

جَائِزَةُ الْحُسَيْنِ
بْنِ عَبْدِ اللَّهِ الثَّانِي
لِلْعَمَلِ التَّطَوُّعِيِّ

AL HUSSEIN BIN ABDULLAH II
AWARD FOR VOLUNTARY WORK



النادي الطبي
Medical Club



Radiology

Subject: MAMMOGRAPHY (women imaging pt2)

Group no: D11

Done by: Hala Yaseen



هَذَا خُلِقَ اللَّهُ فَأَرْوَنِي مَاذَا خُلِقَ الذِّينَ مِنْ دُونِهِ بَلِ الظَّالِمُونَ فِي ضَلَالٍ مُبِينٍ

بسم الله الرحمن الرحيم



MAMMOGRAPHY

المحاضرة حلوة و لطيفة و مهمة ، يلا بسم الله ٥٥

Dr Rasha Mohammad Musleh
Consultant radiologist

BREAST CANCER

- More than 3% will die from the disease.
- Breast cancer incidence in women in the United States is 1 in 8 (about 13%).

Less than 1% of all new breast cancer cases occur in men.



BREAST CANCER IN JORDAN



Ten most common cancers among Jordanian Males, 2011

	Site	Frequency	Percent
1	Lung	279	12.7
2	Colorectal	278	12.7
3	U. bladder	171	7.8
4	Prostate	169	7.7
5	Leukemia	128	5.8
6	NHL	120	5.5
7	Brain & CNS	108	4.9
8	Stomach	81	3.7
9	larynx	79	3.6
10	Hodgkin lymphoma	71	3.2

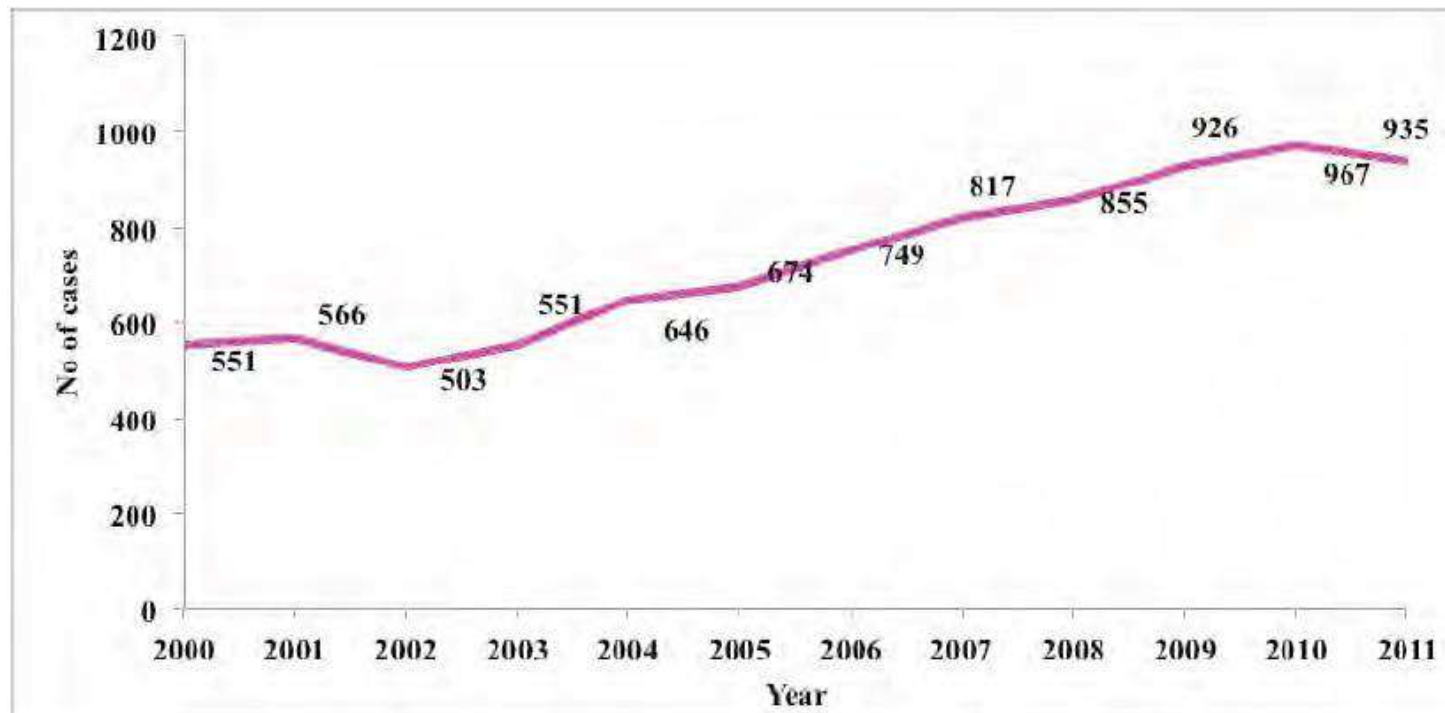


Ten most common cancers among Jordanian Females, 2011

Rank	Cancer	Frequency	Percent
1	Breast	935	37.7
2	Colorectal	233	9.4
3	Thyroid	145	5.8
4	Corpus Uterous	138	5.6
5	Non-Hodgkin lymphoma	100	4.0
6	Leukemia	98	4.0
7	Ovary	70	2.8
8	Brain, Nervous system	67	2.7
9	Hodgkin disease	53	2.1
10	Cervix Uteri	51	2.1

Less than 1% of all new breast cancer cases occur in men.

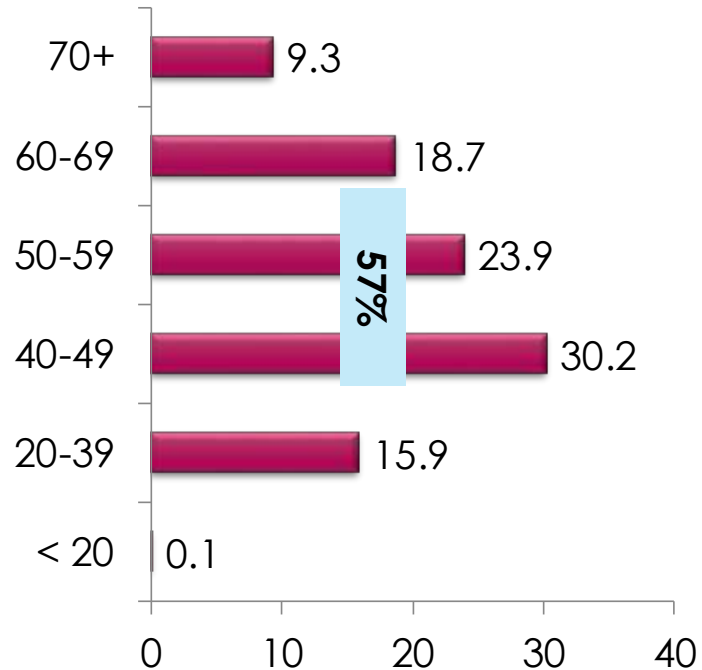
BREAST CANCER IN JORDAN



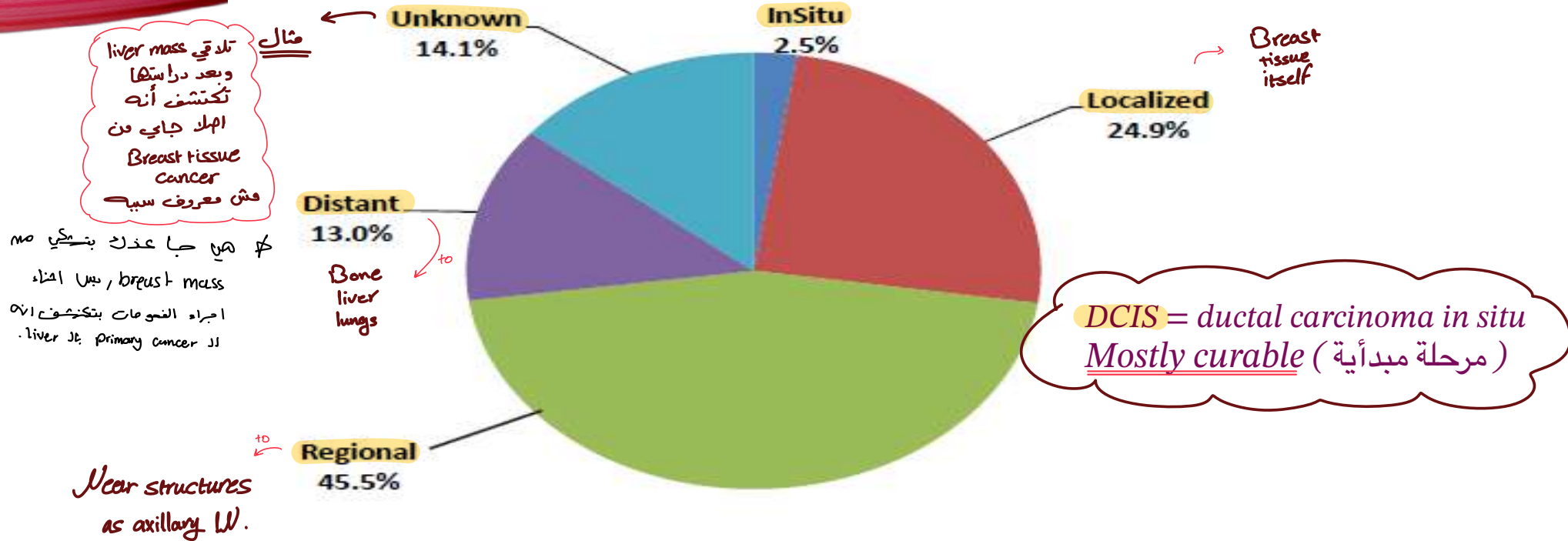
Trend number of female breast cancer 2000- 2011, Jordan

% of Female Breast Cancer cases By Age-group

40-60 yrs
↓
57%



BREAST CANCER IN JORDAN

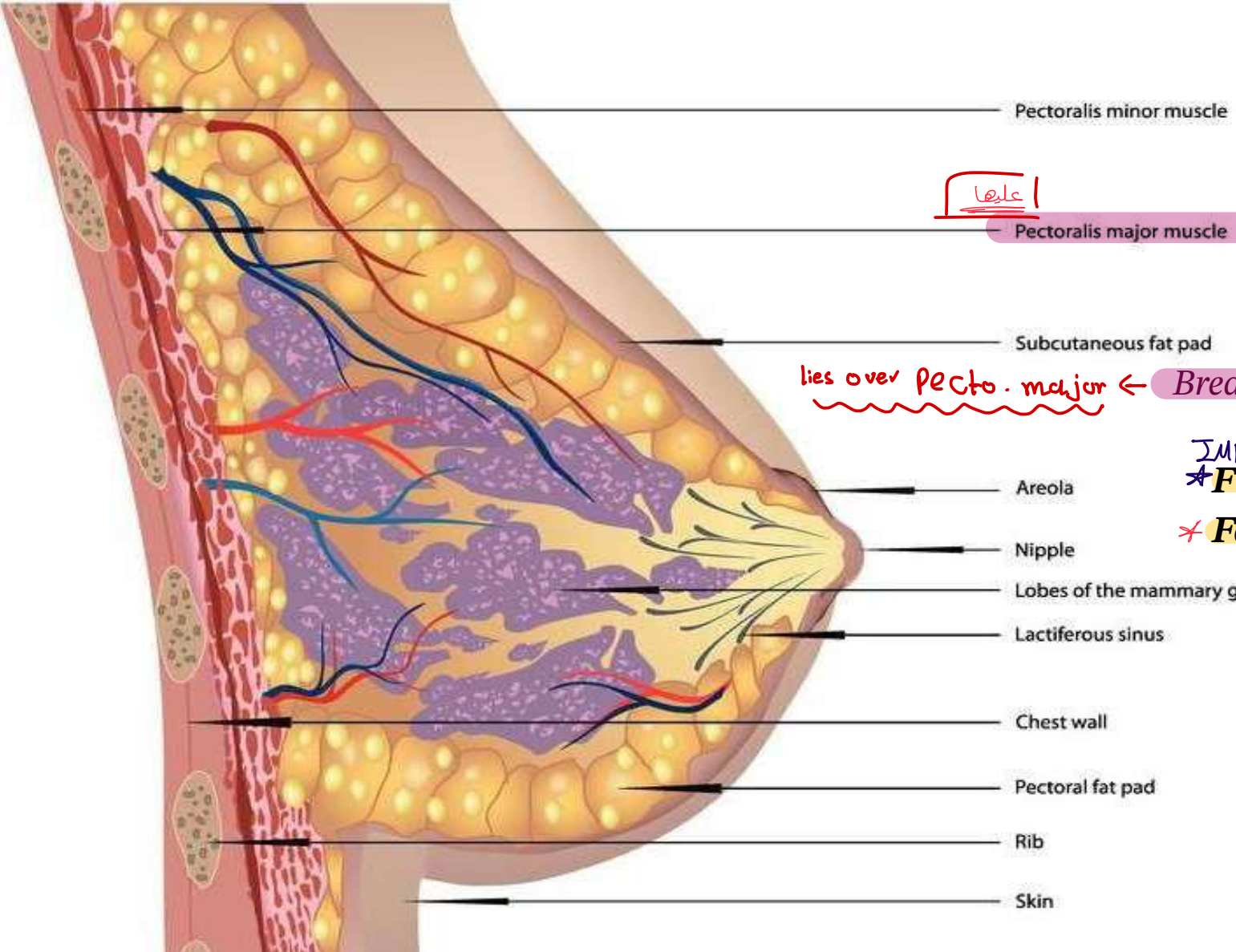


- Distribution of female breast cancer by Summary Stage , 2011

أشعة يعني اناتومي
نعرف أشعة يعني نعرف اناتومي

أهم اشئي نميز يمين و يسار

anatomy

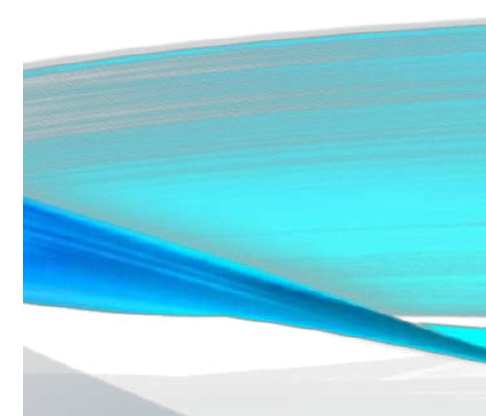


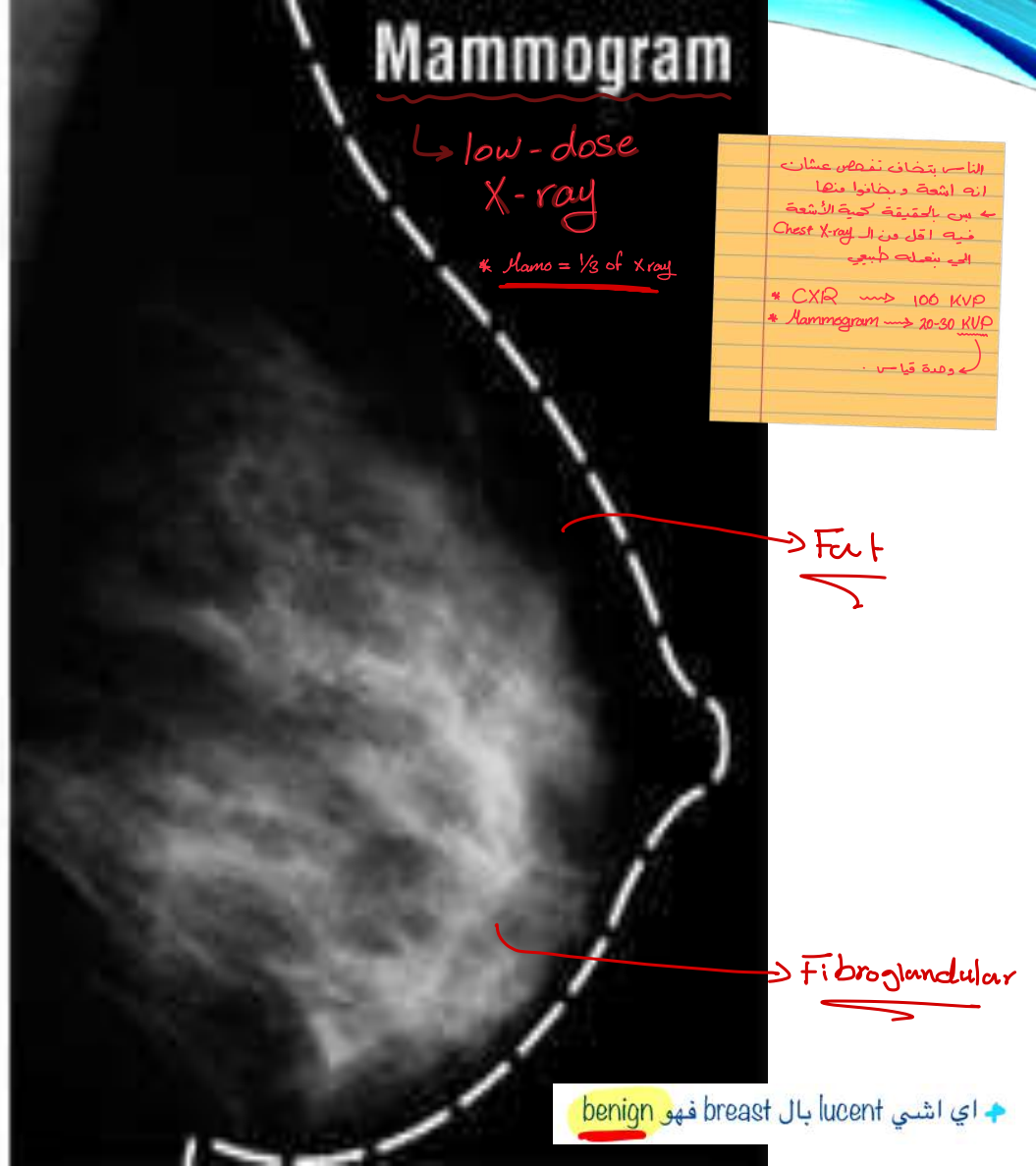
عليها

lies over pecto. major

Breast is between 2nd and 6th rib

IMP
★ **Fibroglandular** → white ^{dense}
✱ **Fat** → black ^{lucent}







Our ultimate goal..

- is to decrease mortality from **breast cancer**

How?

- Finding small breast cancer **before** they are **clinically evident** .treatable if early detected

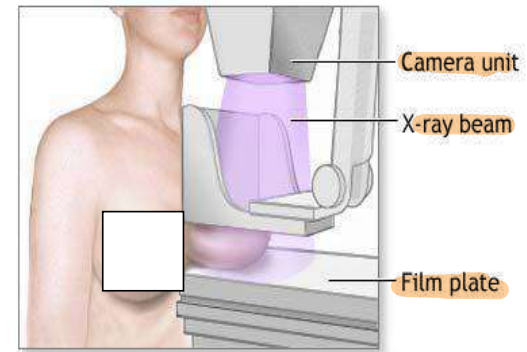
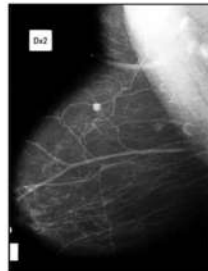
By:

- Screening Mammography

MAMMOGRAPHY

- Has become the standard tool for screening and initial evaluation of breast cancer.
- The major role of mammography is early detection of breast cancer in an **asymptomatic women** i.e. **SCREENING** mammography.

Reduction in mortality has been achieved by the ability of mammography to **find cancer at an early stage and smaller size** even before its clinically palpable .



In mammography, each breast is **compressed** horizontally, then **obliquely** and an x-ray is taken of each position

إذاً هو عبارة عن $x\text{-ray}$ ، و بكمية أشعة قليلة جداً ، هيها 30 ، في حالات الـ chest x-ray مثلاً ، بتوصل لحد 100 kVp ، ف بالتالي لا تخلو الناس تقتنع انه الماموغرام خطير

- Mammography is the cornerstone of breast imaging .
- Is the process of using low-energy X-rays (usually around 30 kVp)

Now ✱ Tomosynthesis (3D multi slices) and contrast enhanced mammogram play a major role in early detection of breast cancer.

- There are several breast imaging modalities available such as Ultrasound, Digital Mammography, MRI and PEM.

✱ we may use contrast

Positron Emission Mammography
(الطب انشعوري)

Positron emission mammography (PEM) is a nuclear medicine imaging modality used to detect or characterise breast cancer. Mammography typically refers to x-ray imaging of the breast, while PEM uses injected positron emitting isotope and a dedicated scanner to breast tumors.

بنعطي المريضة IV contrast هيك الـ fibro-glandular tissue يكون مابين ابيض اكثر و الـ mass بتكون بيضة اكثر

Contrasts :-

Barium → GI

Gadolinium → MRI (T₁)

IV non-ionized → indication and contraindication

RISK OF MAMMOGRAPHY

- Extremely low dose .
- Comparable risk are:
- Travelling 4000 miles by air
- Travelling 600 miles by car
- 15 min of mountain climbing
- smoking 8 cigarettes.

الهدف من السلايد نوضح انه كمية
الاشعة قليلة التي بتعرضها الشخص

* very low risk

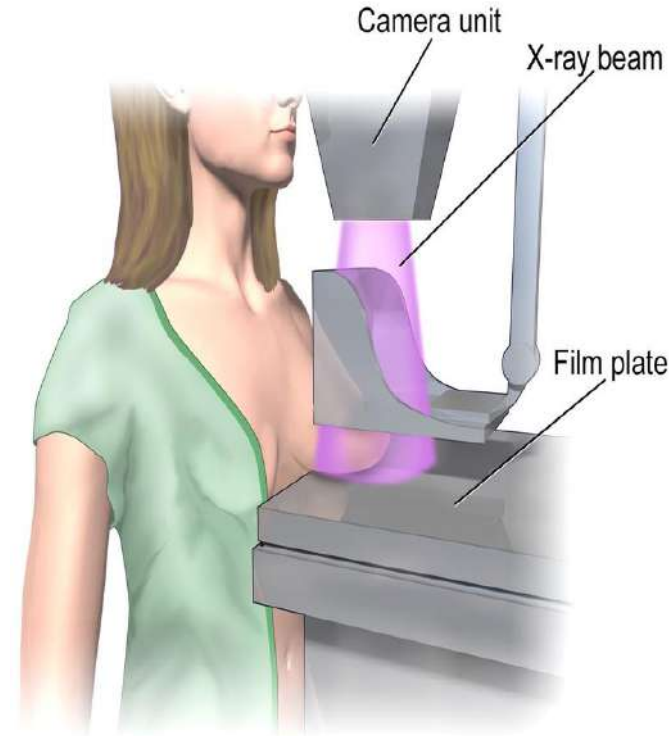
الضغط على الصدر ما بوجع لهاي
الدرجة ، هو شعور عدم راحة بس

عشان نعلن النساء .
(discomfort only)

PROCEDURE

- The breast is compressed using a dedicated mammography unit.
- Parallel-plate compression evens out the thickness of breast tissue to increase image quality by reducing the 1 thickness of tissue that x-rays must penetrate, decreasing 2 the amount of scattered radiation (as scatter degrades image quality), reducing the 3 required radiation dose, and holding the breast still (preventing motion blur). 4

*ليه بنضغط الصدر؟



Mammogram

COMPRESSION PADDLE

- (i) Decreases the thickness of the breast , thus reduces the scattered radiation –improves the contrast .
- (ii) Decreases the kinetic blur = motion blur (تشويش ناتج عن الحركة)
- (iii) Reduces geometric unsharpness by homogenously bringing the object close to the film .
اقلل عدم الوضوح الهندسي
- (iv) Makes breast thickness uniform in film density.
- (v) Differentiates the easily compressible cysts and fibro- glandular tissue from the more rigid carcinomas
- (vi) Separates the super imposed breast lesions → to avoid false +ve.
- (vii) Reduces radiation dose to the breast tissue → more safe

INDICATIONS

Guideline forever:

Age > 40 → mammogram

^{اقل 30} 30 > Age → ultrasound

- Screening of asymptomatic women
- Screening of high risk women (eg: ^{Breast Cancer} BRCA gene) Case بین 30 و 40 حسب کل
- Follow up of patients after mastectomy of same and opposite breast / same breast with implant .
- Investigations of benign breast diseases with eczematous skin, nipple discharge , skin thickening .
- Investigation of a breast lump → bloody , clear discharge is Sus.
- Investigation of occult primary with secondary mets.
- Male breast evaluation .

ما قرأته الدكتور بس اعرفوه

36 - 40 → no high risk → US

with high risk → MRI

??

US

اي ست فوق ال ٤٠ بنصورها mammogram .. بين ٣٠-٤٠ بنصورها ~~MRI~~ .. اي ست عندها first degree relative

مصابة ب breast cancer بنبلشها screening قبل ب عشر سنوات من العمر الي تشخصت فيه القريبة

اي palpable mass بتصورها mammogram .. اي lactating or pregnant woman بنصورهم

ultrasound .. الي عندهم BRCA 1,2 بنبلش ال screening على ال ٢٥ سنة ب MRI

اي male patient عنده mass عمره فوق ال ٢٥ بصوره mammogram

لاي ست عندها breast implant بنصورها mammogram يرتفع ال implant بطريقة معينة بحيث

يبين ال tissue الي تحته بس بضل جزء منه مومنين تقريبا ٢٠٪ ف ممكن نلجأ لصورة MRI

Risk Assessment

Gravida ✓

Breast feeding ✓

Age of menarche ✓

Hormonal Therapy ✓

Medical History

Previous Breast Surgery ✓

Current Medical Problems ✓

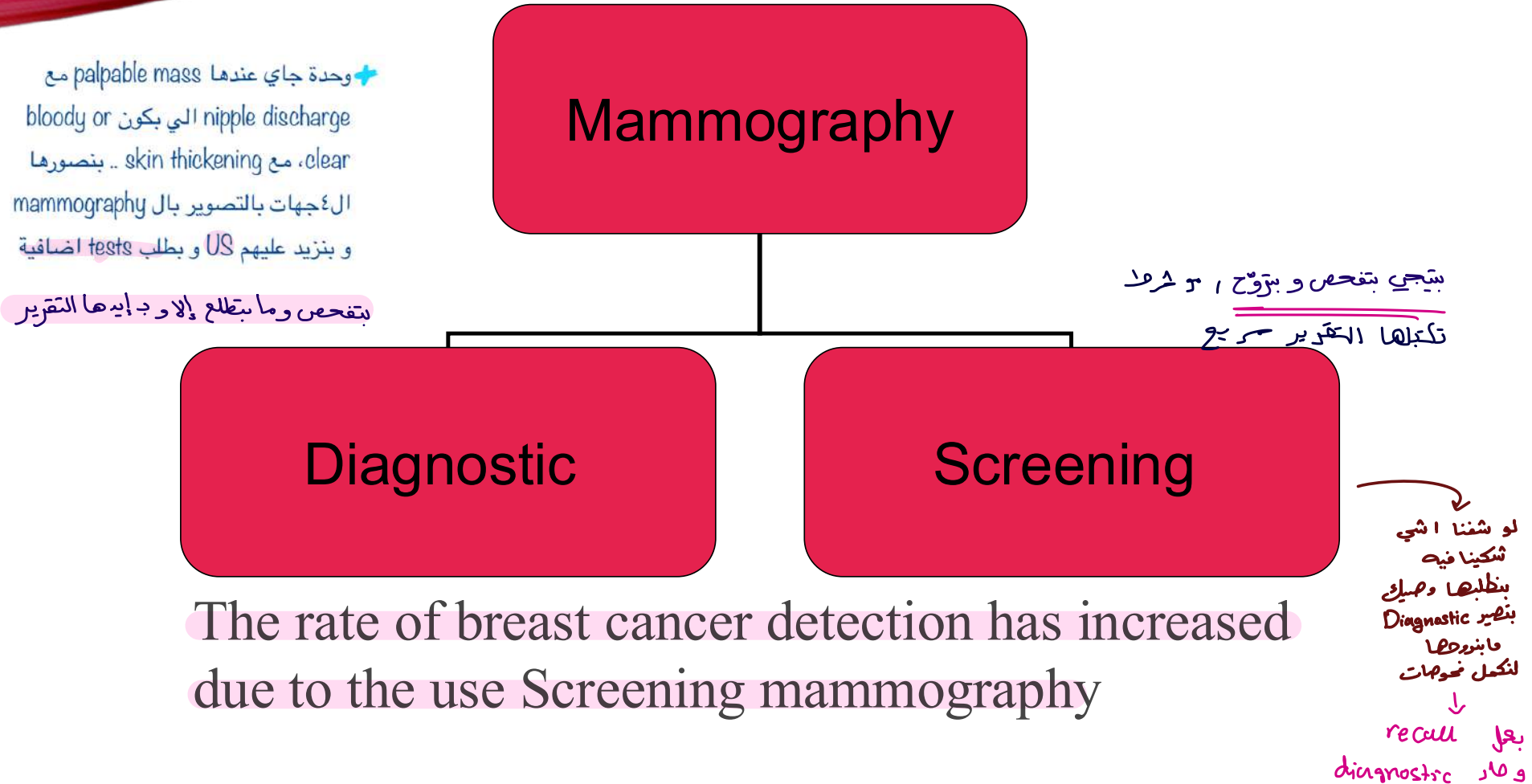
Family History

Family History of breast cancer and age of diagnosis.

Family History of other cancer and age of diagnosis.

Physical Examination

INDICATIONS FOR MAMMOGRAPHY



WHY SCREENING

- High prevalence .
- Improved outcome during asymptomatic period.
- Significant impact on public health.
- Curable early stage.
- It can be detected 3-5 years before it is clinically palpable

SCREENING MAMMOGRAPHY

- Mammography in asymptomatic patients.
- Guidelines or screening protocols in each country.
- Baseline: >40 years annual.
- Till life time expectancy is > 10 years
- In ladies less than 40 years and above 30 years with high risk: (30 - 40) + high risk
 - strong family history
 - genetic predispositions (early onset of breast cancer, male breast cancer). BRCA 1 and BRCA 2 gene mutation.
 - 10 year prior to age of diagnosis of first degree relative .
 - History of prior radiotherapy
- *MRI for high risk patient .

DIAGNOSTIC MAMMOGRAPHY

1. Evaluation of breast symptoms and signs
 - pain, mass, nipple discharge, skin or nipple retraction or changes.
2. Before breast surgery (multifocal, multicentric, bilateral).
3. Follow up breast cancer patients: the treated breast. ✦
4. Work up of patients with metastasis from an unknown primary. ✦
5. Additional views in screening patients (recalled patient)
6. Under supervision of radiologist

!! انواع التصوير :

CC right

CC left

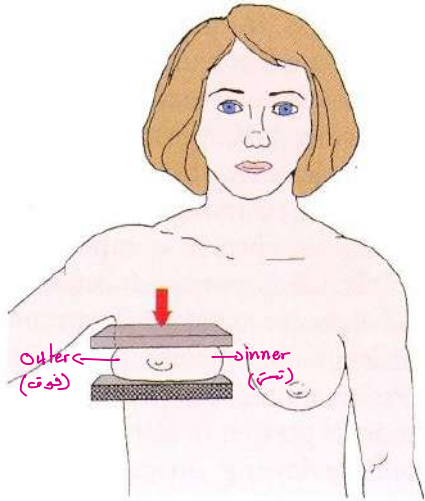
MLO

عشان نقدر نحدد احنا وين ، بنقسم ال breast من عند ال nipple

BASIC VIEWS:

1. CRANIOCAUDAL VIEW (CC VIEW).

Outer and inner



*الفكرة هون منضطت

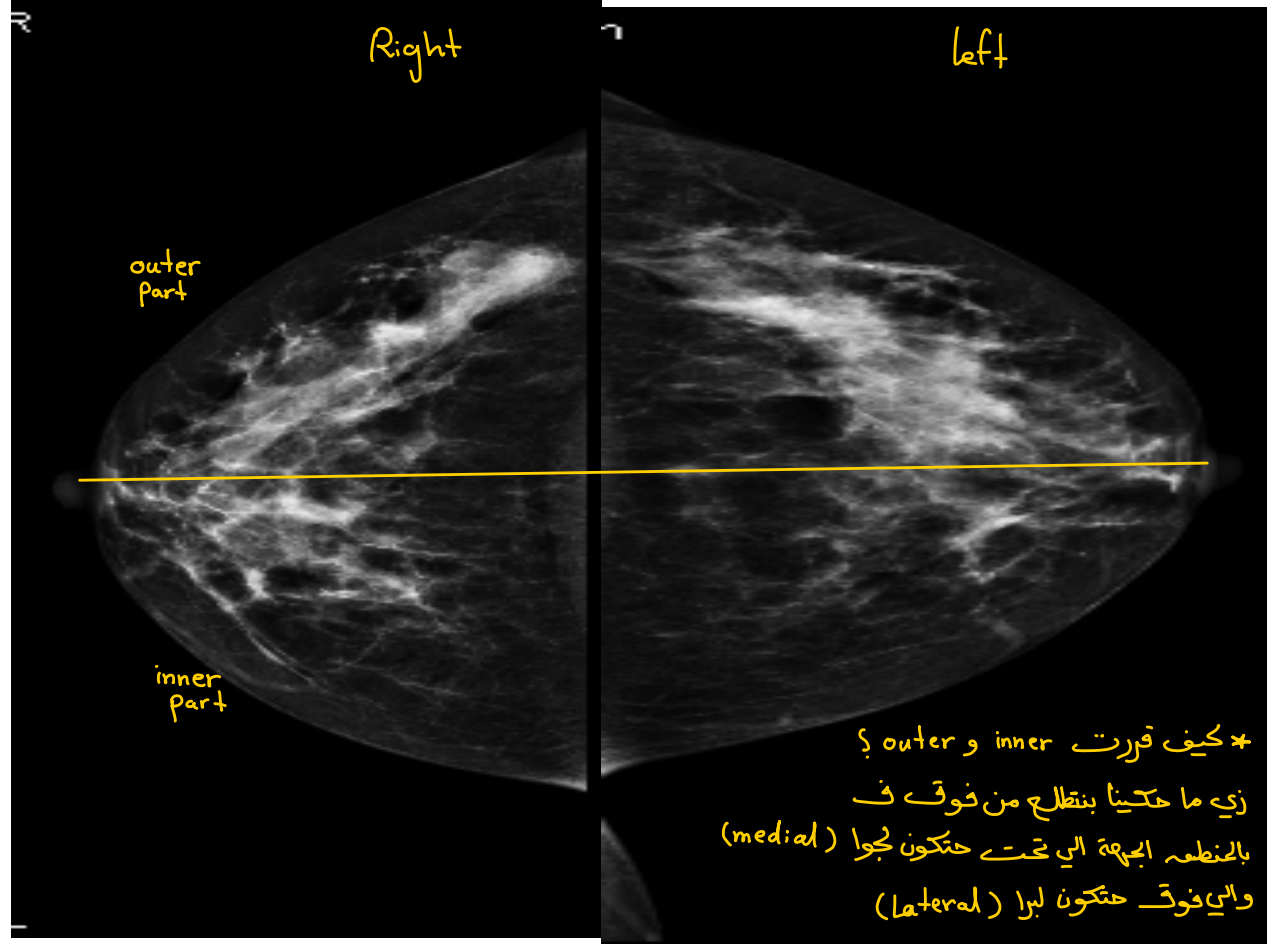
السر، واتجاه الأشعة

من فوق لـ تحت

نفس ال breast بس بدل ما يكون بالطول
عملناه هون بالعرض بحيث صار ال outer

part فوق و ال inner part تحت

ف بالتالي الصوب ال CC
كمان بتطلع ال breast من فوق



*كيف قررت ال inner و outer ؟

زي ما حكينا بنطلع من فوق ف

بالمنطعة الجهة الي تحت ح تكون لجوا (medial)

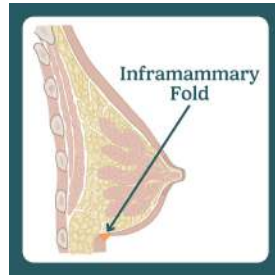
والي فوق ح تكون لبرا (lateral)

CRANIO-CAUDAL VIEW

- The cassette is placed under the breast at the level of the inframammary fold .

- The breast is then pulled until the inframammary fold is taut .

نشان می‌دهد که این پیکان محدود



- Compression is applied and Xray beam is directed vertically from above .

یعنی از جهت من → CC
فوقه (منه از اس) تحت (الامبرین)

- Postero medial aspect should also be included .



Rt

CC

Lateral
Outer

calcification

شو هاد الجزء؟
outer left

هاد normal right

breast لونه على سواد

لانه في fat اكثر

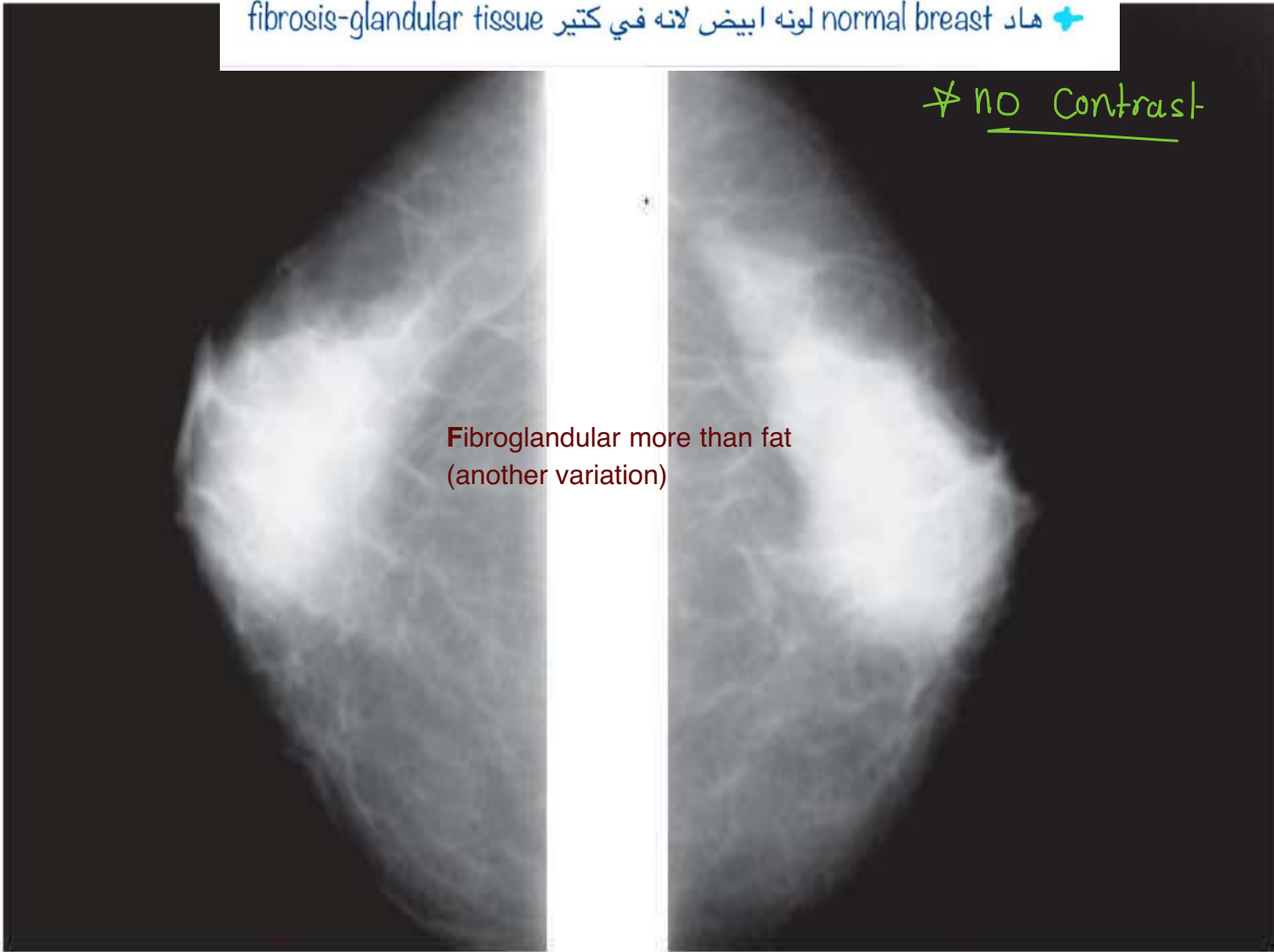
**The predominant
Of the variations**

Medial
Inner

fibrosis-glandular tissue هاد normal breast لونه ابيض لانه في كثير +

* no Contrast

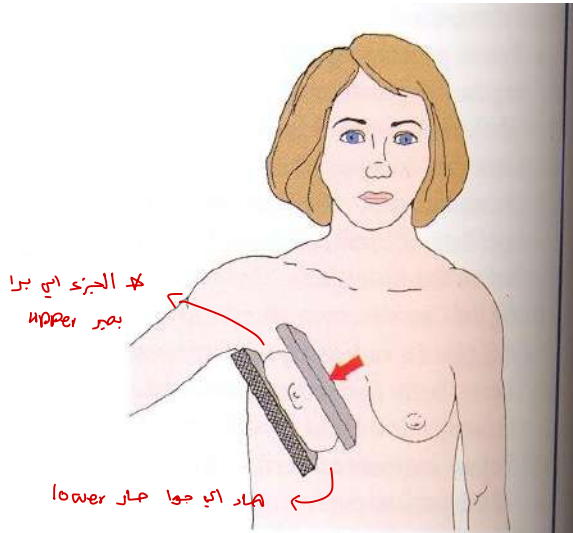
Fibroglandular more than fat
(another variation)



2. MEDIOLATERAL OBLIQUE VIEW (MLO VIEW).

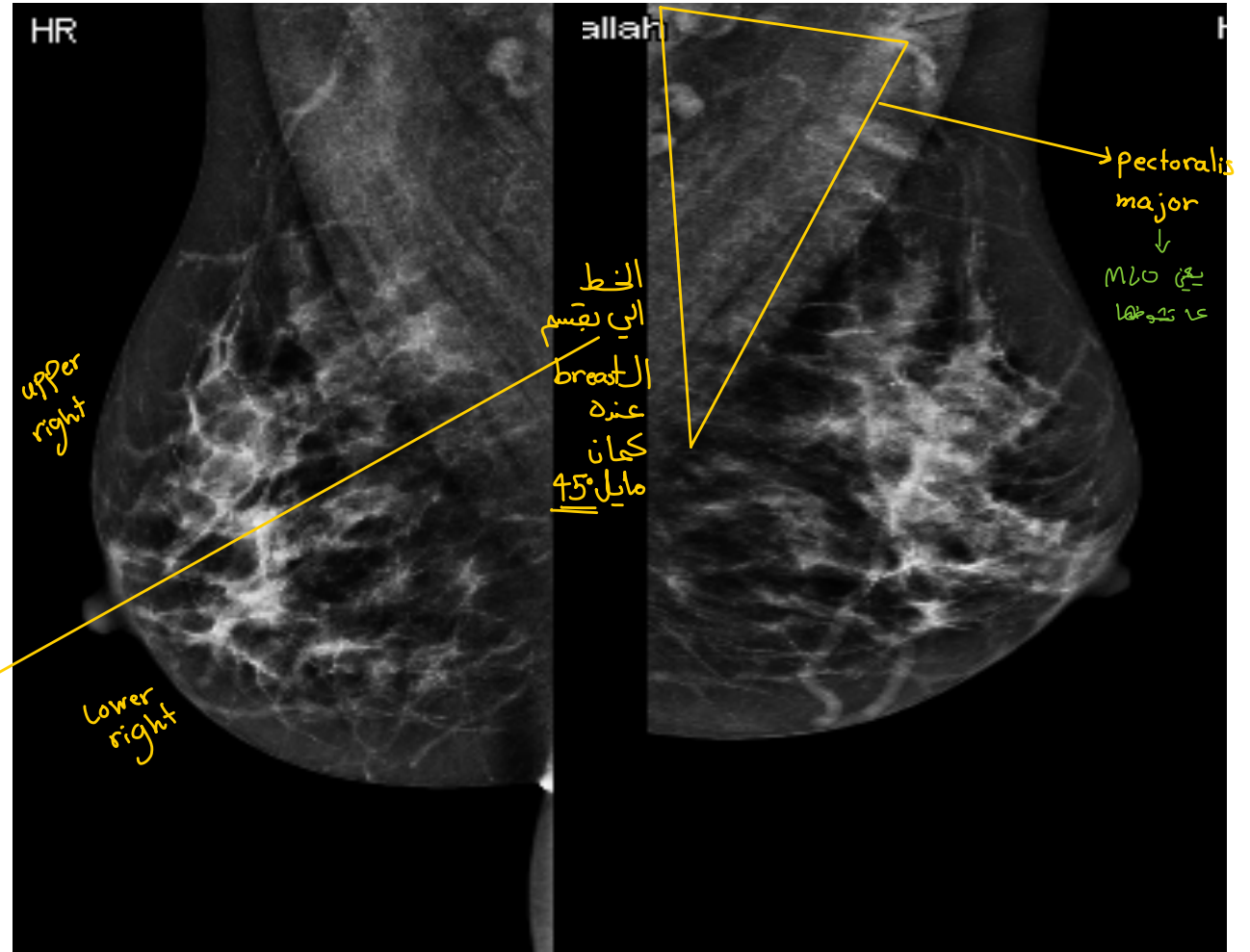
هون بميل جهة التصوير 45°

Upper and lower



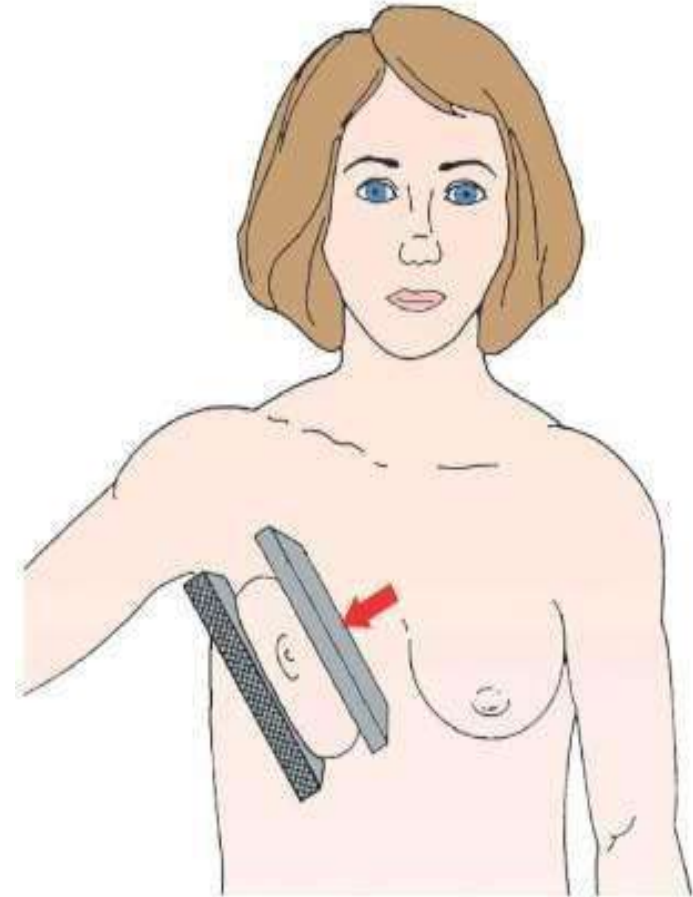
Mediolateral oblique (MLO)*

* بما اني ميّلت الجهة الي بتدخل منها
الاسلحة، ف ميّلت كيف بتطلع كمان.. ف رح يصير
الجزء ابي فوق هو upper والي تحت هو lower



MEDIOLATERAL OBLIQUE VIEW

- Best view to image all of the breast tissue and the pectoral muscle .
- The C-arm of the mammographic unit is rotated to 45 degree so that the cassette is parallel to the pectoral muscle .
- The film holder is kept high up in the axillary fossa and the patient's arm is abducted at the elbow by 80 degrees.
Shoulder
- The xray beam enters the breast from the medial side –compression is applied to the pectoralis major muscle .



* fibroglandular tissue
in middle east is more

* with age they ↓
and fat ↑

أي اشئ بشوفه ع ال CC لازم اشوفه ع
ال MLO ، ف هاي نفس الصورة ب سلايد
٢٣ ، وين مكان ال calcification ؟

1. بنقسم البريست ب خط مايل
2. بما انه احنا ب MLO ف بحدد
upper و lower عندي
3. بوصف مكان الاشئ

Calcification in
upper left breast

outer

cc

Rt

MLO

Upper

Lower

أول ما أشوف
هائي العضلة
بحرف انه
MLO الصورة

شايقين البريست
هون اغلبه *fat* ،
هاد الاشني بعتمد
على عدة عوامل زي
كم مرة خلقت ، كم
مرة رضعت ، عوامل
وراثية ، و كثير
شغللات

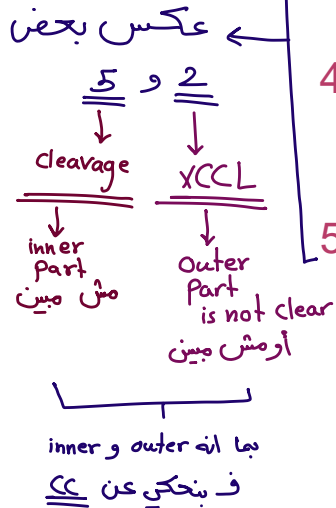
الاسلايد مهم مهم مهم !!

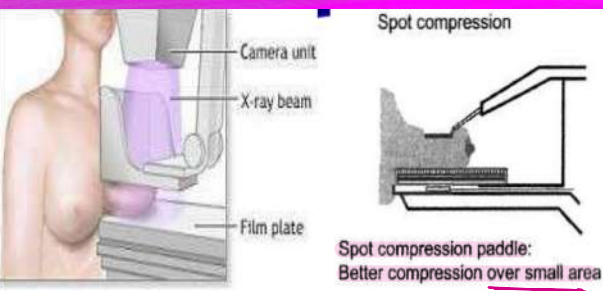
SUPPLEMENTARY VIEWS

جدول شغلان اضافية بعملهم للـ
diagnostic mammogram

1. Lateral projections (mediolateral/lateromedial)
2. Extended craniocaudal projection , XCCL .
3. Tangential views in palpable masses and in skin calcification . Skin mole (عدسة مكبرة) .
لـ نشت mass بالصورة وشكيت انها اشـ بالجلد .. بعمل صاـ النوع .
4. Spot compression magnification views (calcification or suspicious mass).
↳ it comes as 2nd Step after main mammography when Suspecting something.
5. Cleavage view for inner masses.

عشان حرك بنظورها
بعد الاستحمام
بدون ولا اشـ
حتى مزيل عرق
بتبين كانه
calcification .





COMPRESSION VIEW

- The compression device is parallel to the receptor surface .
- Radiolucent plate that is flat and parallel to the support table .
- Should match the cassette size



هيا هاي العدسة المكبرة ، شو اسم ال
 ؟ study
 Spot compression magnification

* Can't know
 if CC or MLO

MAGNIFICATION VIEW



mainly using it for
calcification

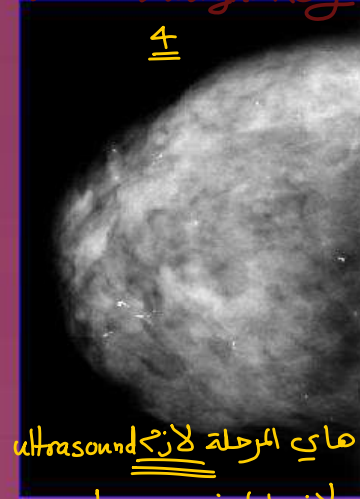
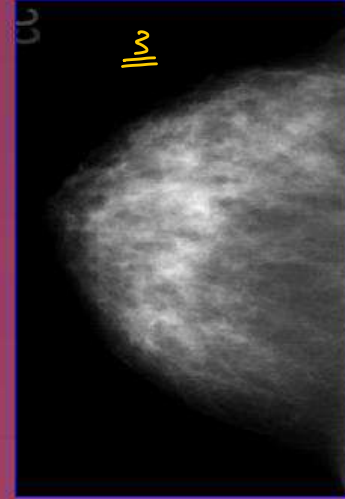
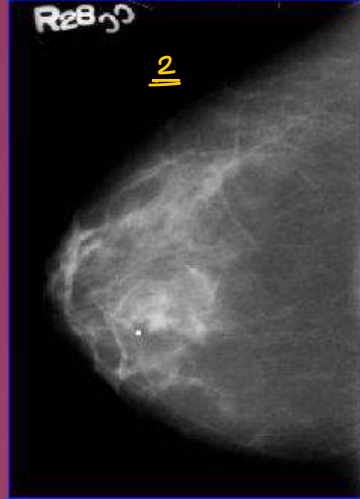
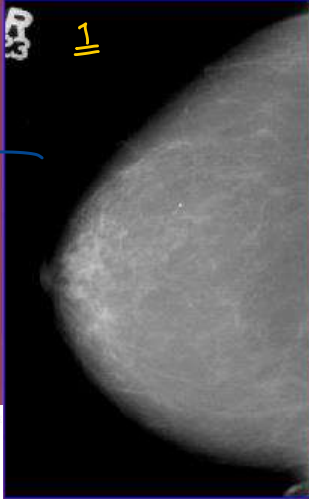
لأنه يمكن يكون إشارة
الى Malignancy او بياتة

types
↪

Breast Density

↪ More prone to Malignancy

ON



predominant fat

• mass يبان أوضح لأنه:
• الدهون تظهر مظلمة (dark) على الماموجرام
• mass يظهر فاتح (white) → تباين أعلى → detection أسهل

قد اصعب الفحص
باليدين.

ماي المرحلة لازم ultrasound
لانه اذا في mass ما بتبين هون

87%

Sensitivity

63%

97%

Specificity

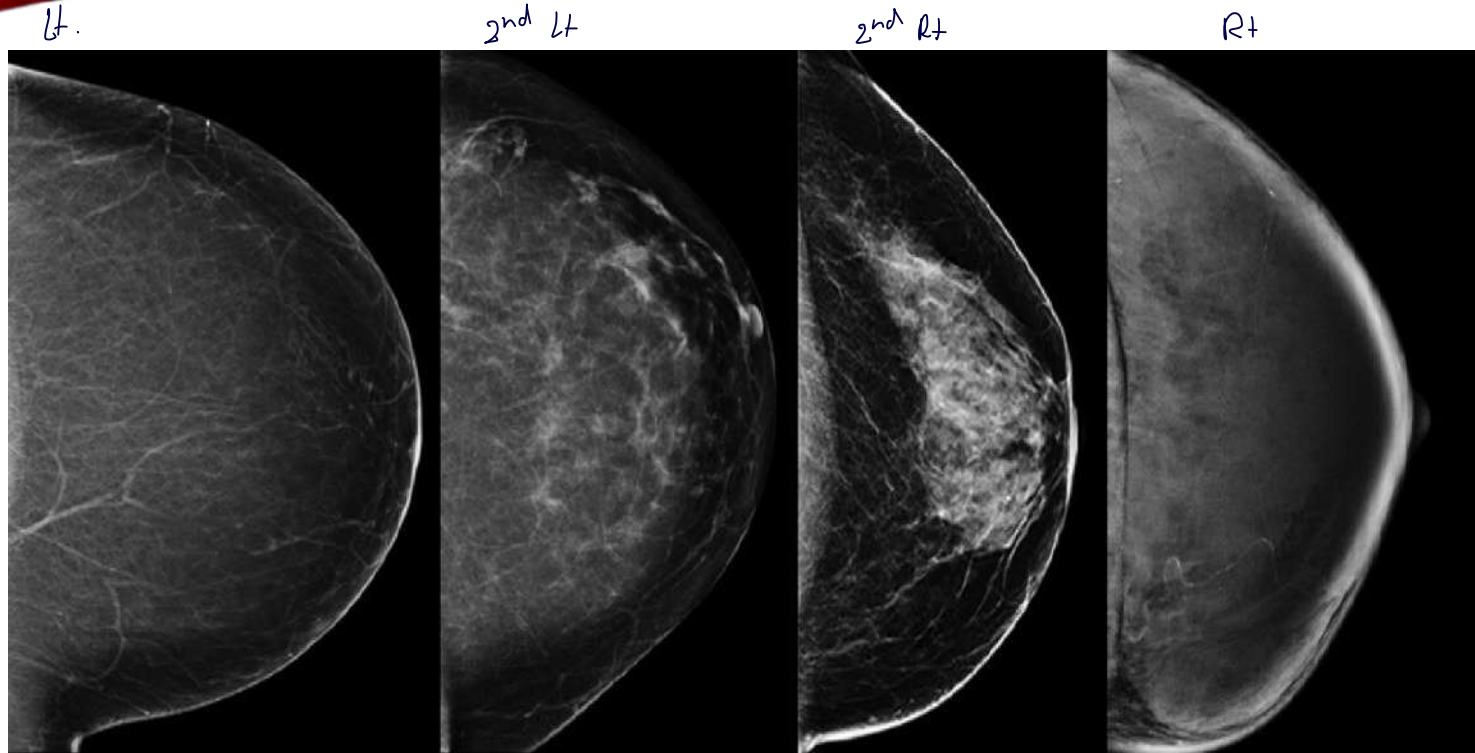
89%

Carney PA. Ann Int Med 2

• لو الثدي dense، يعني فيه غدة أكثر من الدهون:
• ال mammogram sensitivity تقل
• ال masses الصغيرة ممكن تختفي أو تتغطى بالأنسجة الغدية
• لأن الغدة بيظهر أبيض على الماموجرام وال mass غالباً أبيض كمان → صعوبة التمييز

الحل للتغلب على Dense tissue
• نستخدم Additional imaging:
• Ultrasound → dense breast ممتاز له
• MRI → high-risk عالي الحساسية، خاصة للـ dense breasts
• أحياناً 3D digital breast tomosynthesis (digital mammography) → يقلل مشكلة تراكم الأنسجة

MAMMOGRAMM - DENSITY



Subjective assessment of breast density. entirely fatty (far left), scattered areas of fibroglandular density (second from left), heterogeneously dense (second from right), and extremely dense (far right).

MAMMOGRAPHIC ALARMING SIGN

⚠ كل هاي العلامات تدل على الخطر !

- Irregular spiculated mass
- Asymmetrical breast density
- Architectural distortion

¹ Clustered micro calcification, ² pleomorphic and linear ³ branching microcalcification

- Skin and nipple retraction
- Skin thickening
- Pathological lymphadenopathy (By MLO)

!! أهم 3 انواع بكل المحاضرة ، هدول *malignant* ، و اي اشئ عداهم فهو *benign* ، ميزوهم منيح !!

*clustered micro calcification

↳ 5 or more spots $\Rightarrow$ in area less than 1 cm

*pleomorphic

↳ large area, different types and sizes.

*Linear Branching

↳ tree like

الفرق بين ال distortion and mass : ال distortion

بتكون بس speculations زي اشعة الشمس بس

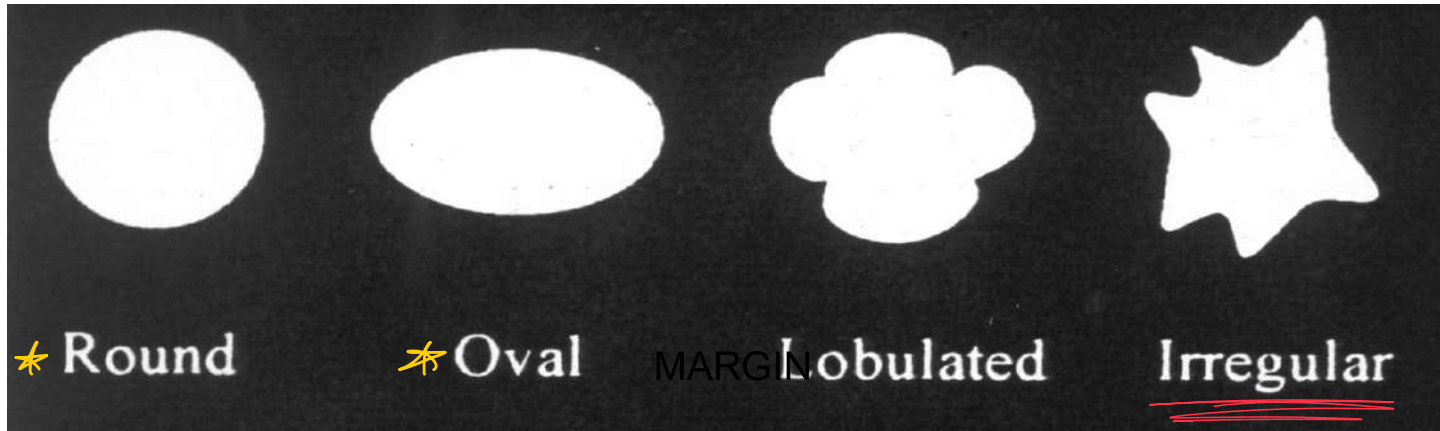
بالنص ما في mass اما ال speculated mass في

mass بالنص لونها ابيض و طالع منها speculations

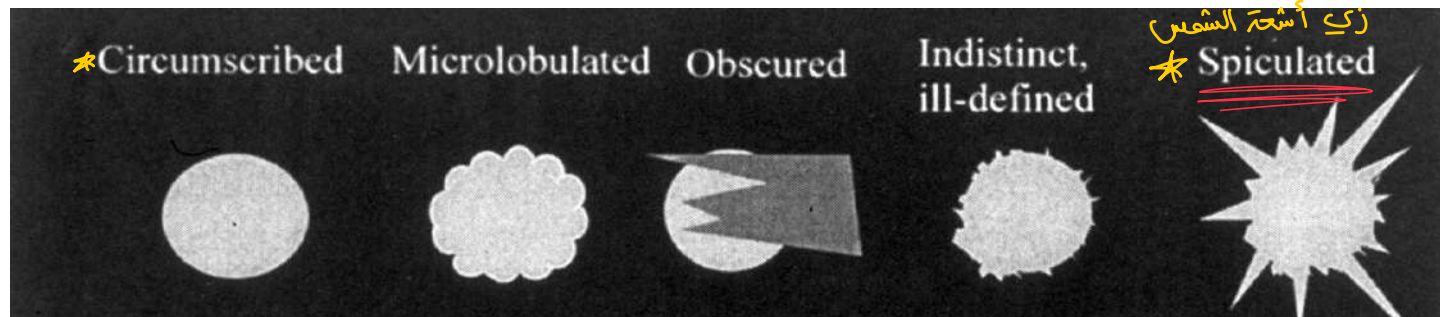
عند ال Pectoralis

MASS

Shape



MARGIN



أول ما اشوف اي mass او اي اشئ غريب
بالصورة ، بدي اشوف :

▼ هي هو طبيعي ؟

▼ هي هي *circumscribed* ولا *irregular* ؟

▼ شو شكلها ؟

▼ هل هي *dense* ولا *lucent* ؟

BENIGN MASS

Circumscribed oval or
round mass and may
contain coarse ,pop corn
or benign calcification

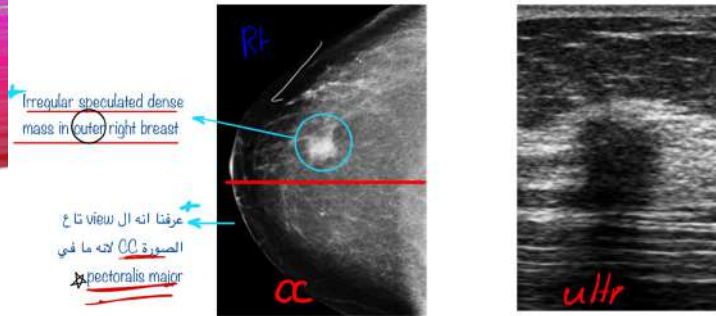
↓
غالباً هذا الى بدي اياه
من كل صورة

* المهم أرفف الى قدامي صح *

اسألوا حالكم شو شايفين بالصورة بعدين اقرأوا هاي 🙋



INVASIVE LOBULAR CA.



MALIGNANT MASS

Variable shape , irregular outline , spiculated and may contain malignant pleomorphic or linear branching calcifications

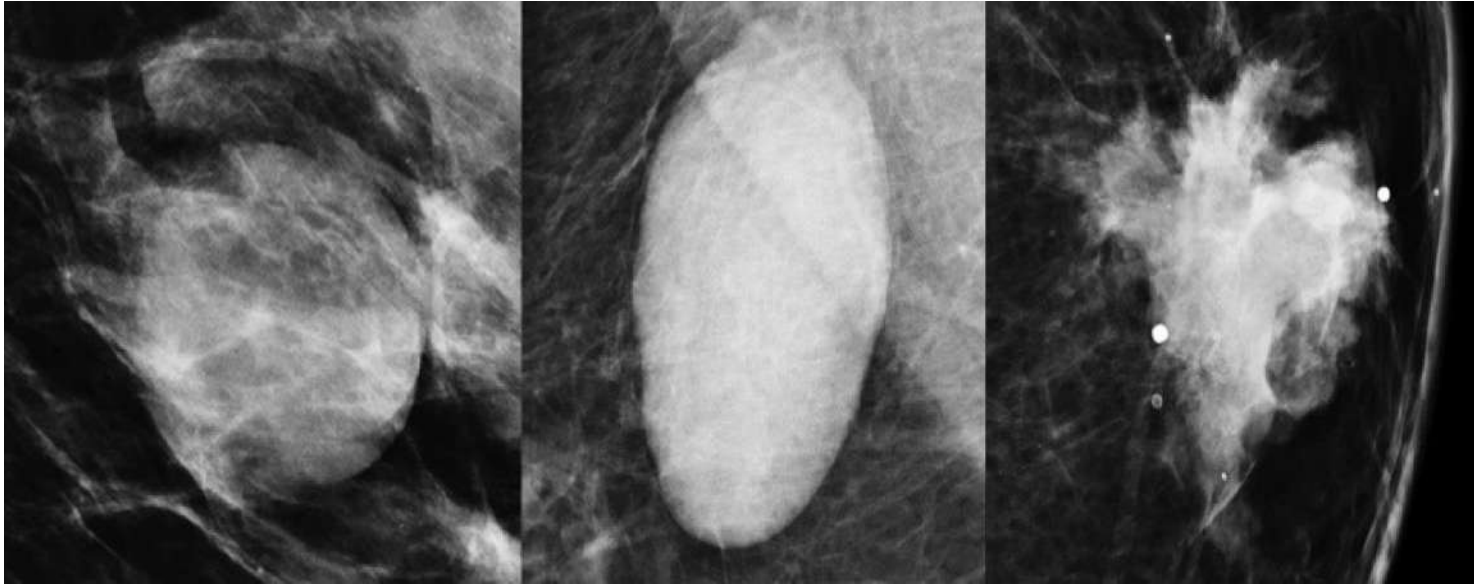
ببلش خطوة خطوة

اول اشني في منطقة لونها ابيض و مش واضحة المعالم ، ف بالتالي عنا ، *speculated* ، *irregular* ، *dense mass* ، و بالاضافة شو شايفين ؟ في نقاط لونها ابيض متفرقة و متوزعة و شكلها مختلف ، ف بحكي انه في *pleomorphic calcifications*

هل هاي *malignant* ؟ تذكروا انها من ضمن ال 3 المهمين ف اه



MAMMOGRAM - **MASS**ES



Rounded

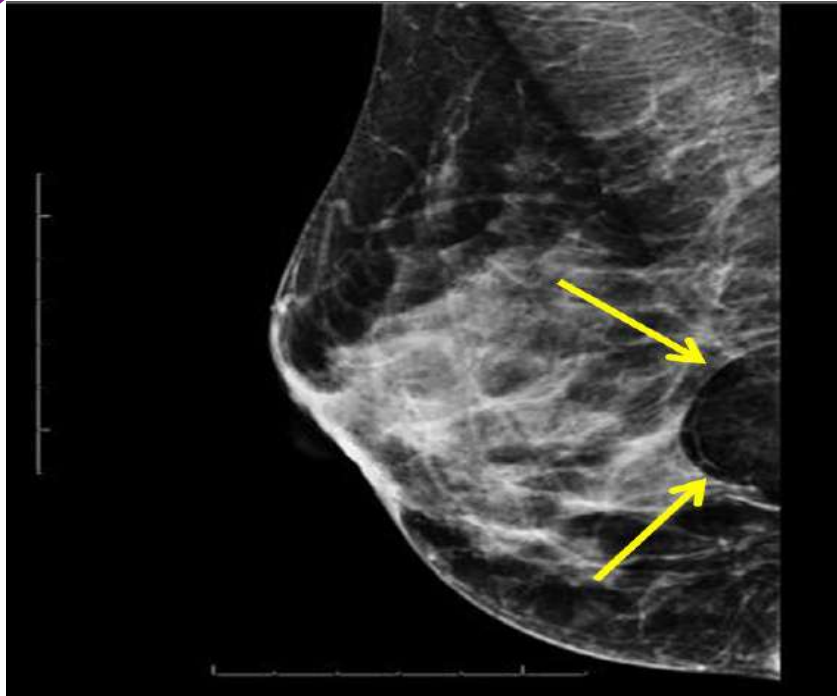
oval dense

irregular
spiculated dense

بجوف

RADIOLUCENT MASS

MLQ?



حكيينا انه الـ *fat* بكون لونه أسود
طب انا شو شايف هون؟ شايف *mass* لونها
اسود ، لعاد أكيد مكونة من *fat*

و *circumscribed* ، *regular* ، بنسبة
99.9% هاي الـ *masses* بتكون *benign*



FALSE NEGATIVE MAMMOGRAM

- Extremely dense breast ✓
- Occult on mammogram (lobular cancer) ✓
- Technical ✓
- Error in interpretation ✓

Hidden
مخفی و نامرئی

CALCIFICATION

بكونوا بقنوات الحليب و بصيرلهم sedimentation و بيبنوا

على 2 lateral view الي بنصوره على ٩٠ درجة

- Most calcification are benign . (Milk of calcium , egg shell , popcorn , lucent center , vascular , suture , large rod like (secretory) and skin calcification .

صح هم benign و على الاغلب بنعتبرهم DCIS

بس كمان سنة سنتين ممكن يتحولل cancer

- Microcalcification are important as early sign of breast cancer.
- 90% of DCIS appear as microcalcification .
- Malignant calcification (¹pleomorphic , ²cluster , ³linear branching)

BENIGN CALCIFICATIONS

When seeing calcification

لو شکایت
و ما عرضت ایز } Next step

✱ Spot Magnification

Typically Benign

Skin



Round

Vascular



Eggshell

Coarse



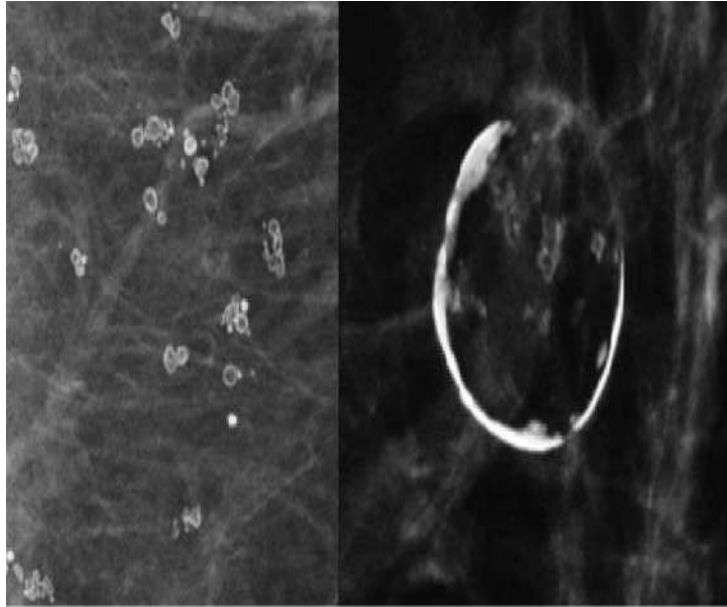
Milk of
calcium

Large,
rod-like



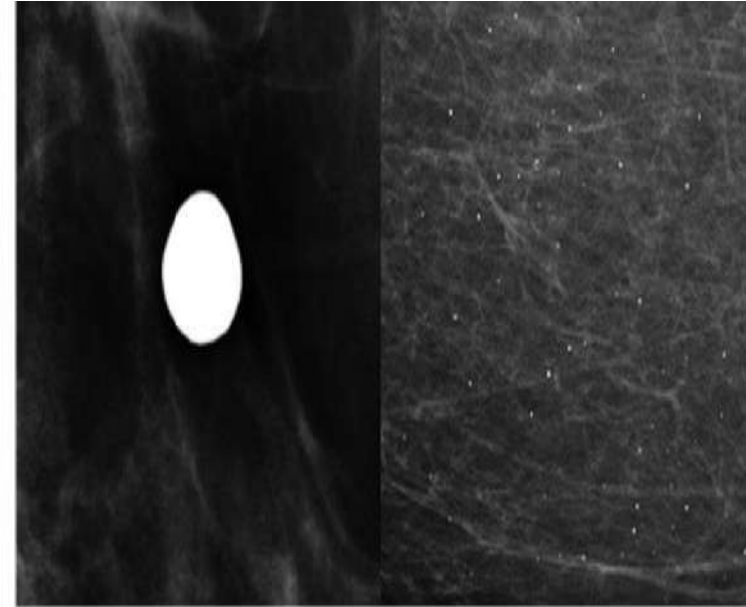
MAMMOGRAM – BENIGN !!! CALCIFICATIONS

*Any Calcification
with Lucency (نورانية)
is Benign until proven
otherwise.



a.

(a) Rim calcifications: Lucent-centered and eggshell calcifications have been combined into one category



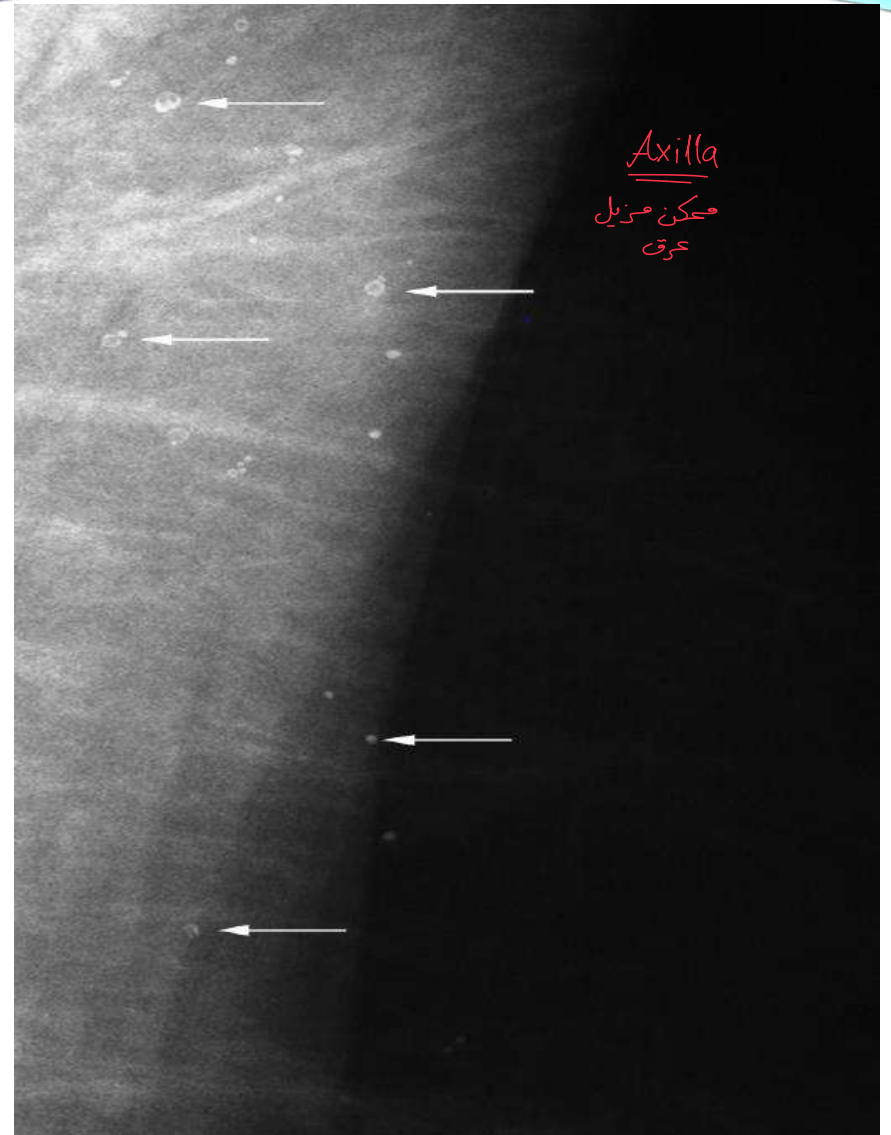
b.

(b) Round calcifications: Round and punctate calcifications have been combined into one category.

DERMAL CALCIFICATION

عشان اتأكد انها بالجلد ، شو بعمل فحص اضافي ؟

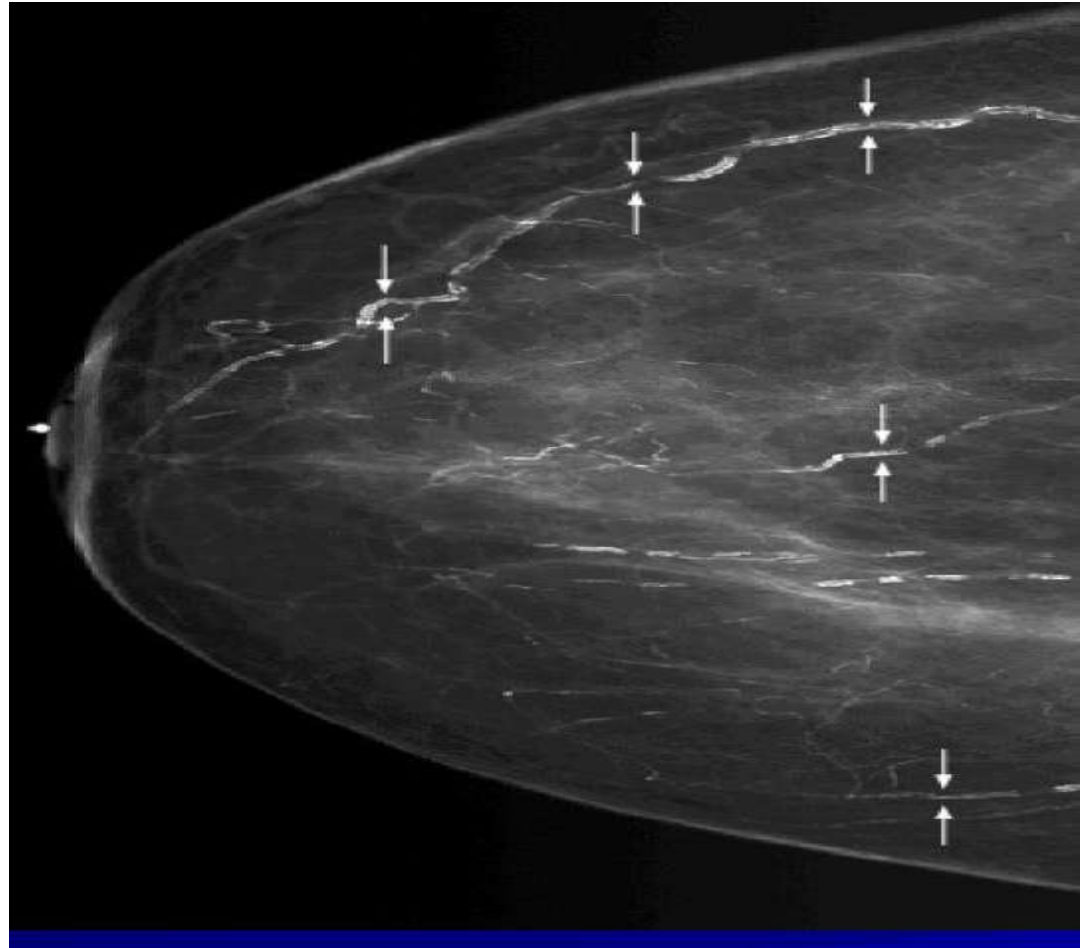
👁️ *tangential*



VASCULAR CALCIFICATION

هون ماخذ شكل الـ *vessel* ، لما اشوفه
لازم اخبر المريضة تزور طبيب قلب
مختص بالـ *coronaries*

خاصة لو بعمر صغير
< 60



اجت صورة بالامتحان !!

ممش ١٥٥% لون أسود
بس فيها lucency

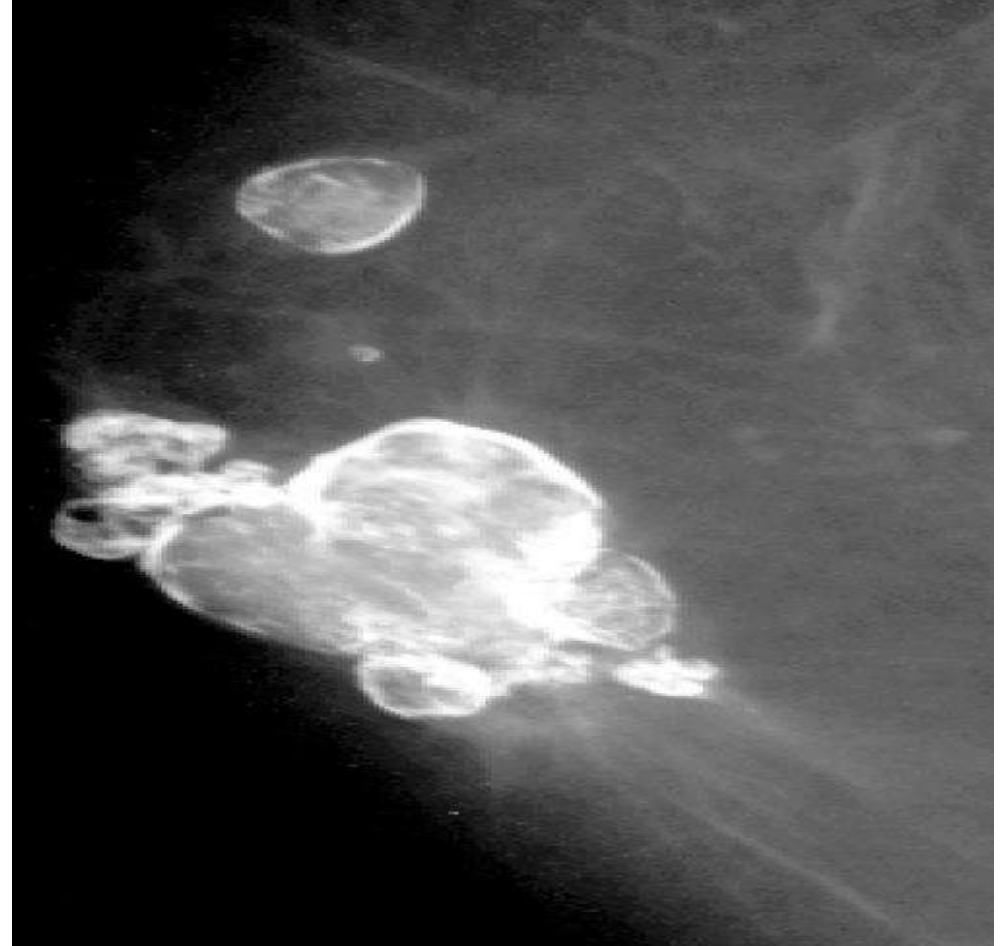
↑ LUCENT CENTER CALCIFICATION

نمشي خطوة خطوة
شو شايف ؟

في *mass* و شكلها *irregular* بس *macroscopic* و كبيرة ،
شكلها زي حبة البوشار

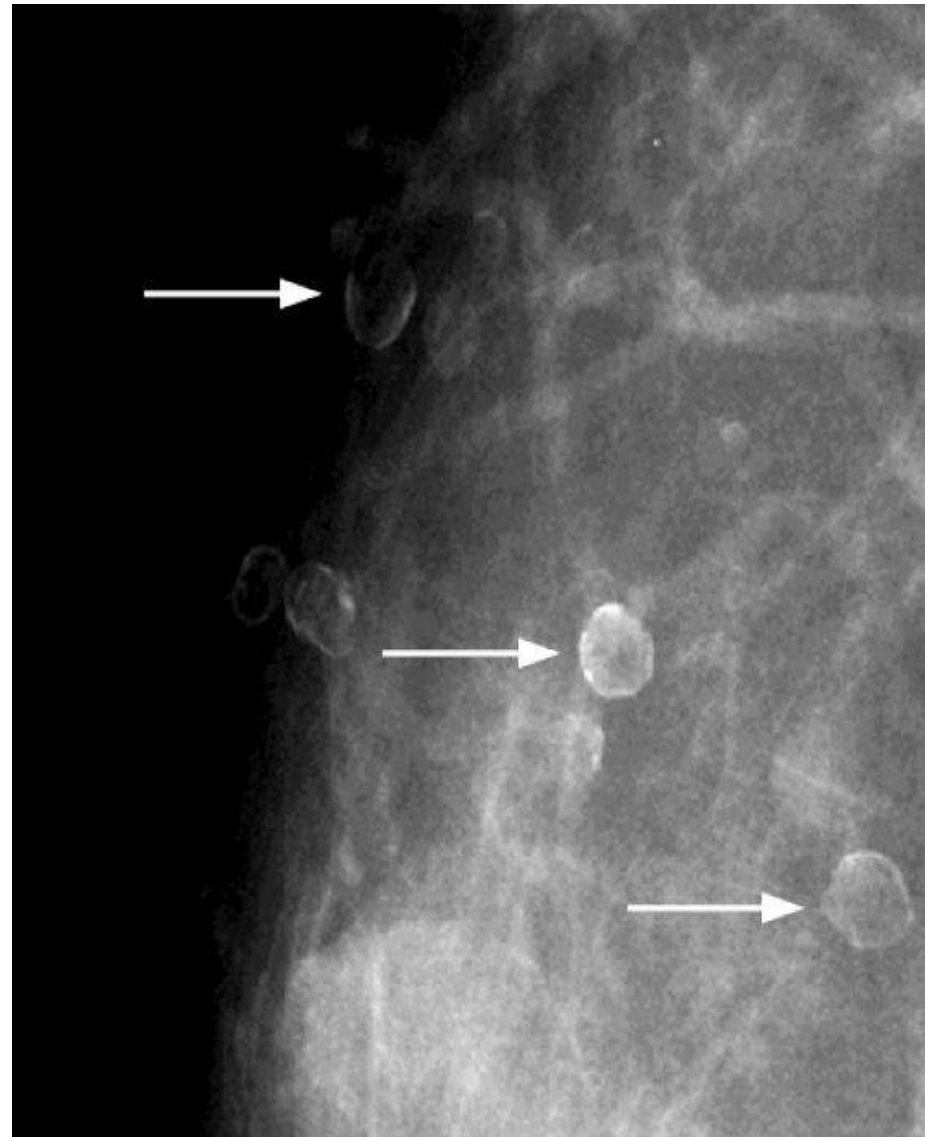
ف بالتالي هاي اسمها *macroscopic popcorn mass*

* *calcification* ، و غالبا بتيجي مع *calcified fibroadenoma*
و بما انها ممش من الـ 3 الخطرين ف هاي *benign*



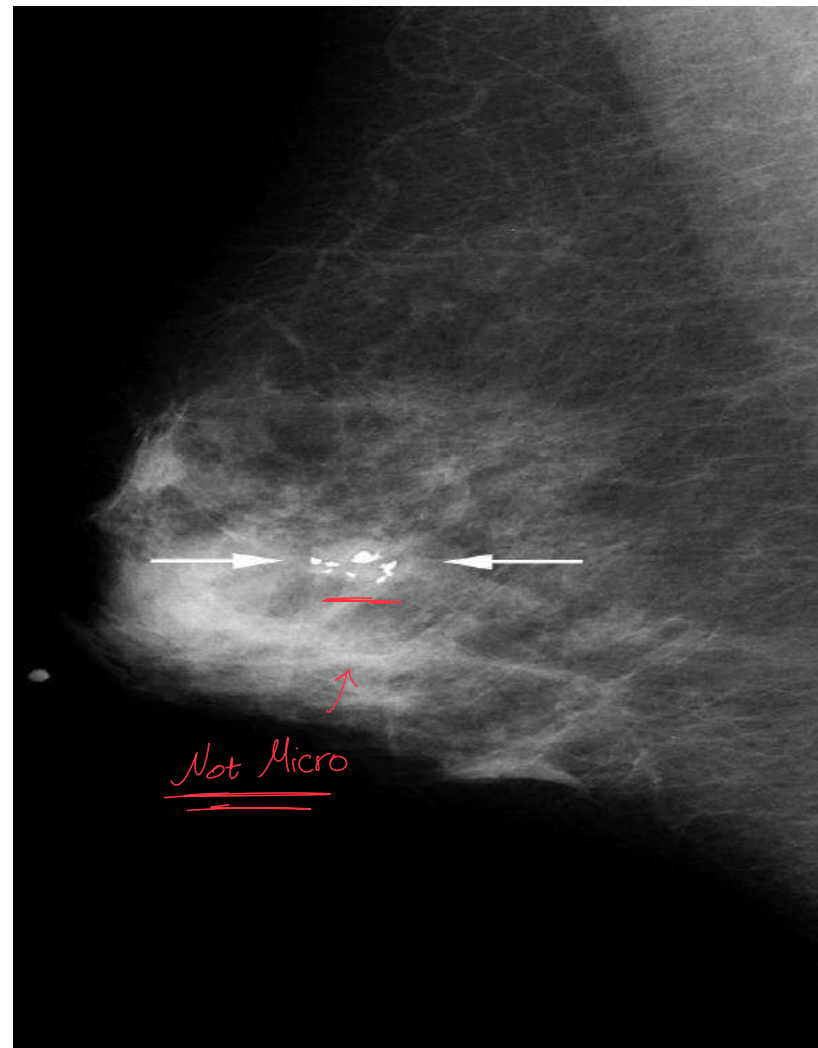
Egg shell , rim calcification

هاي *benign* ولا *malignant* ؟
اكيد *benign*



Pop corn calcification

Fibroadenoma

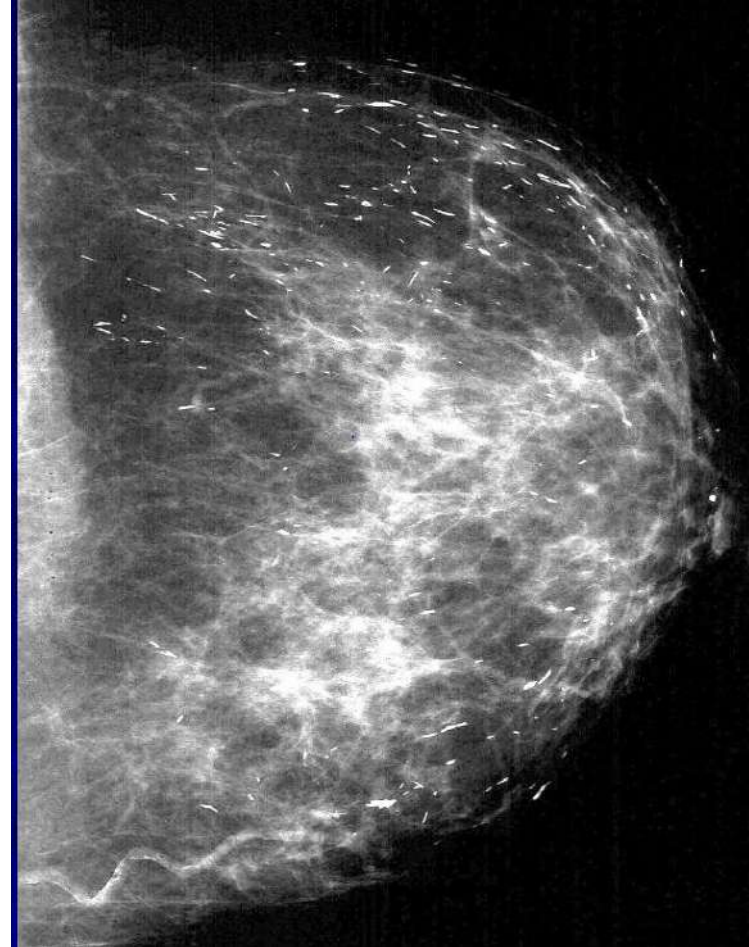


Secretory calcification

Milk on walls
of lactiferous
ducts .

اي *calcification* بشوفه بكون ع شكل *pattern*
شحطة فراغ شحطة فراغ و رايع باتجاه الـ *nipple*
ف هاد بكون *secretory calcification*

فقط عن الـ
شحطة
as lactiferous duct (shape)
on wall



MLO

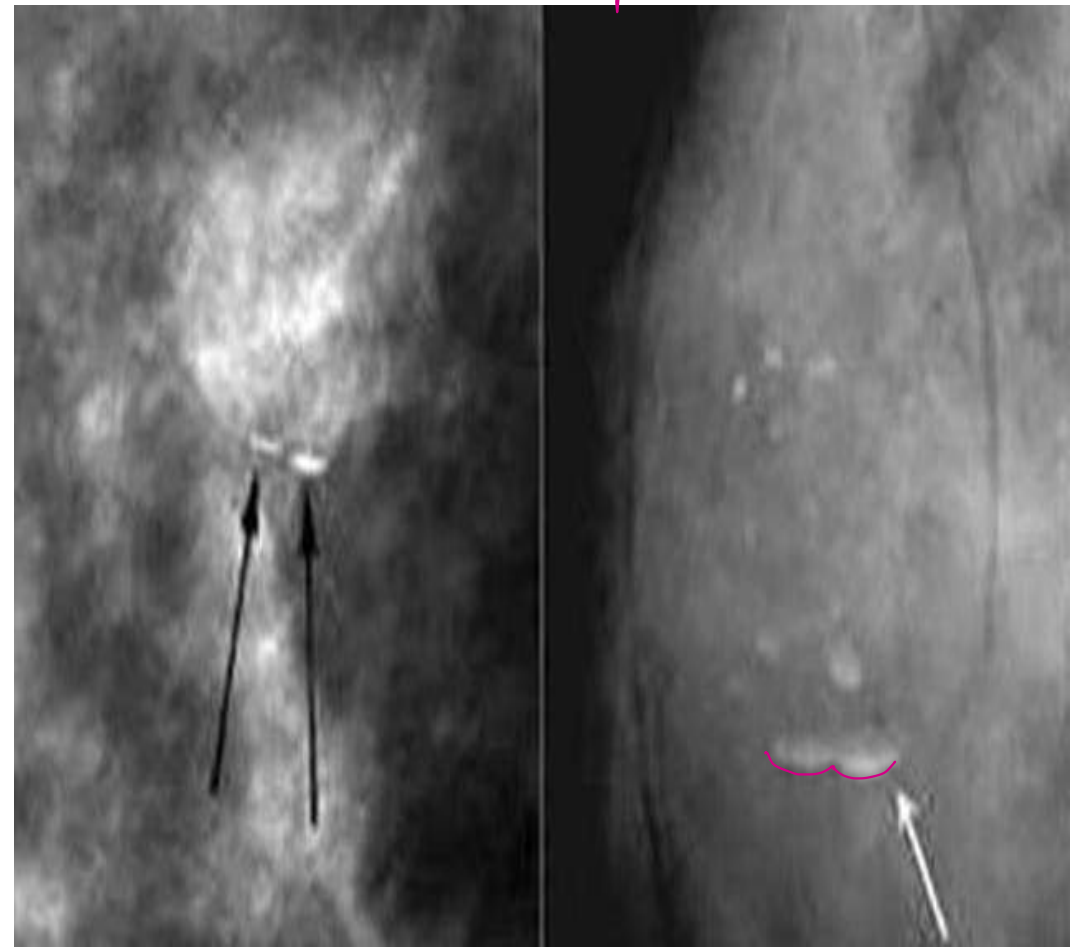
as teacup

Milk of calcium layering
on true lateral view

هون عنا mass و عنا calcification
نازل لتحت ، زي نقط المي ع الزيت

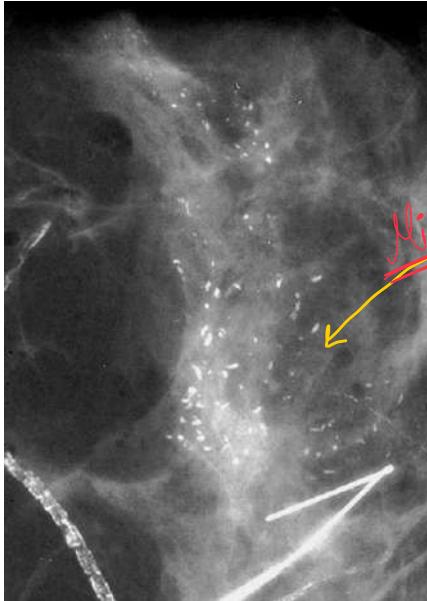
تغير شكله ← الفرق عن الي ؟

جوار duct



HIGHER PROBABILITY OF MALIGNANCY

Pleomorphic calcification ➡ *suspicious*

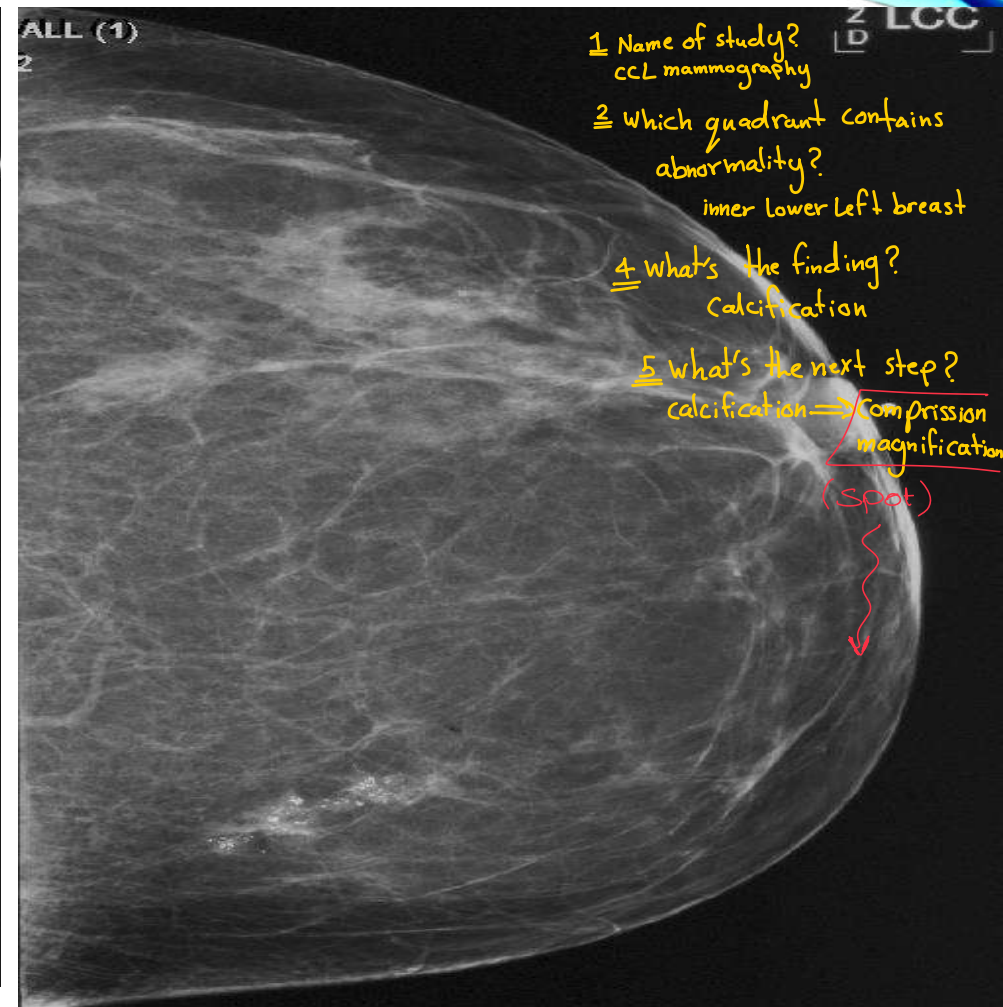


Pleomorphic,
heterogeneous



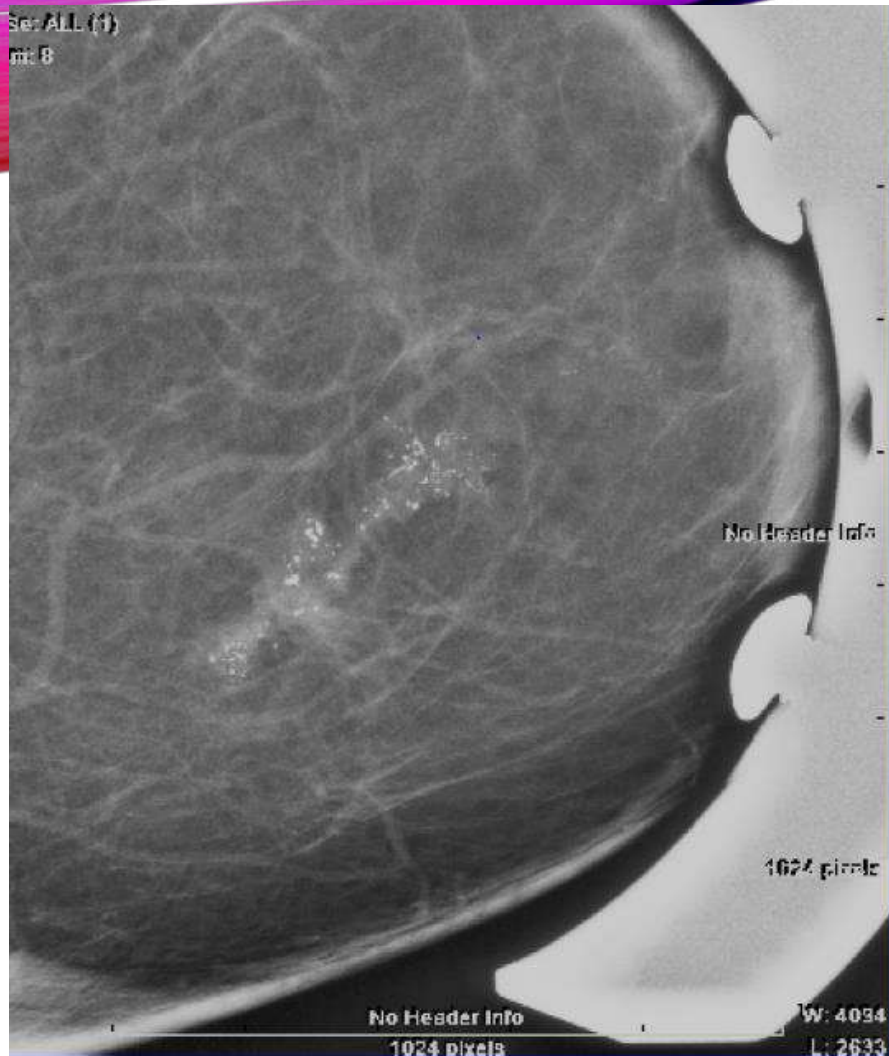
Fine, linear
and/or
branching





The Next step spot

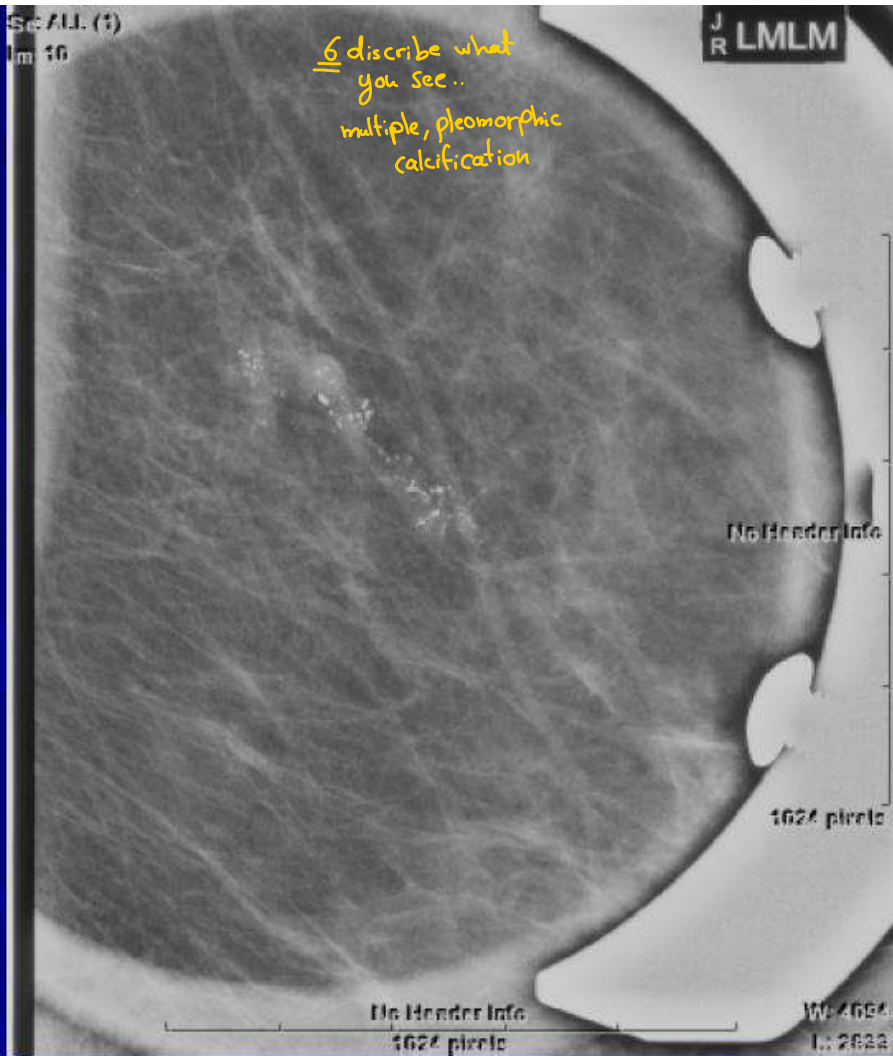
Se: ALL (1)
Im: 8



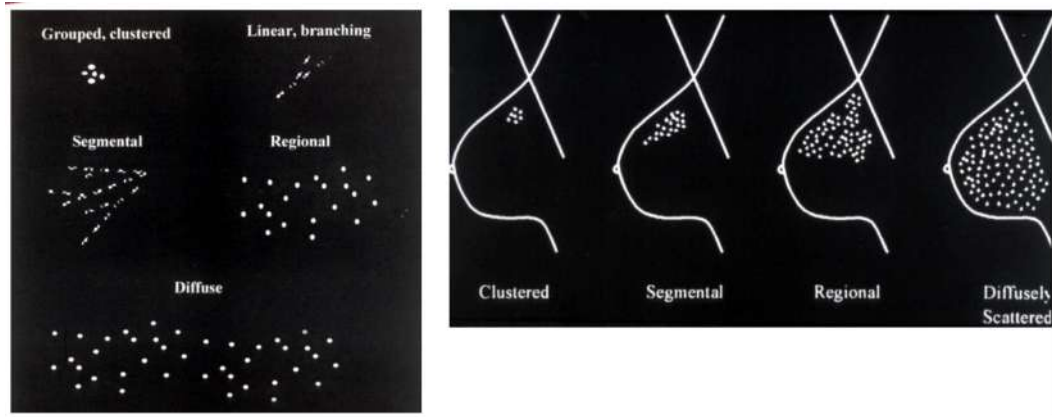
Se: ALL (1)
Im: 10

6 describe what
you see..
multiple, pleomorphic
calcification

J
R LMLM

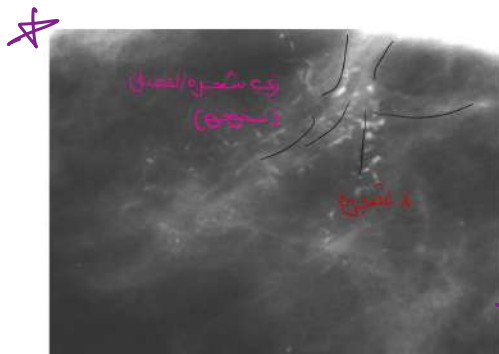


- Pleomorphic calcification at lower inner left breast
...suspicious

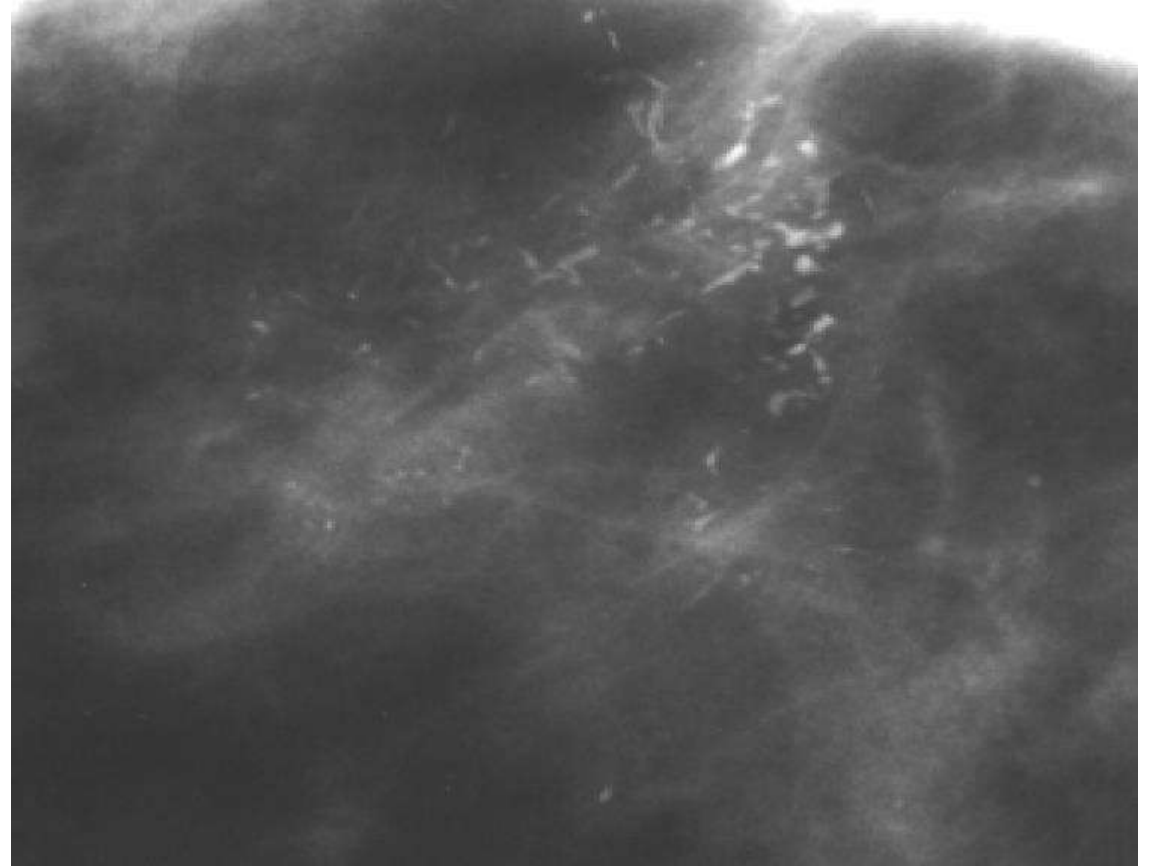


Spot compression

Linear branching
calcification



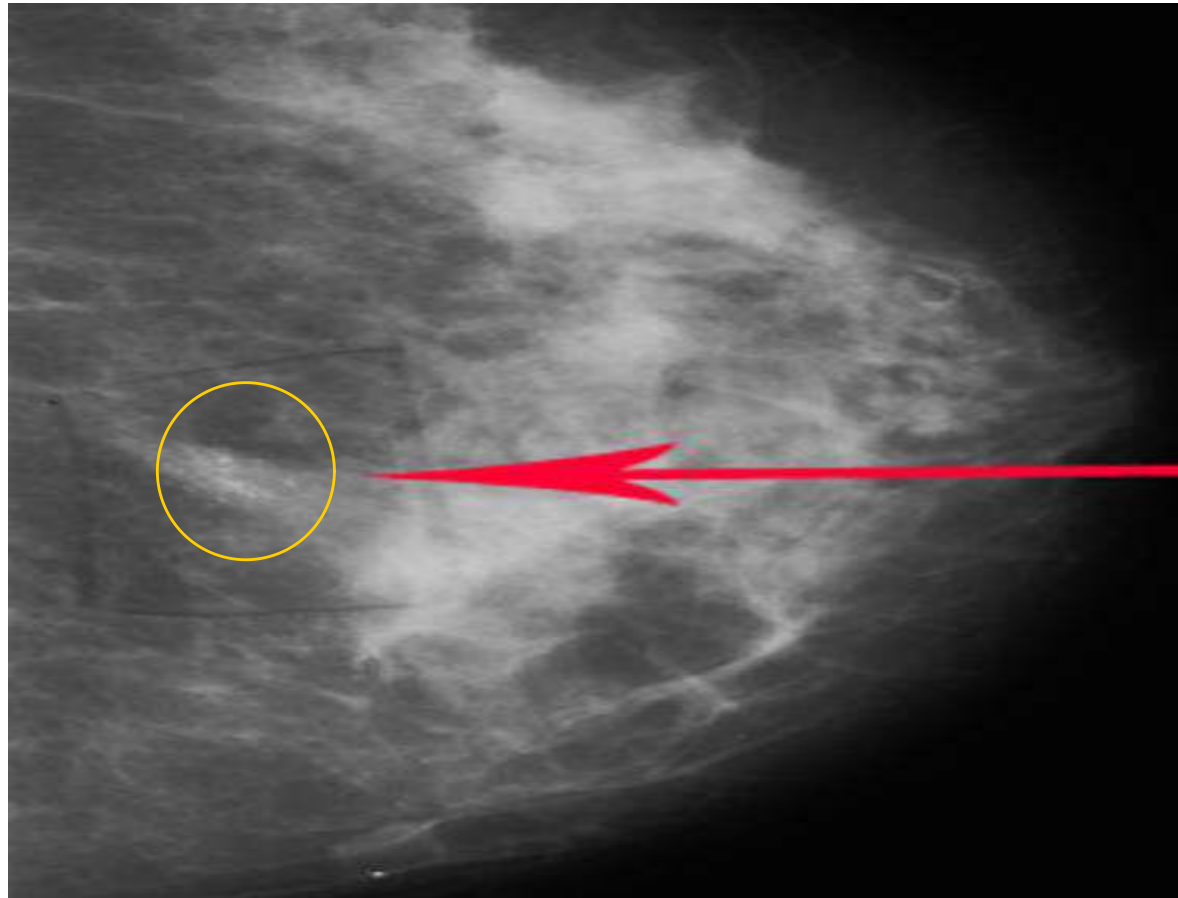
→
كل
الشعيرة



Cluster of calcification (at
least 5 in less than 1 cm)

Is cluster calcification suspicious?

yes $\Rightarrow$ واحد من الـ 3
الخطرين



Older Film Technology

هاي بس للتوضيح
بين زمان و هسا



New Digital Technology

اكي بنيد مع الوقت
BiRADS.4

2



* لغة تواصل *

!!!! حفظ زي اسمكم !!!!

BREAST IMAGING- REPORTING AND DATA SYSTEM

- BI-RADS CAT. 0: NEED ADDITIONAL IMAGING &/OR PRIOR MAMMOGRAMS.
- CATEGORY 1: Negative-no findings to comment on
- CATEGORY 2: Benign finding(s). Normal, with characteristic benign finding(s) on mammogram
→ including cysts + calcification
- BI-RADS CAT. 3: PROB. BENIGN. INITIAL SHORT-INTERVAL FOLLOWUP SUGGESTED
- Has less than 2% risk of malignancy
- Recommendation: 6-month protocol

ملخص الهم !!

0 ➡ تعالي ارجعي قسم التصوير بدھم اياكي (مش واضح)

1 ➡ ولا اشني

2 ➡ اي اشني معدا الـ 3 انواع الخطرين

3 ➡ ارجعيلي بعدين ، *benign* اي اشني بشك انه

4 ➡ *malignancy* اعراض

5 ➡ زي 4 بس الهم الاعراض كثير واضحة و سيئة

6 ➡ بتكون عاملة عملية بعدين بتكتشف انه كanser

- BI-RADS CAT. 4: have 2-95%chance of malignancy
- ~~CAT. 4 A~~ -LOW SUSPICION OF MALIGNANCY
- ~~CAT. 4 B~~ -INTERMED. SUSPIC. OF MALIGNANCY
- ~~CAT. 4 C~~ -MODERATE CONCERN

BI-RADS CAT. 5 : HIGHLY SUGGEST. OF MALIG.-APPROP. ACTION BE TAKEN

Has at least 95%prob. of malignancy. (skin ,nipple changes ,LAP) ↴

⚠⚠⚠ الاعراض بتضوي
يوجد كanser يوجد كanser

BI-RADS CAT. 6 :PROVEN MALIGNANCY.

عندها *mass* دخلت ع الجراحة شالتها ، بس شالوها بودوها ع
الباثو بتطلع *malignant* ف بتتصور صورة
ف بالتالي هاي بتكون مشخصة بس مش مصورة

BI-RADS

- CATEGORY 0 -Need additional Imaging evaluation

→ مش قادر تشخص

more → + US , Spot compression

- CATEGORY 1 - Negative

→ Benign calcifications or cyst

- CATEGORY 2-Benign finding

→ Fibroadenoma follow up every 6 months

- CATEGORY 3-Probably benign findings

→ Biopsy

- CATEGORY 4-Suspicious abnormality

→ Biopsy, nipple retraction

- CATEGORY 5 -Highly suggestive of a malignancy
95% → malignancy

as4+

- Nipple retraction
- skin thickening
- axillary lymphopathy

- Category 6 » proven biopsy



مثلا وحدة بتاخذ chemo و بدهم يشوفوا ال prognosis و ال response او بدھا تعمل عملية reduction و بالصدفة اكتشفوا عندها mass او مريضة عندها very enlarged lymph nodes و ال breast كان normal و لا اخدنا biopsy منهم كان metastasis of primary breast cancer origin

دوخت والهوره

مش واضحة
طلعت

INDICATION FOR BREAST ULTRASONOGRAPHY

!!!! حفظ

1. Evaluation of palpable **breast masses** (SOLID /CYST) and **asymmetrical** density
2. Evaluation if there are sign of infection, discharge and thickening .
3. Evaluation of abnormalities detected on mammography or MRI.
3. Initial imaging evaluation of breast symptom and signs (masses, nipple discharge, ..) in **women under 30 years of age** who are not at high risk for development of breast cancer,
4. In **lactating and pregnant women**.
6. Evaluation of **palpable mass after mammogram**

- Redness, swelling, tenderness
- Nipple discharge
- Skin thickening
- Helps differentiate **abscess / mastitis / tumor**

✖ Mammography not preferred in young women due to dense breast tissue

- To further characterize the mass
- Helps guide **biopsy** if needed

any LN → US is Preferred

INDICATION FOR BREAST ULTRASONOGRAPHY

4. Evaluation of problems associated with breast implants.
5. Supplement to mammography in dense breast .
6. screening for ^{عش فبين} occult cancers in women.
7. Guidance of breast biopsy and other interventional procedures.
8. Evaluation of axilla (Lymph nodes)

- 1 Size
- قياس الكتلة بالسنتيمتر أو المليمتر
• مهم لتحديد التغيرات أو نمو الكتلة مع الوقت
- 2 Shape
- Oval, round, irregular
 - عادة:
 - Benign → oval or round
 - Malignant → irregular
- 3 Border definition
- Well-defined vs ill-defined
 - Benign → حدود واضحة
 - Malignant → حدود غير منتظمة أو مختلطة
- 4 Internal echogenicity
- Hypoechoic → كثافة منخفضة
 - Hyperechoic → يمكن أن يكون شحمي أو fibro-glandular tissue
 - Isoechoic → صعوبة التمييز عن النسيج الطبيعي

- 5 Posterior enhancement / shadowing
- Enhancement → زيادة الإشارة خلف الكيس (cystic lesion)
 - Shadowing → نقص الإشارة خلف كتلة صلبة (malignant or dense)
- 6 Architectural changes

- تشوهات النسيج حول الكتلة
- مثال: traction, distortion, retraction
- مهمة للتمييز بين benign vs malignant

◆ Ultrasound & Calcifications

- microcalcifications ضعيف جداً في كشف US
- السبب: الصدى يمر خلال الأنسجة، لكن calcifications صغيرة جداً لتظهر
- غالباً تظهر فقط إذا كانت كبيرة أو coarse
- Mammography هي الأفضل للكشف عن microcalcifications
- خصوصاً مهمة في early detection of DCIS (ductal carcinoma in situ)

◆ ملخص سريع

Feature	Mammography	Ultrasound
Mass detection	✓ Excellent	✓ Good
Cystic vs solid	⚠ Limited	✓ Excellent
Microcalcifications	✓ Excellent	✗ Poor
Dense breast	⚠ Limited	✓ Better visualization
Pregnant/lactating	✗ Limited	✓ Safe

✂ Operator dependent , ✂ non invasive

Breast Ultrasound

Imaging Characteristics

size

shape

border definition

internal echogenicity

posterior enhancement

architectural changes

▼ تذكروا ع الـ ultrasound 👁👁

الاسود هو hypoechoic

و الدكتور ما بدها حدا يحكيها عن اي اشي hyperechoic ، ولا اي اشي

→ Cyst, Fibroadenoma, Cancer → appear white

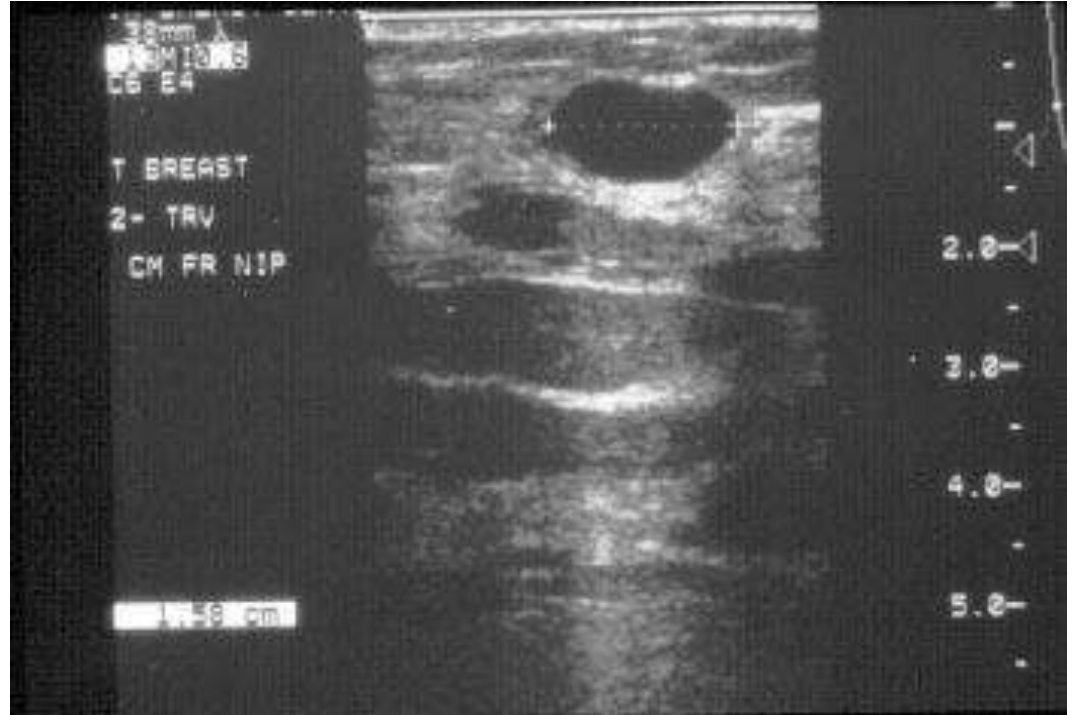
Mammography

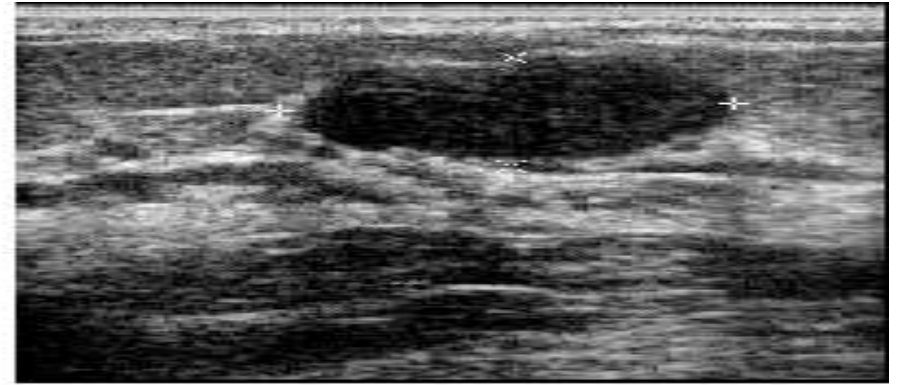
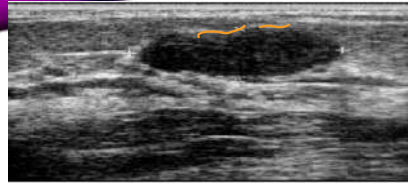
Show it as mass
So US is the next step

- Simple Cysts
 - anechoic ← pure black
 - smooth, thin margins
 - posterior acoustic enhancement

What's the Bi-RAD ?

2, why ? Mostly benign characteristics





Solid Lesions - Benign

- Round or oval shape
- Smooth well defined borders
- gentle lobulations

Bi-RAD 3 → Follow up

بتشبه الـ *fibroadenoma* بس مو متأكد

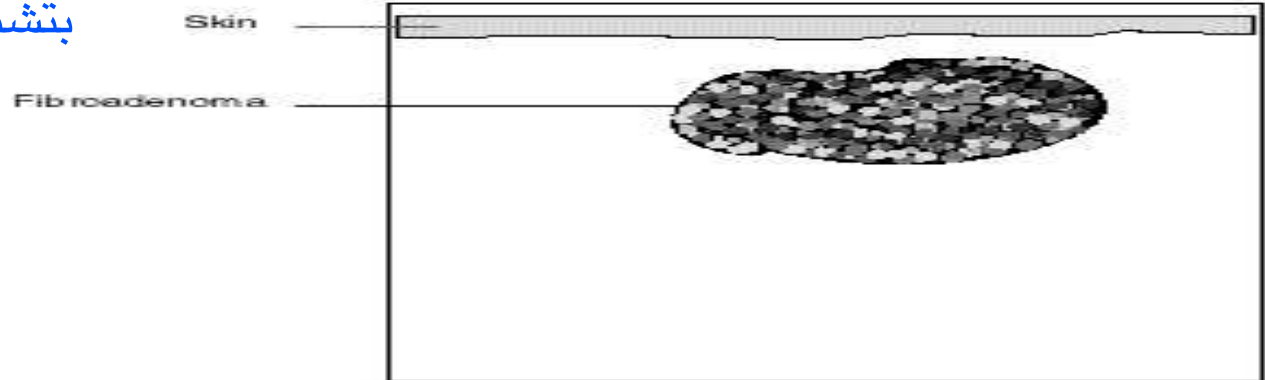


Figure 26

الوصف مهم !!
منه بنعرف نصنفها

بالتالي حسب الوصف هاي *Bi-RAD 4*

Solid Mass - Malignant

- Irregular shape and borders
- hypoechoic
- Angular margin
- Taller than wide
- * Thick echogenic rim
- Posterior shadowing

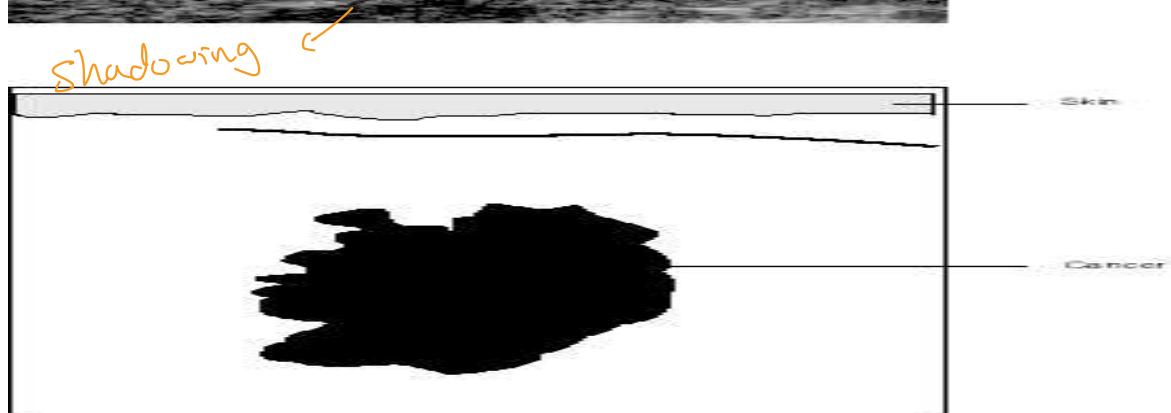
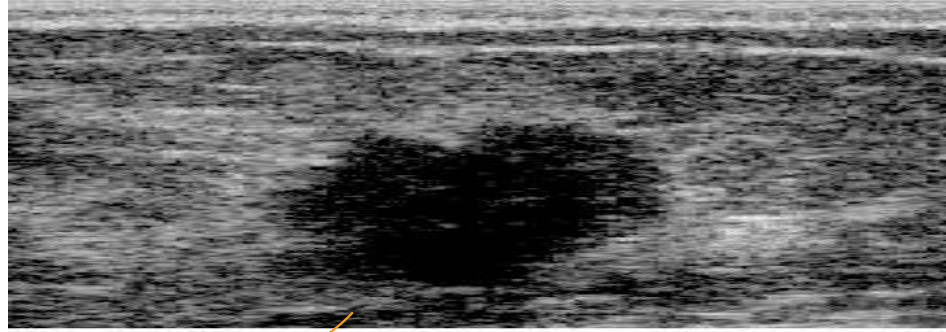
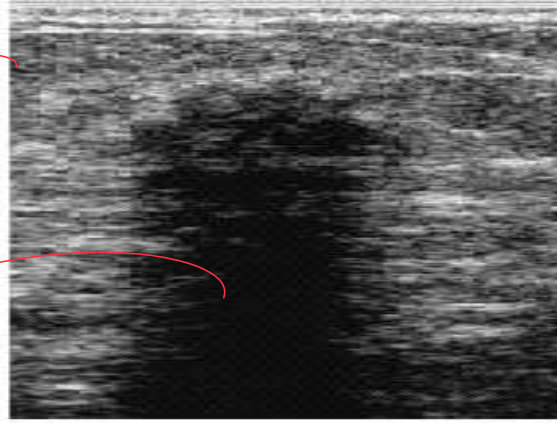


Figure 39

MALIGNANT VS. BENIGN

BI RADS
4

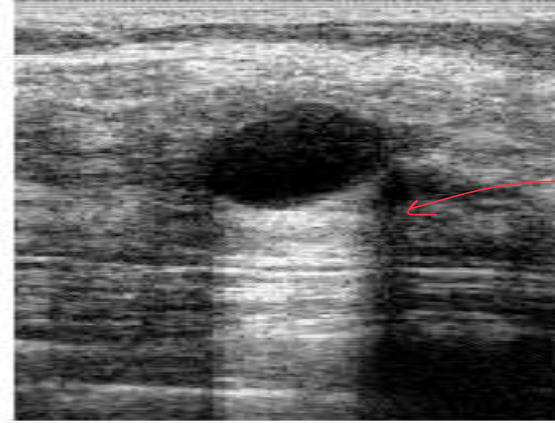
Acoustic
Shadow



BI RADS 2

ال benign بتيجي
enhancement مع

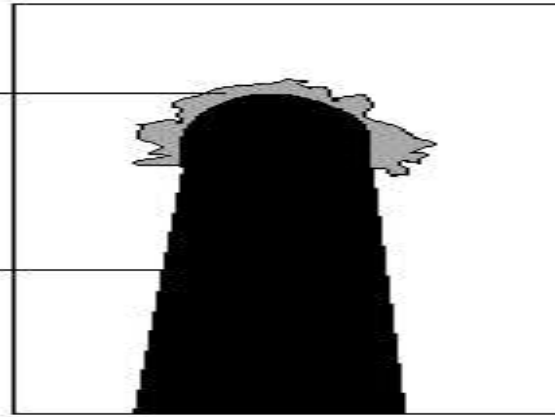
اله علاقة بال
desmoplastic
reaction



Hyperechoic Rim

Posterior
Shadow

= Cancer

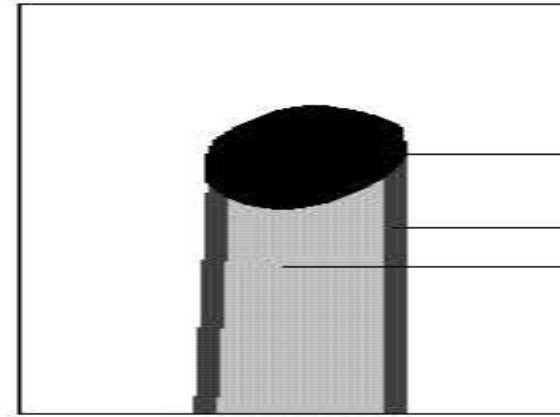


Cyst

Edge
Artifact

Posterior
Enhancement

= cyst



Irregular⁺ spiculated hypoechoic mass
at 6 :00 position of the right breast

→ Operator dependent

