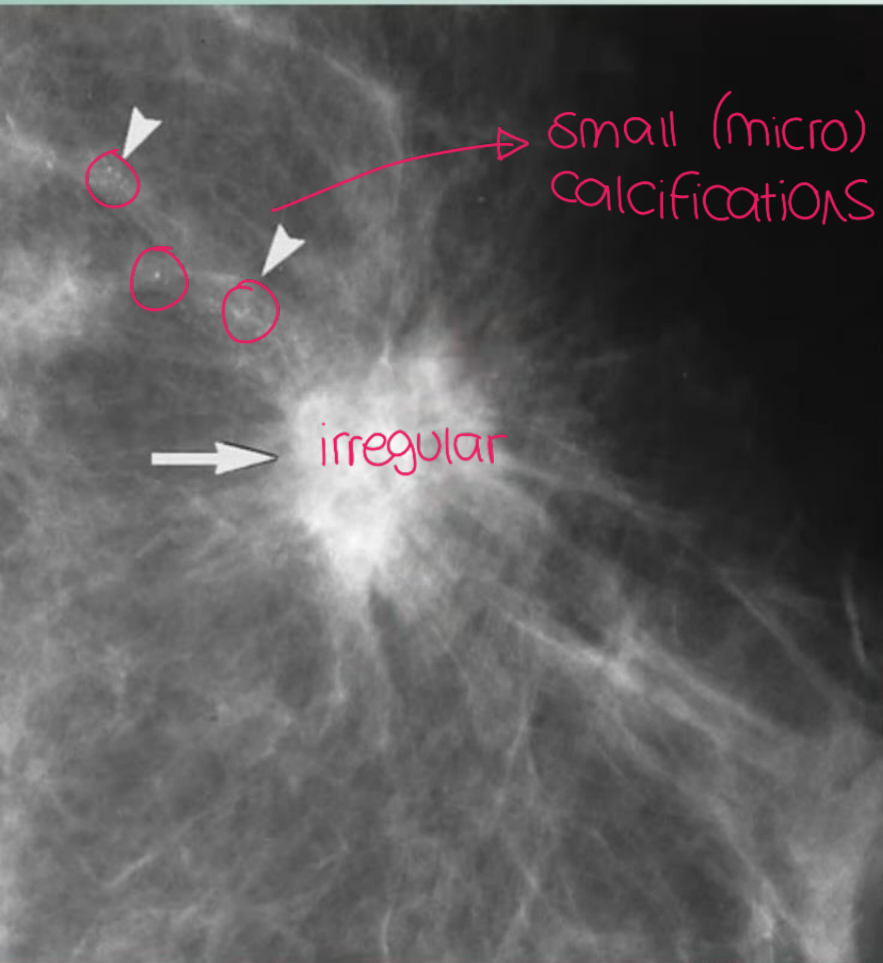
Compare both breasts!



Very dense irregular mass extending to nipple (typical appearance of malignancy)



>5 microcalcifications → biopsy



Medio lateral Oblique

CranioCaudal

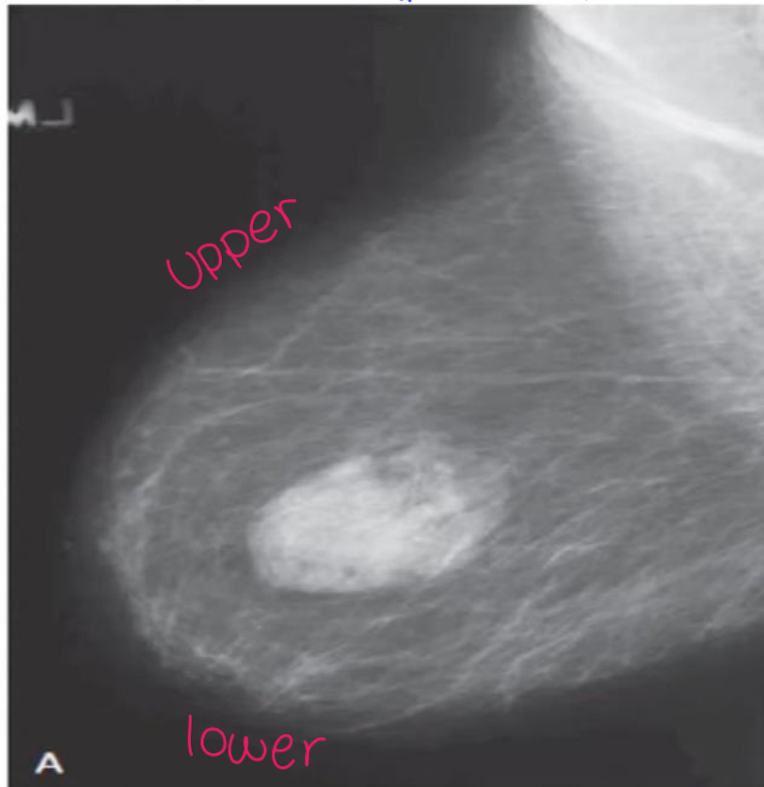


Figure 2-4. Hamartomas have a very characteristic appearance on mammography, composed of fatty and soft tissue densities surrounded by a fibrous capsule. **A**, The MLO view shows the "within a breast" appearance of hamartoma. **B**, The CC view. (Images courtesy of Dr. Alexey Kuznetsov, Department of Radiology, University of Michigan.)

Mediolateral Oblique

Cranio caudal

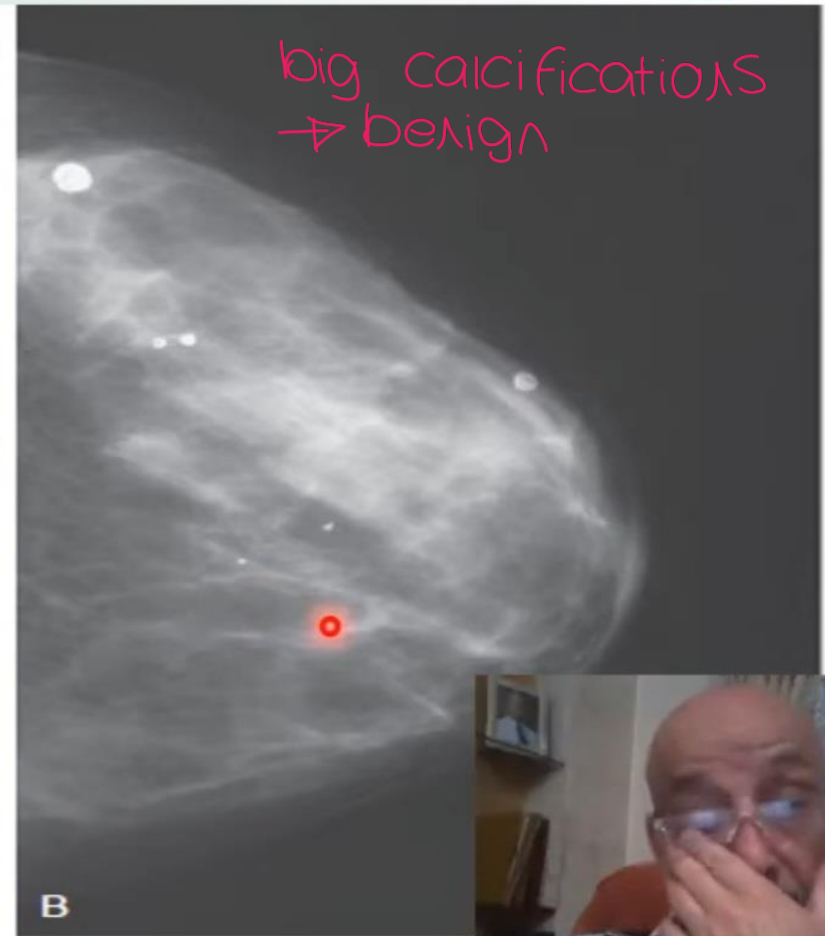
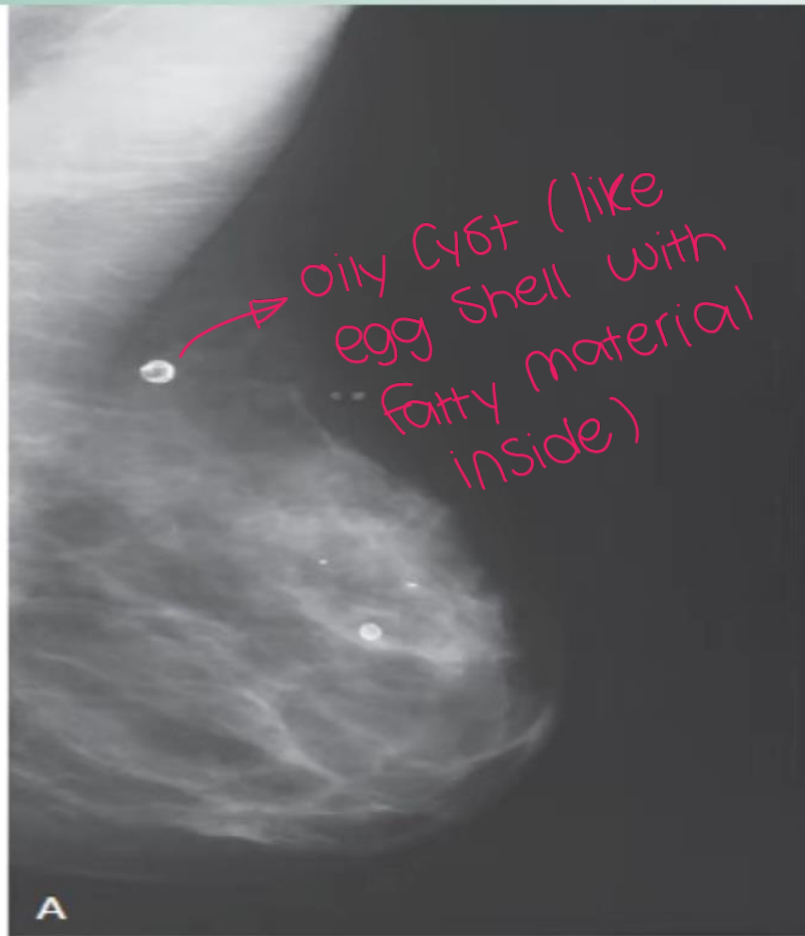


Figure 2-6. MLO and CC views of the right breast demonstrate benign calcificati
cysts. (Images courtesy of Dr. Alexis Nees, Department of Radiology, University o

Radiographic views of the breast

Standard views:

- **45° Medio lateral Oblique (MLO view) / Lundgren's view**
- **Craniocaudal view (CC view)**



RCC

Right
Craniocaudal



LCC

Left
Craniocaudal

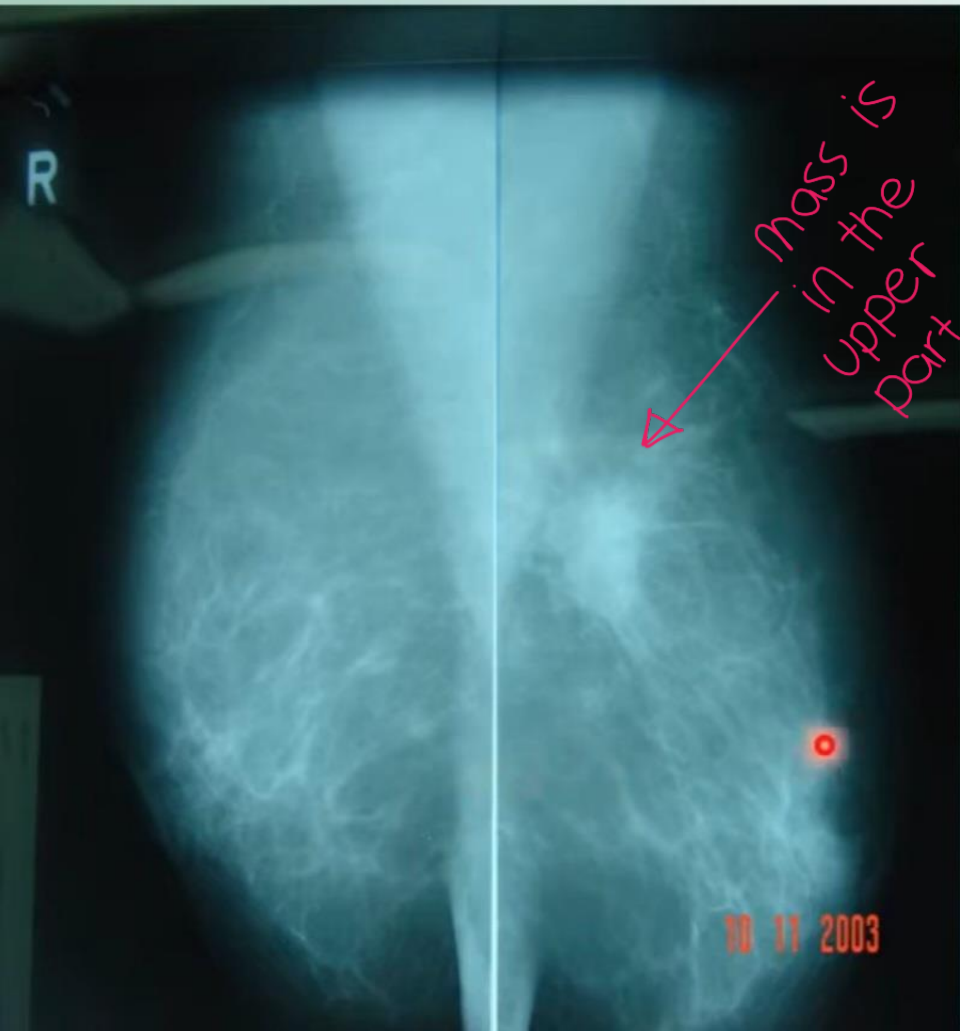


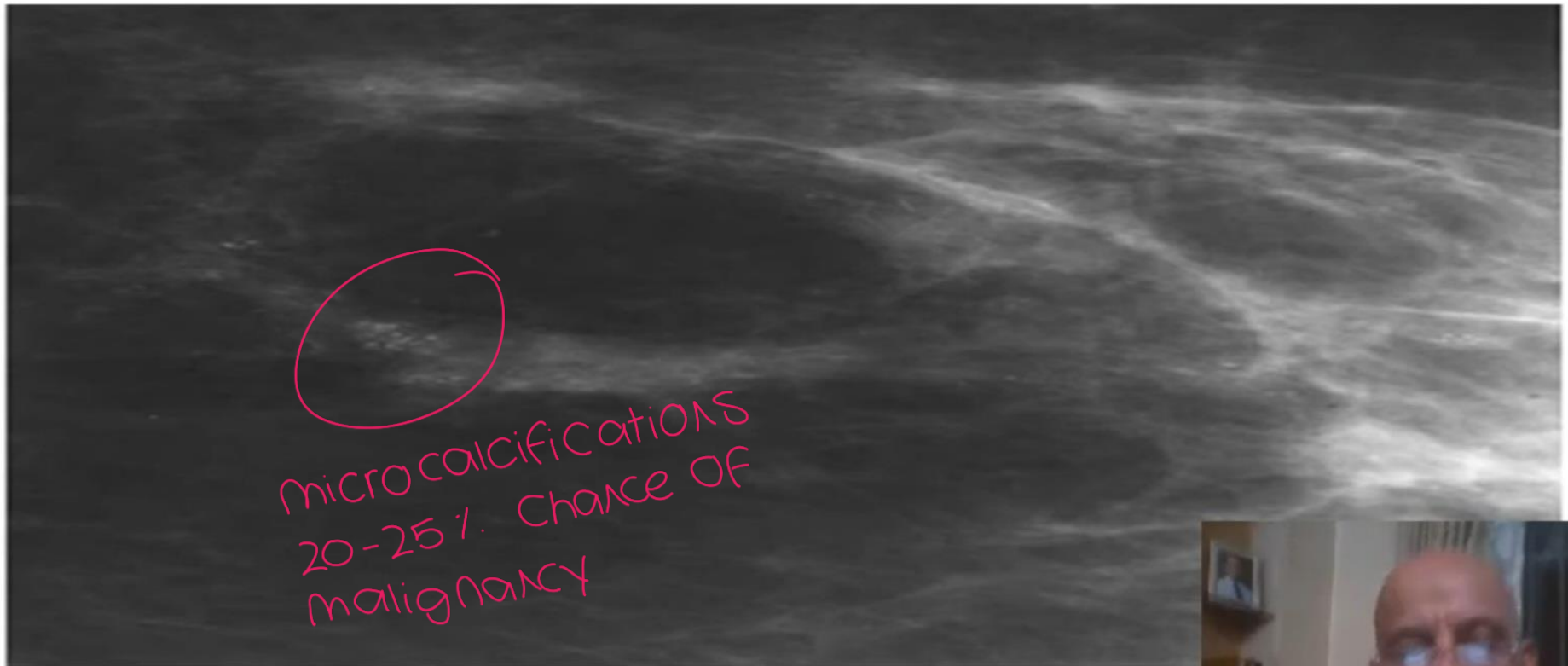
RMLO

Right
Mediolateral
Oblique



mass is in the upper outer quadrant of left breast





Microcalcifications
20-25% chance of
malignancy

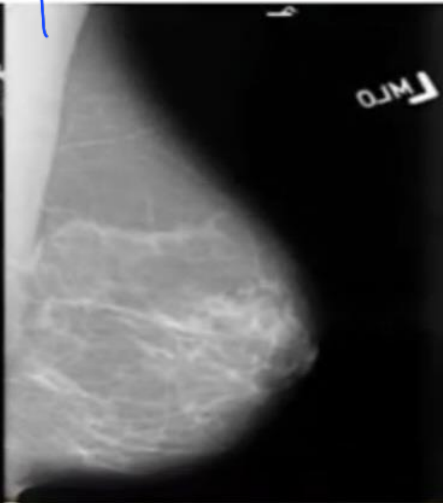
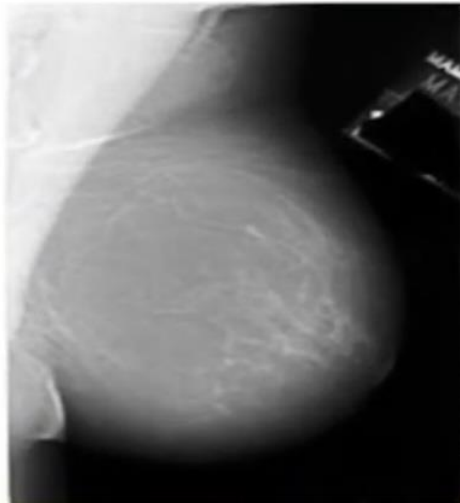
Figure 2-7. Magnification CC view demonstrating segmentally distributed, pleomorphic microcalcifications. Pathology demonstrated DCIS and invasive carcinoma. (Image courtesy of Dr. A. Department of Radiology, University of M



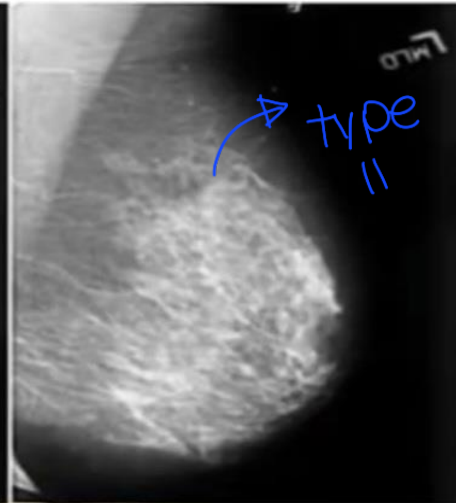
assume all following images are of women in the same age:



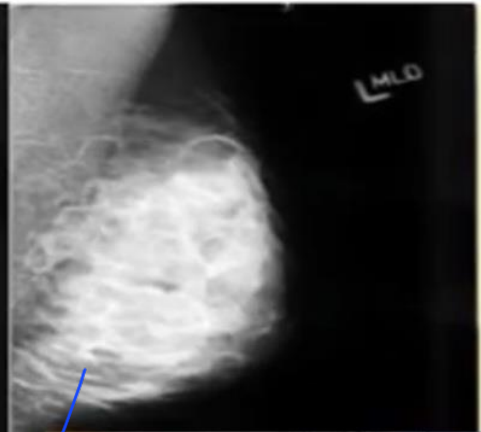
normal fatty breast (old age)



retroareolar glandular structure (prominent ductal pattern type I)



dysplastic breast & needs biopsy

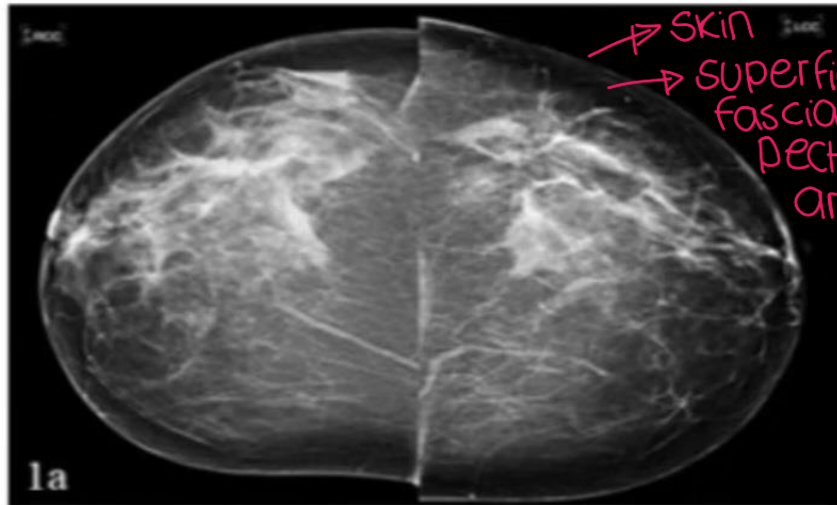


Breast composition and its mammographic appearance.³

if a young female had this it would be normal (↑ glandular)

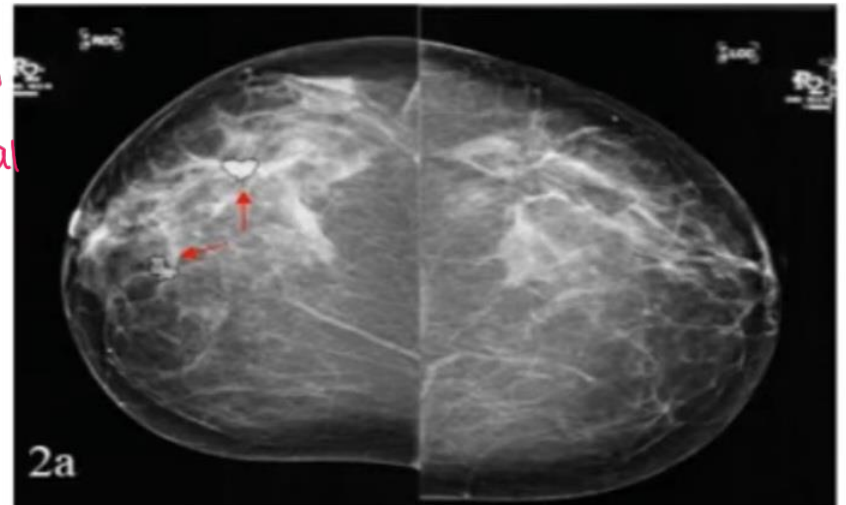


digital mammography

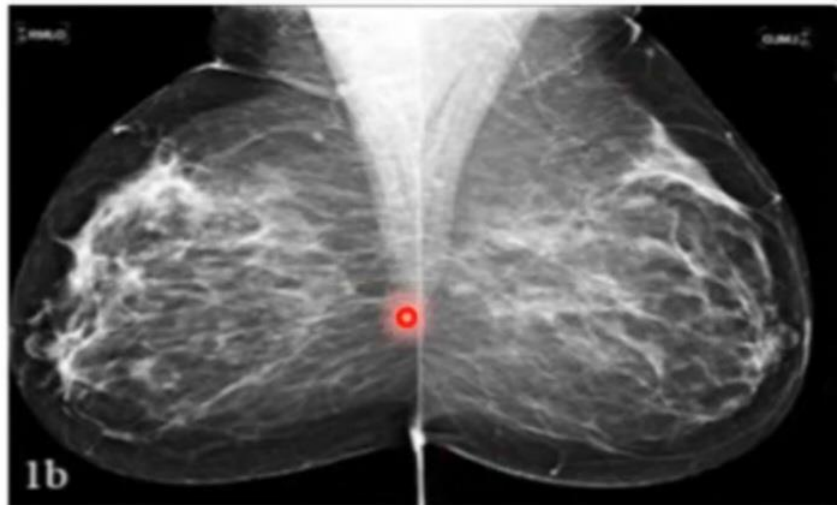


→ skin
→ superficial fascia of pectoral area

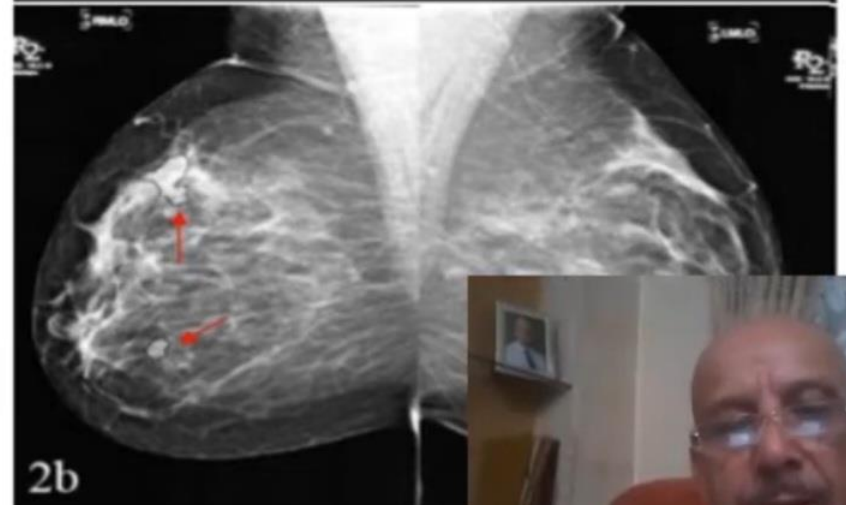
1a



2a



1b



2b





BI-RADS mammographic assessment categories

Assessment category	Recommendation	Probability of malignancy
0: Incomplete	Need for further evaluation	Not applicable
1: Normal	Normal interval follow-up	0 percent
2: Benign	Normal interval follow-up	0 percent
3: Probably benign	A short interval follow-up is recommended	<2 percent
4: Suspicious abnormality	A biopsy should be considered	≥2 to <95 percent
		(a) Low-risk
		(b) Intermediate-risk
5: Highly suggestive of malignancy	Biopsy or surgery should be performed	≥95 percent
6: Biopsy-proven carcinoma	Appropriate action should be taken	



BI-RADS: Breast Imaging Reporting and Data System.

Source: *Breast Imaging Reporting and Data System (BI-RADS) Atlas, 4th Edition*. Radiology, Reston, VA, 2003.



not painful, easy, can be done w/out U/S
→ for palpable lesions & w/ U/S for deep ones

Fine Needle Aspiration Biopsy (FNAB)

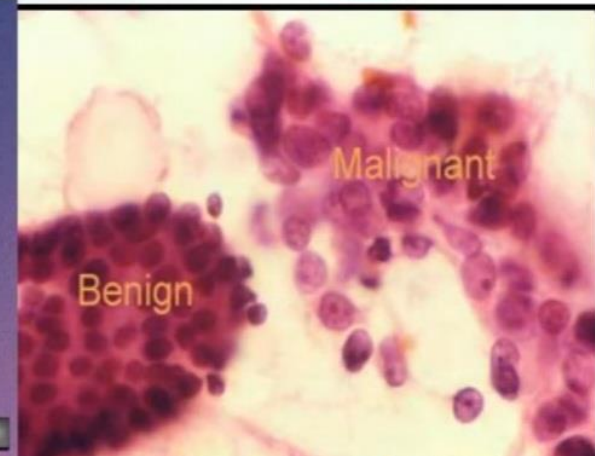
Fine needle **aspiration** biopsy is usually done in an office.

A small needle is inserted into the **tumor** and a sample of tissue is drawn up into the needle.

Material from the needle is put on a slide and examined for the presence of malignant cells.

It is a simple procedure done with minimal discomfort.

Disadvantage: May not always rule out **cancer** when it is negative.



Core
biopsy

pt has
central
tumor &
retracted
nipple

local
anesthesia



hormonal studies can't be done by FNA but with CNB



Biopsy



FNA

- relatively atraumatic
- sensitivity of %99-73
- ideal for simple cyst aspiration
- can't distinguish in-situ vs invasive cancer

CNB

- cutting needle
- greater trauma
- high sensitivity - 100%
- distinguishes between invasive and in-situ
- stereotactic with mammography and US
- hormonal studies can be done:
 - estrogen
 - progesterone
 - HER 2



Incisional biopsy

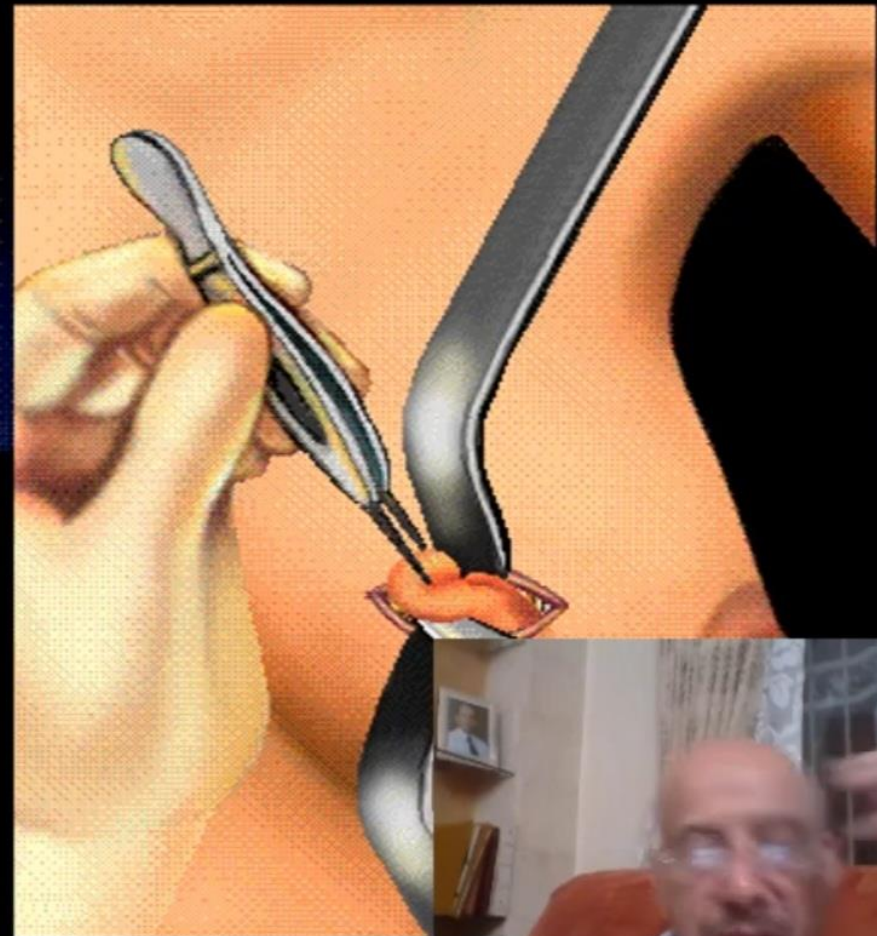
Incisional biopsy is done under local anesthesia, often with mild sedation.

It is an outpatient procedure. Only part of the tumor is removed for diagnosis.

Incisional biopsy is usually done when the tumor is large.

It is rarely performed except in special circumstances.

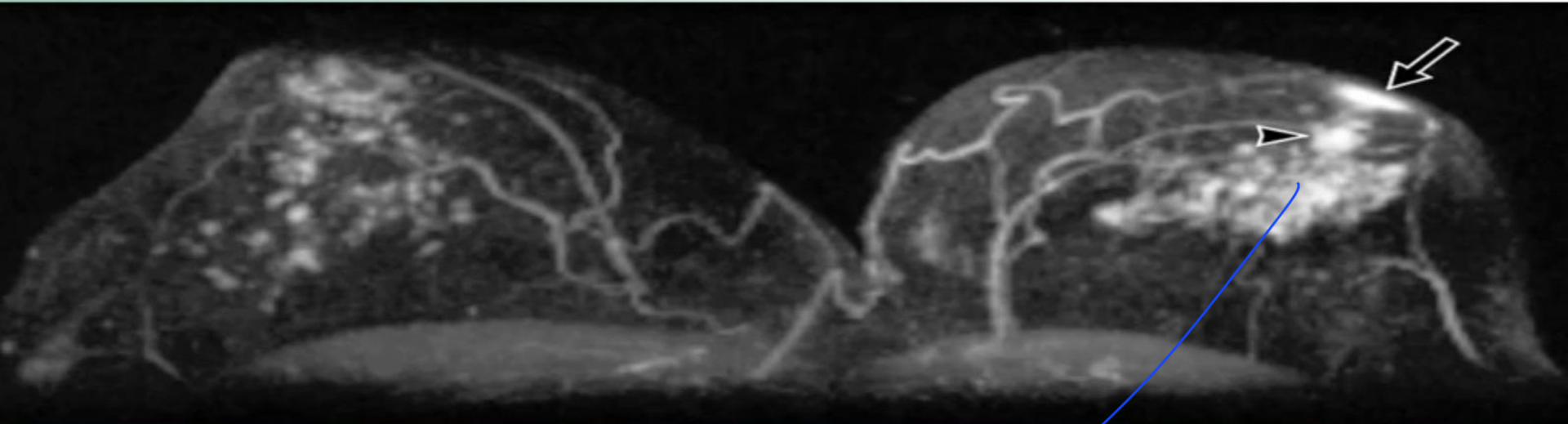
(remove mass without safety margin)



Paget's Disease of the Nipple



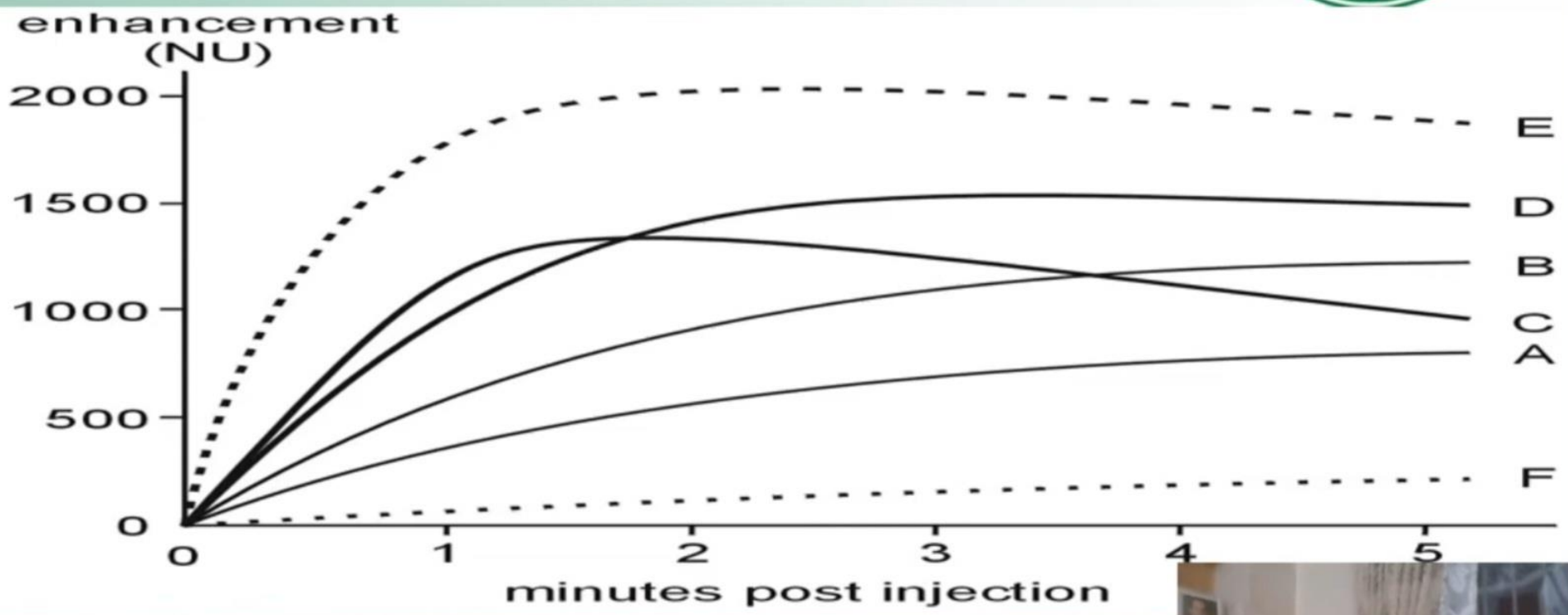
Strong family history → MRI at age 30



retro
areolar
carcinoma



We usually give an IV dye (gadolinium) during MRI to help us to differentiate bet. benign & malignant masses depending on dye enhancement levels



MR Imaging, breast

Enhancement curves for carcinomas. About 90% of enhance according to the patterns represented by D and E. NU = normalized units

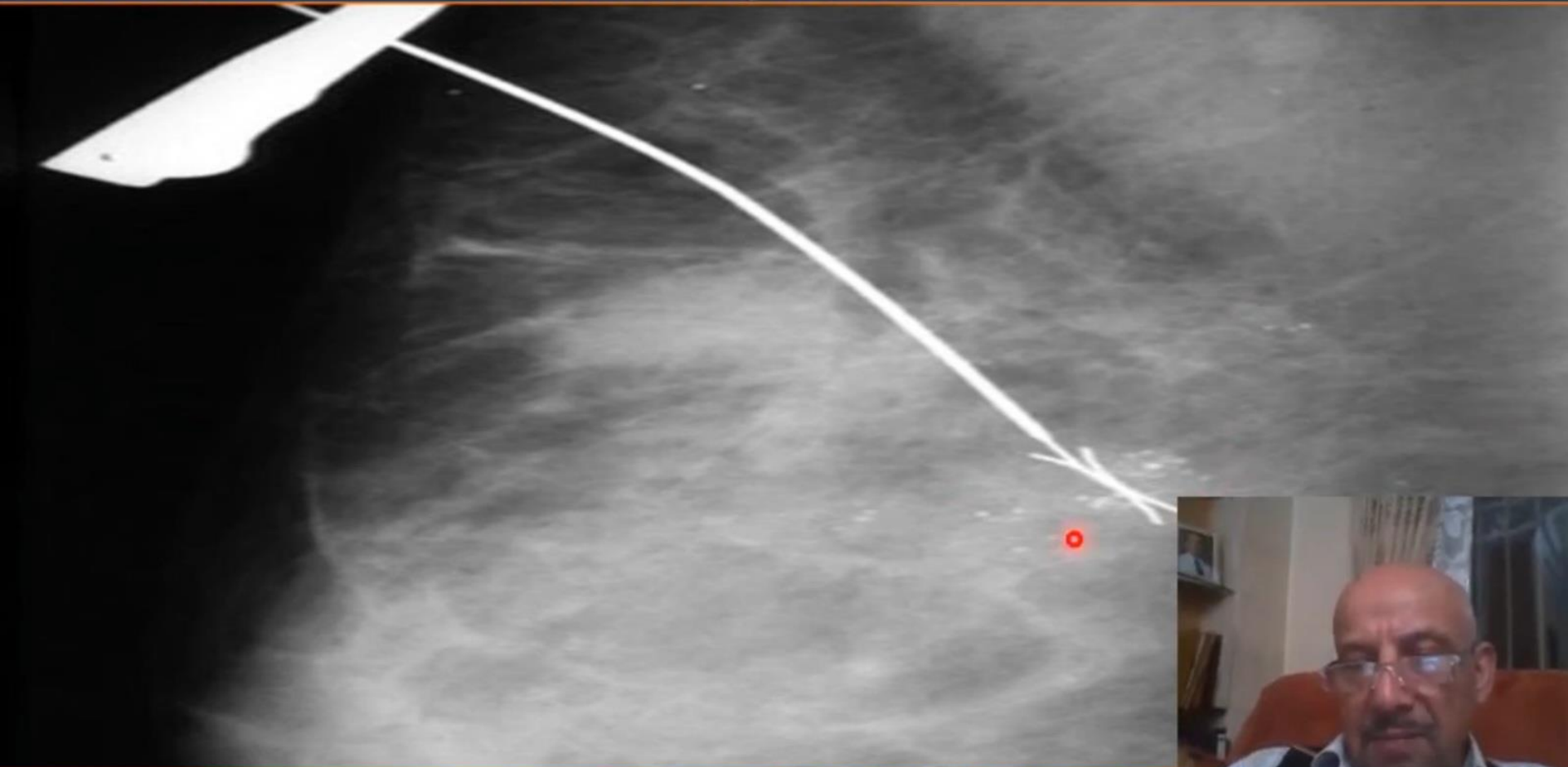


- We can use a guide wire inserted under U/S or mammogram & will be fixed around the tumor to help the surgeon know tumor location if it reduced in size with Neoadjuvant



Medscape®

www.medscape.com



Source: Appl Radiol © 2003 And

Stereotactic Image- Guided

Breast Biopsy (preferred over guide wire)

- ↳ mainly done for calcifications
- ↳ radial scar or sclerosing Adenosis masses can be excised completely by a rotating knife & a vacuum



patient lies here in prone position → pt head here

