IMAGING IN BREAST CANCER

Screening and newer tools

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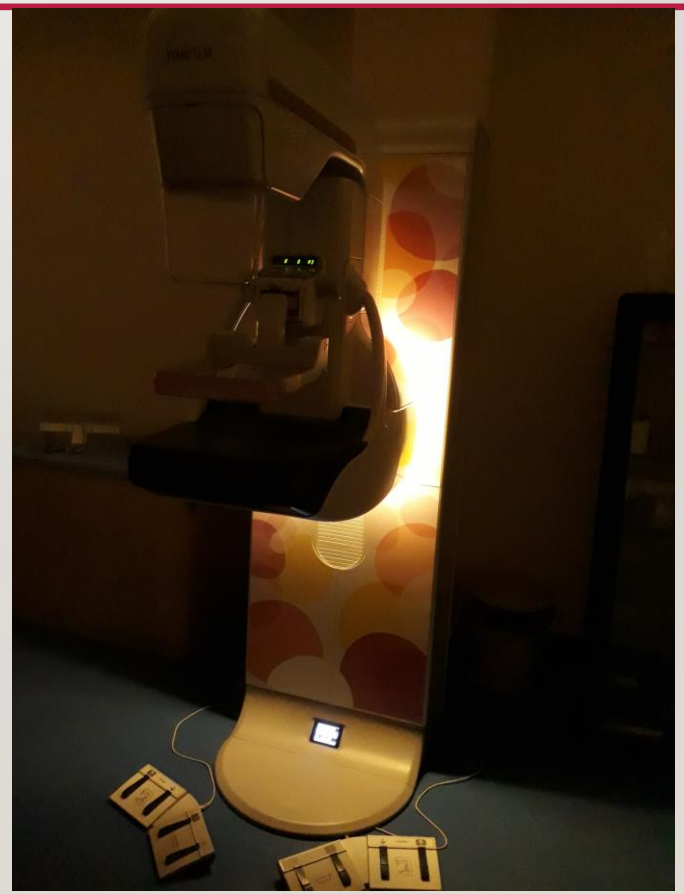
MAMMOGRAPHY - BASICS

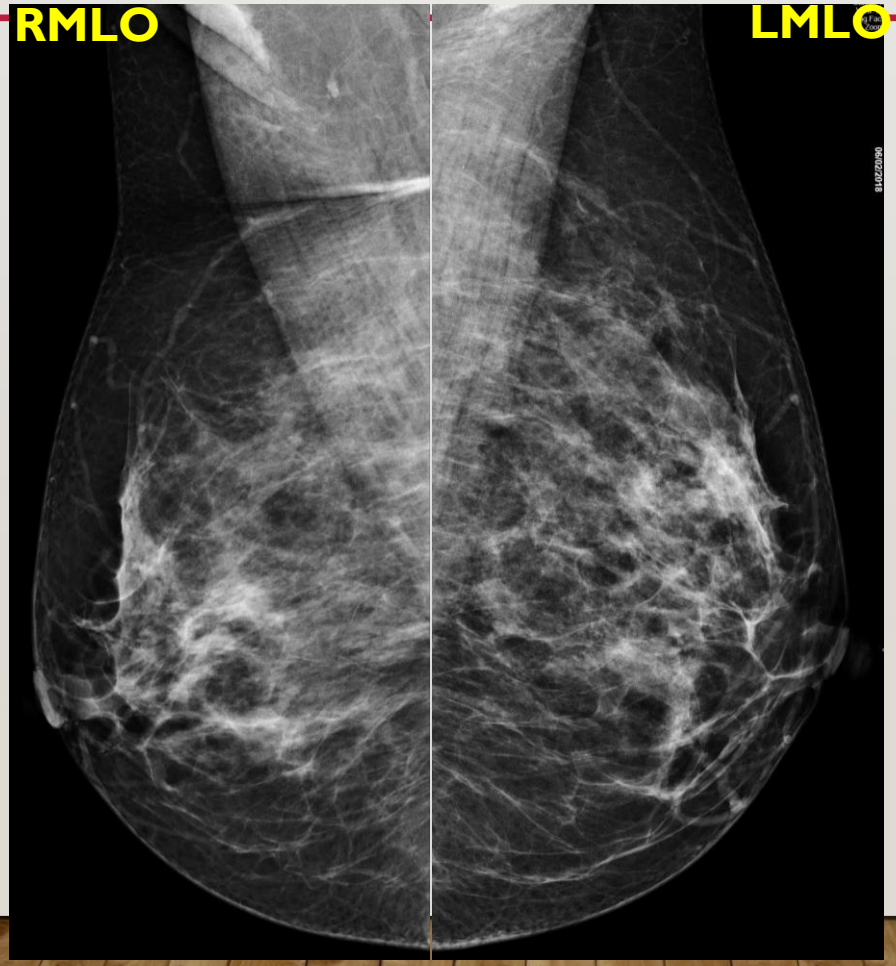
- Explain to patient
- Changing area
- Gentle handling
- Female mammographer

- MAKE LADY COMFORTABLE

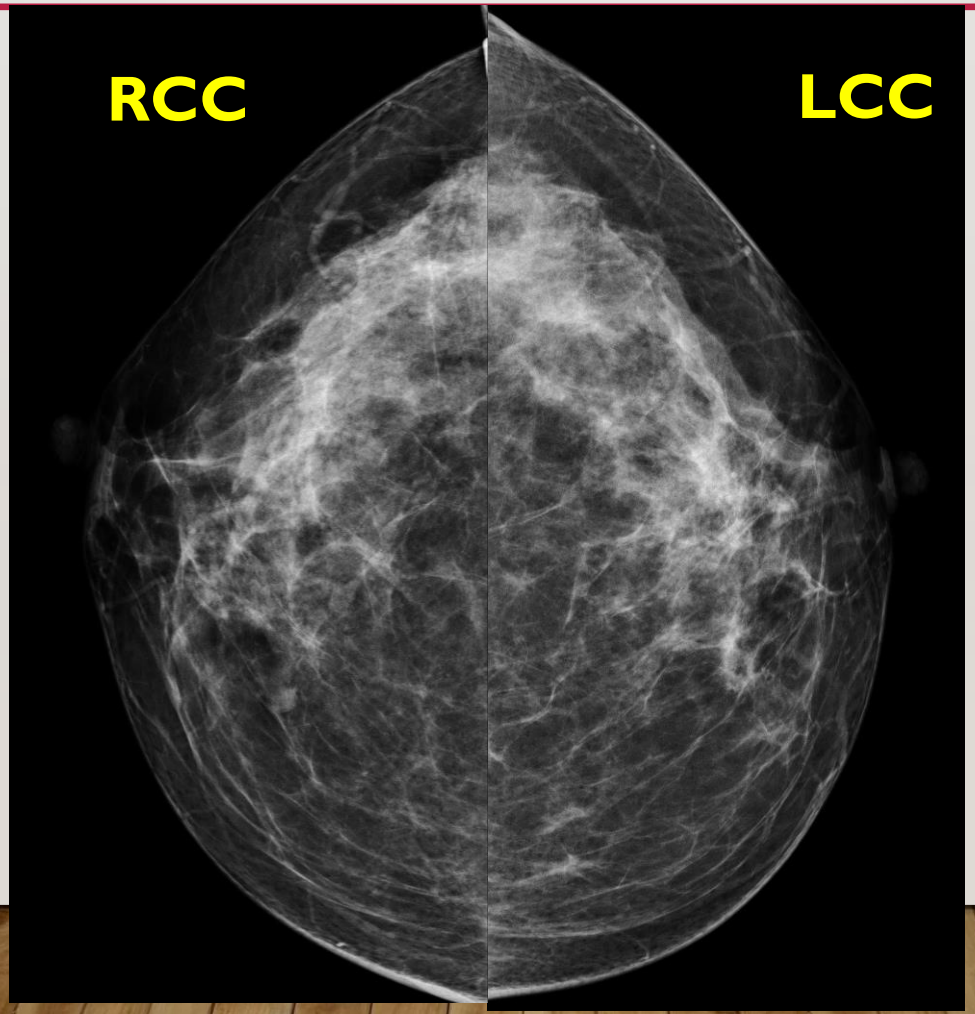
MAMMOGRAPHY – MOOD LIGHT



MAMMOGRAPHY - VIEWS



MAMMOGRAPHY - VIEWS



INTRODUCTION

- International Guidelines
- Indian epidemiology

- Easy English
- Radiologist + Surgeons + Oncologists + GP friendly

- Easily available
- Quick to read

BREAST IMAGING SOCIETY, INDIA (BISI)

www.bisi.co.in

SCREENING MAMMOGRAMS

DATA

For women at average risk of breast cancer, screening mammography is recommended between ages of 50 and 74 years

REFERENCE

Brackstone M, Latosinsky S, Saettler E, George R. CJS debate: Is mammography useful in average-risk screening for breast cancer? Canadian Journal of Surgery: 2016 Feb; 59(1):62-66

SCREENING MAMMOGRAMS

DATA

Mammography screenings are effective and generate a 17% reduction in breast cancer mortality in women 39-49 years of age

REFERENCE

Magnus MC, Ping M, Shen MM, Bourgeois J, Magnus JH. Effectiveness of mammography screening in reducing breast cancer mortality in women aged 39–49 years: a meta-analysis. J Womens Health (Larchmt) 2011; 20(6): 845–852

SCREENING MAMMOGRAMS

DATA

There is no evidence of mortality benefit from mammography screening of women under the age of 35 years

REFERENCE

Guidance on Screening and Symptomatic Breast Imaging, Third Edition, Reference : BFC(13)5; 2013. Document from The Royal College of Radiologists

SCREENING MAMMOGRAMS

DATA

Patients presenting with breast cancer are about one decade younger in developing countries than their counterparts in developed nations. The proportions of young patients (< 35 years) vary from about 10% in developed to up to 25% in developing Asian countries, which carry a poorer prognosis

REFERENCE

Agarwal G, Pradeep PV, Aggarwal V, Yip CH, Cheung PS. Spectrum of breast cancer in Asian women. World J Surg. 2007 May;31(5):1031-40

SCREENING MAMMOGRAMS

DATA

In the developing countries, the majority of breast cancer patients continue to be diagnosed at a relatively late stage, and locally advanced cancers constitute over 50% of all patients managed

REFERENCE

Agarwal G, Pradeep PV, Aggarwal V, Yip CH, Cheung PS. Spectrum of breast cancer in Asian women. World J Surg. 2007 May;31(5):1031-40

SCREENING MAMMOGRAMS

DATA

There is no upper age limit established for screening mammography, but as the benefits of screening mammography may take years to be fully realized, screening recommendations should take into account life expectancy and comorbid conditions, with screening mammography remaining appropriate when a woman's life expectancy exceeds 5 to 7 years

REFERENCE

American College of Radiology ACR Appropriateness Criteria for Breast Cancer Screening, 2012. Revised 2016.

BISI GUIDELINES – BREAST SCREENING

- MAMMOGRAPHY
- ANNUAL
- 40 – 70 YEARS

BISI GUIDELINES – BREAST SCREENING (<40YRS)

- Diagnosed with malignancy at <40 yrs of age (surviellance for metachronous breast cancer)
- High risk group – lifetime risk of breast cancer more than 20-25% or greater

  - BRCA 1 or BRCA 2 gene mutation

  - first degree relative has BRCA 1/2 mutation

  - radiation therapy to chest between the ages of 10 - 30 yrs

HIGH RISK SCREENING – WHEN TO START?

Screening with annual mammography (and annual MRI) is recommended to begin at age 30 years or 10 years before age of first-degree relative with breast cancer, whichever is later.

With history of mantle radiotherapy, annual mammogram (and annual MRI) should be started 8 years after radiation therapy, but not before age of 25 years

Mammography and MRI Breast are complementary examinations, and both should be performed

DIAGNOSTIC ALGORITHMS

- DO NOT FORGET TRIPLE ASSESSMENT
- CORRELATE WITH ALL OTHER IMAGING
- INTERVENTION OF CHOICE – CORE BIOPSY

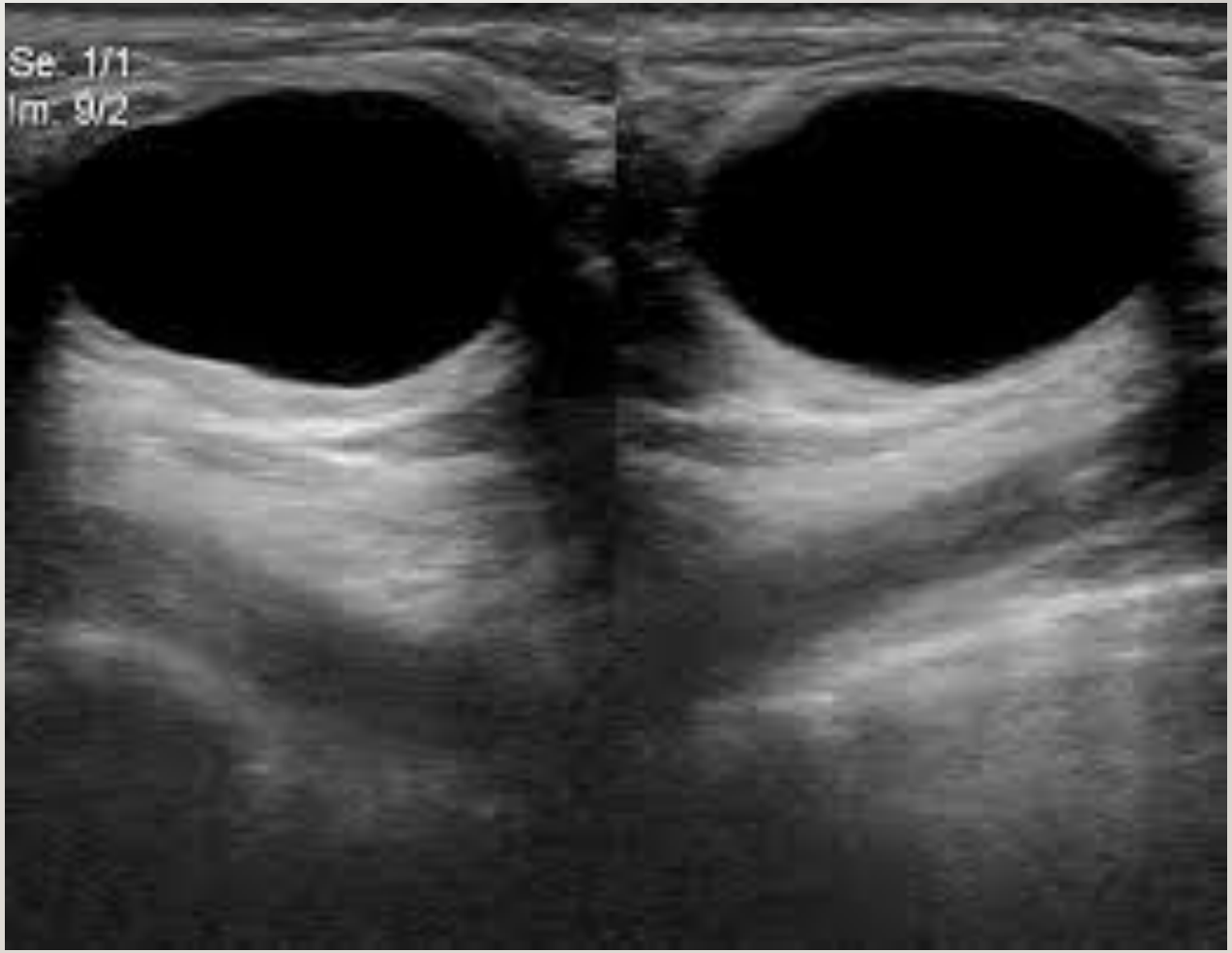
BREAST LUMP

- Up to 30 years of age ultrasound of both breasts is the primary modality. Mammogram in this age group is performed only if there is strong clinical suspicion of breast cancer
- If age is more than 30 years, then both mammography and ultrasound of both breasts are recommended
- Further management is according to imaging results as follows:

BREAST LUMP

SIMPLE CYST

BIRADS 2



BREAST LUMP

COMPLICATED CYST - INFLAMED

HAEMORRHAGIC

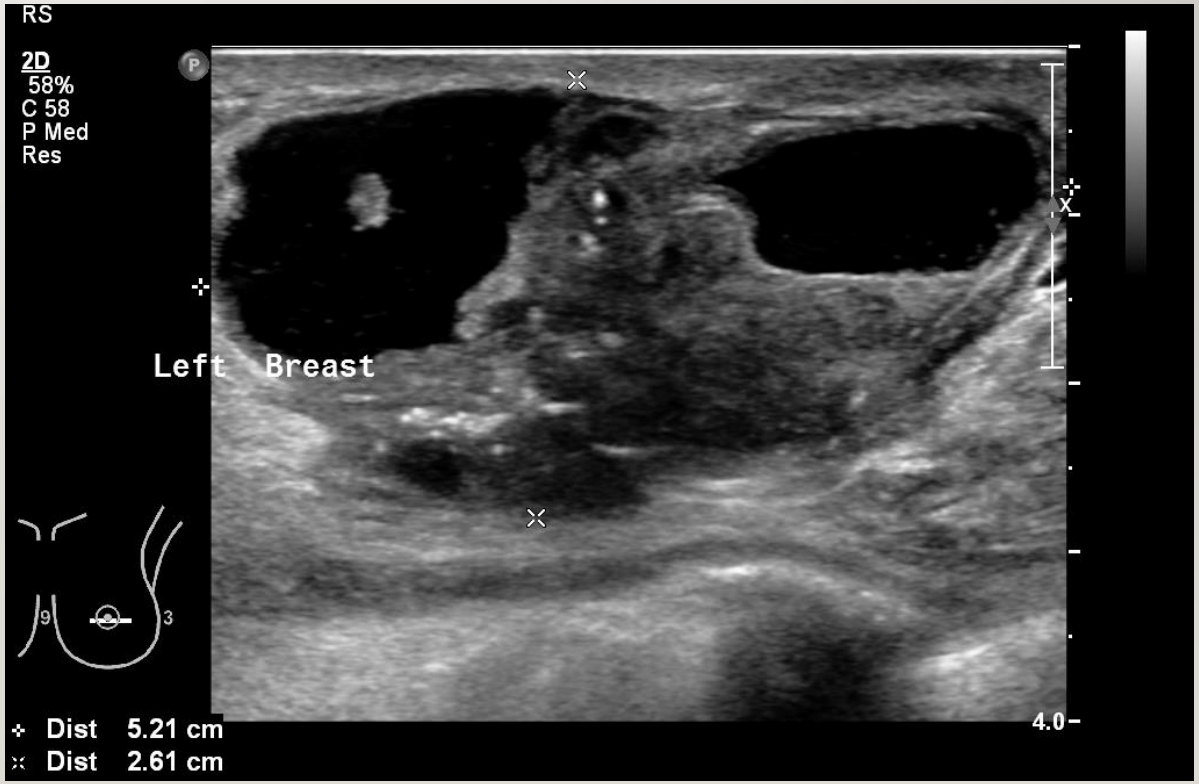
BIRADS 2

BREAST LUMP

PARTLY CYSTIC PARTLY SOLID

BIRADS 4/5

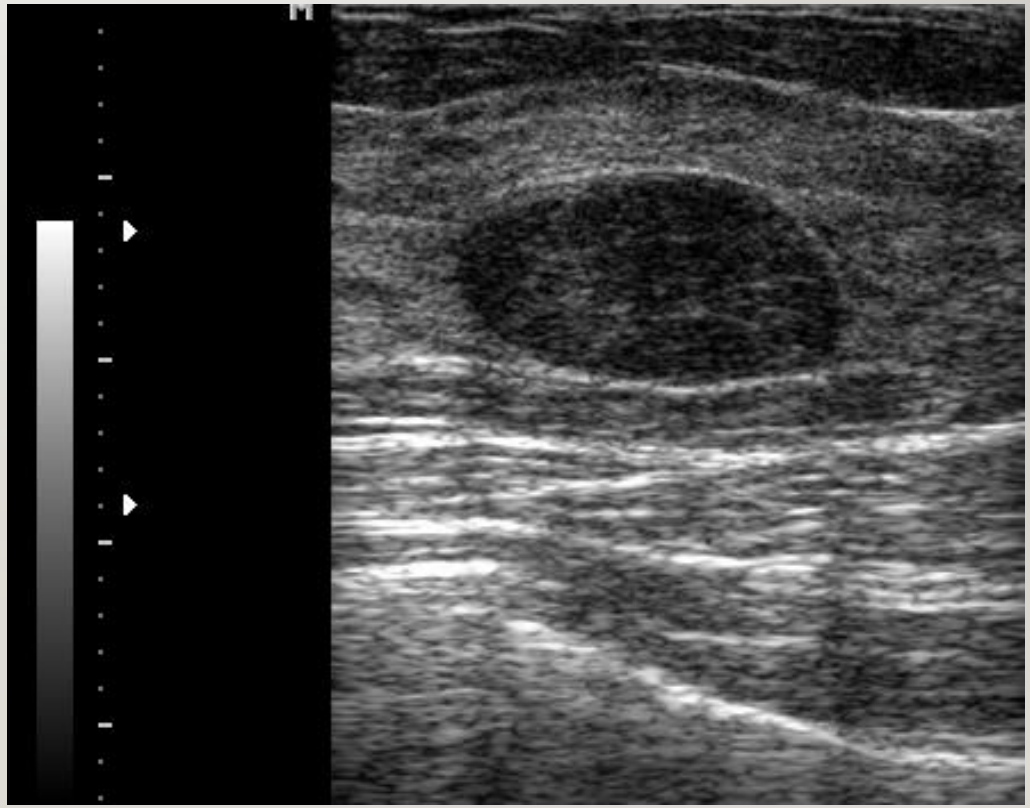
CORE BIOPSY



BREAST LUMP

SOLITARY CIRCUMSCRIBED MASS

BIRADS 3



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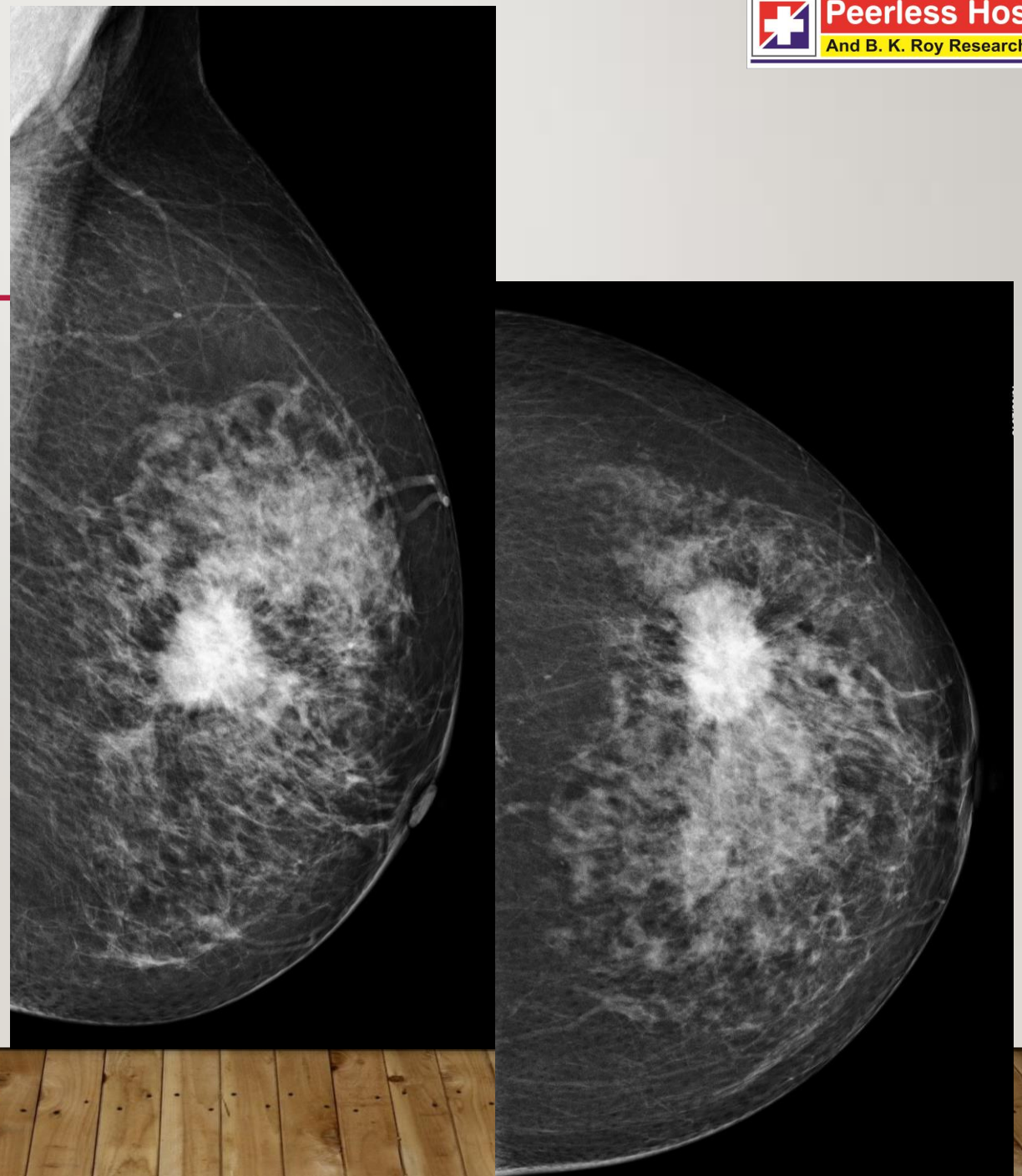
BREAST LUMP

SUSPICIOUS MASS

BIRADS 5

CORE BIOPSY



BREAST LUMP

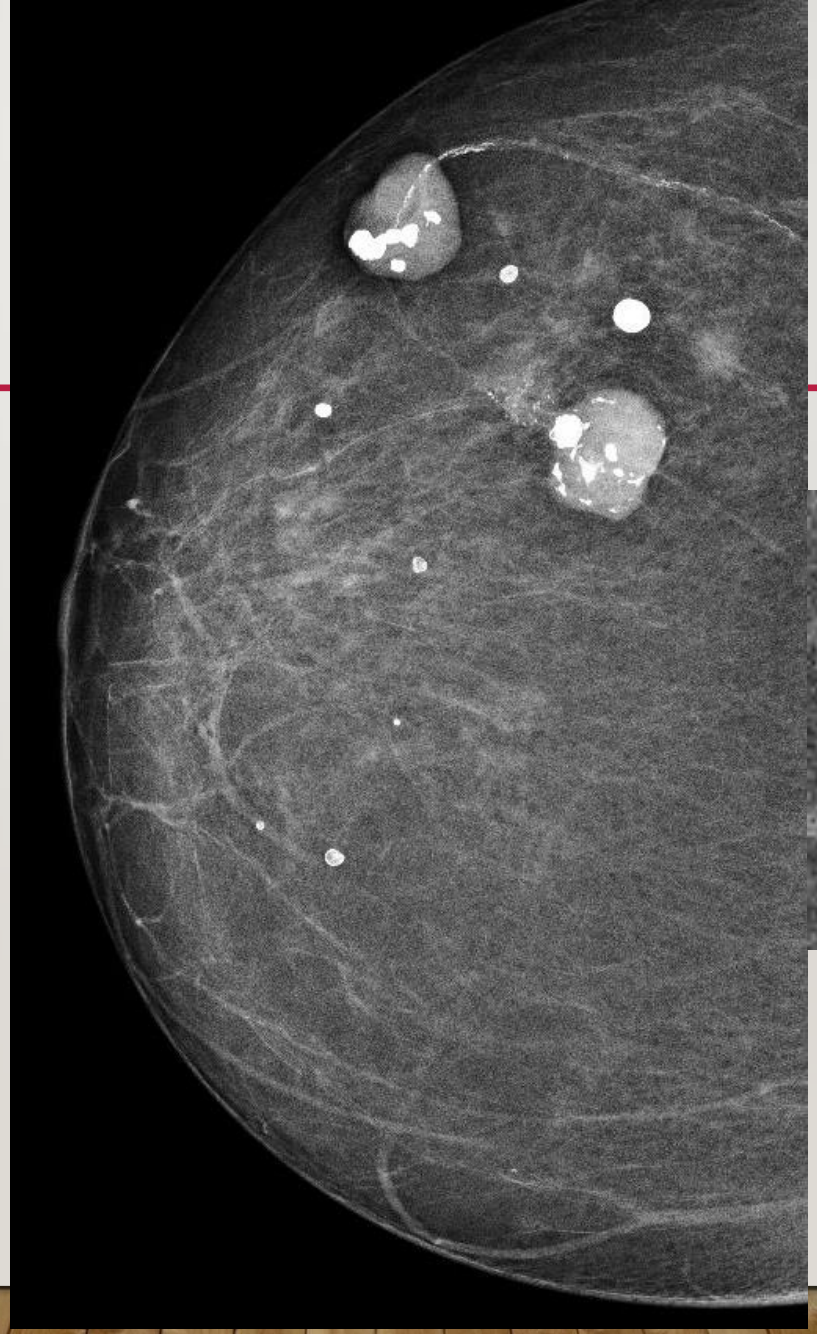
CALCIFICATION

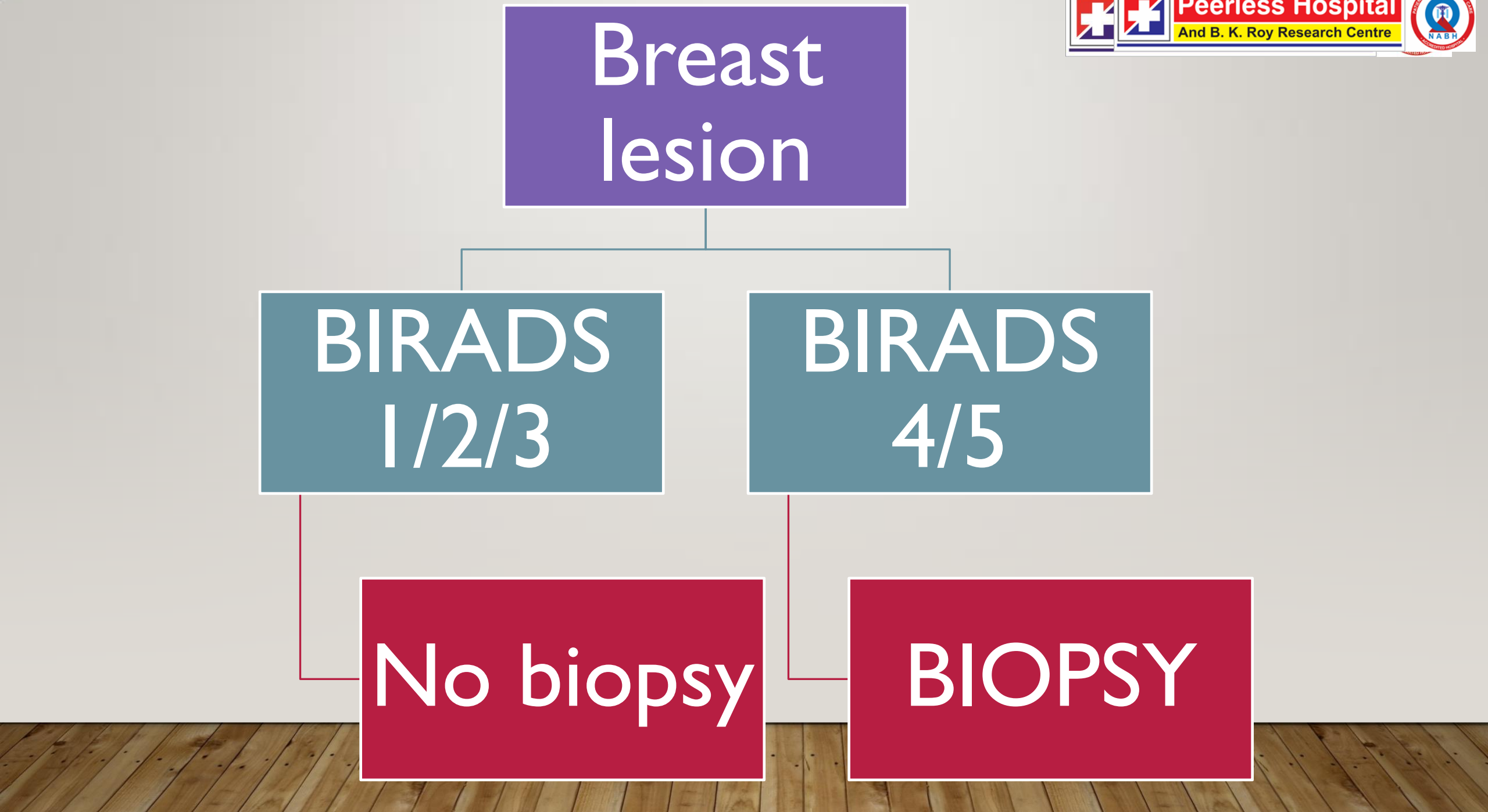
- **Benign – Fibroadenoma**

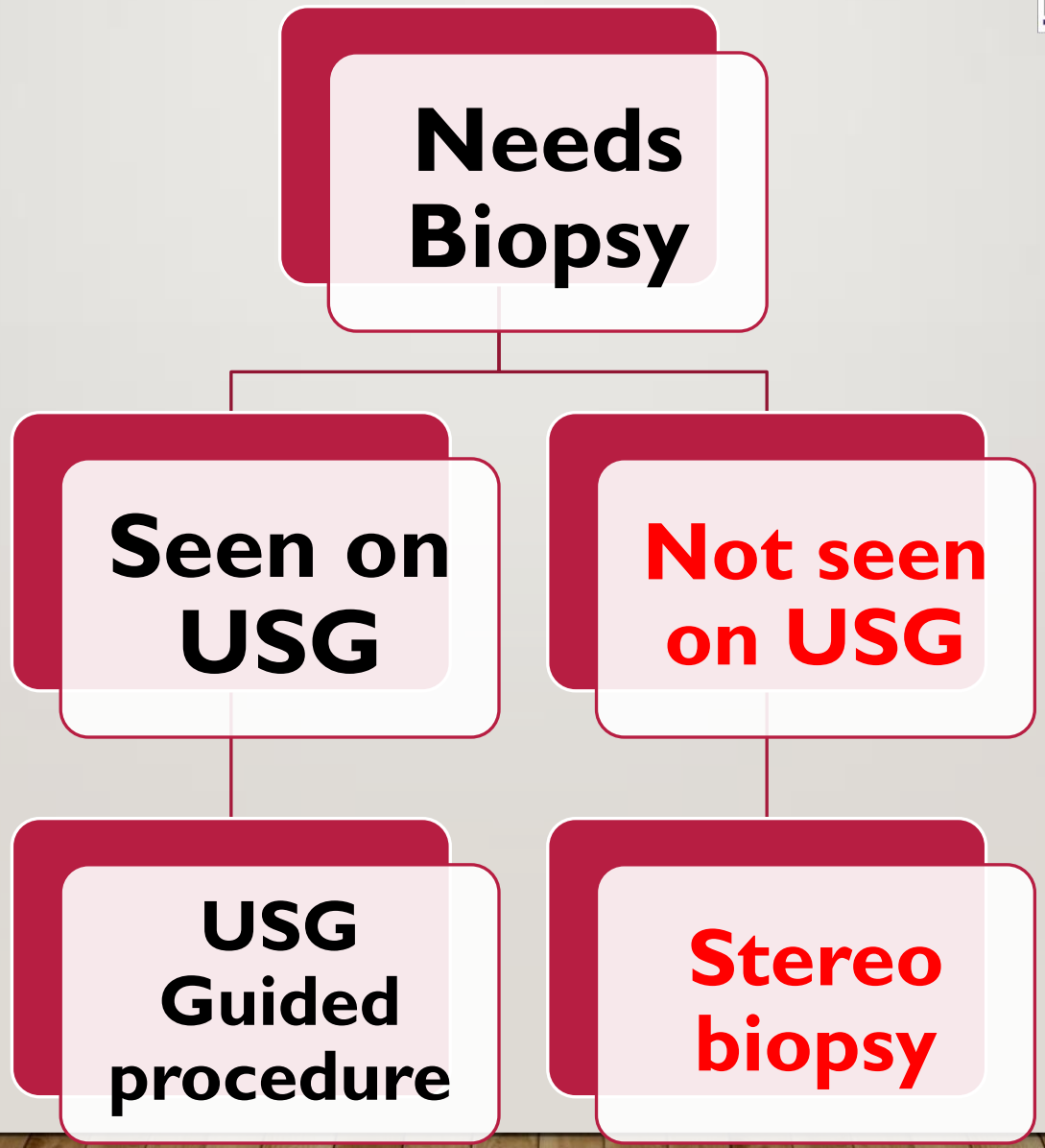
  BIRADS - 2

- **Malignant – DCIS**

  BIRADS - 5




Breast lesion
BIRADS 1/2/3
BIRADS 4/5
No biopsy
BIOPSY


Needs Biopsy
Seen on USG
Not seen on USG
USG Guided procedure
Stereo biopsy

BREAST PAIN

- Ultrasound only for age up to 30 years
- Both mammography and ultrasound for age more than 30 years
- Mammography should be avoided in lactating and highly painful breasts which preclude adequate compression during mammography.
- Acute mastitis – investigation only if nonresolving/progressive
- Follow-up mammography and ultrasound is recommended in non-lactational mastitis or abscess after acute symptoms have resolved. A non-resolving lesion should be subjected to biopsy.
- If inflammatory breast cancer is suspected, then ultrasound of both breasts and if possible, mammography should be performed

NIPPLE DISCHARGE – TRIPLE ASSESSMENT IF

- nipple discharge is from single duct
- spontaneous
- serous or bloody
- associated with lump on CBE or
- age is more than 50 years

NIPPLE DISCHARGE

- Ultrasound only (age up to 30 years)
- mammography with ultrasound (age more than 30 years)
- If abnormality is found on imaging, further management will depend on its BIRADS category.
- If no abnormality is found and discharge is serous or bloody, CEMRI should be obtained

DIAGNOSED BREAST CA

- **Mammo & USG breast**
- **Biopsy BIRADS 3/4/5 lesions**
- **MRI Breast if : lobular ca**

  young women with dense breasts

  ABPI – accelerated breast partial irradiation

ADVANCES

- Stereotactic procedures
  - Biopsy (14 guage and VAAB)
  - Wire Localisation
  - Clip insertion
- Vacuum Assisted Breast Biopsy
- Tomosynthesis
- CESM

STEREOTACTIC BREAST BIOPSY

CONCEPT OF STEREOTACTIC LOCALISATION

- Mammograms are 2-dimensional images of a 3-dimensional lesion
- We know the ‘x’ and ‘y’ co-ordinates of a lesion

- The whole exercise is to get the ‘z’ axis or depth of a lesion

PARALLAX SHIFT

The apparent movement of the lesion between projections is referred to as parallax shift and is calculated relative to the reference point

PARALLAX SHIFT

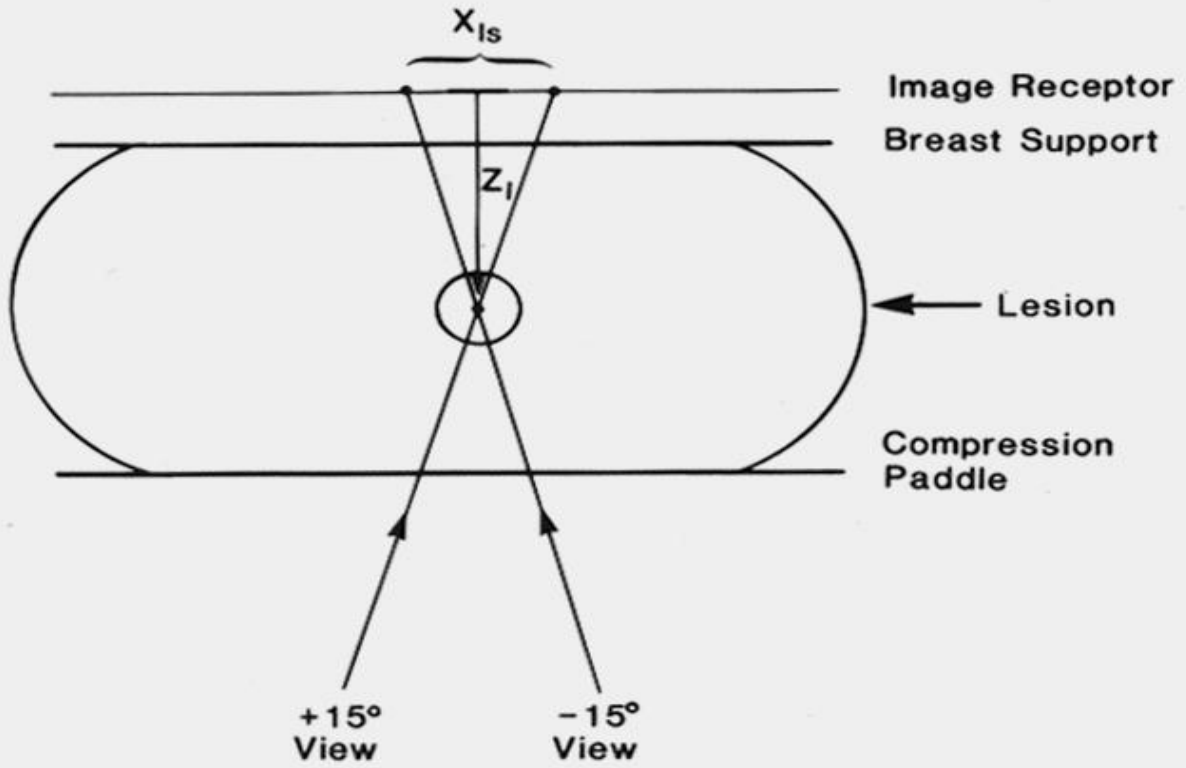
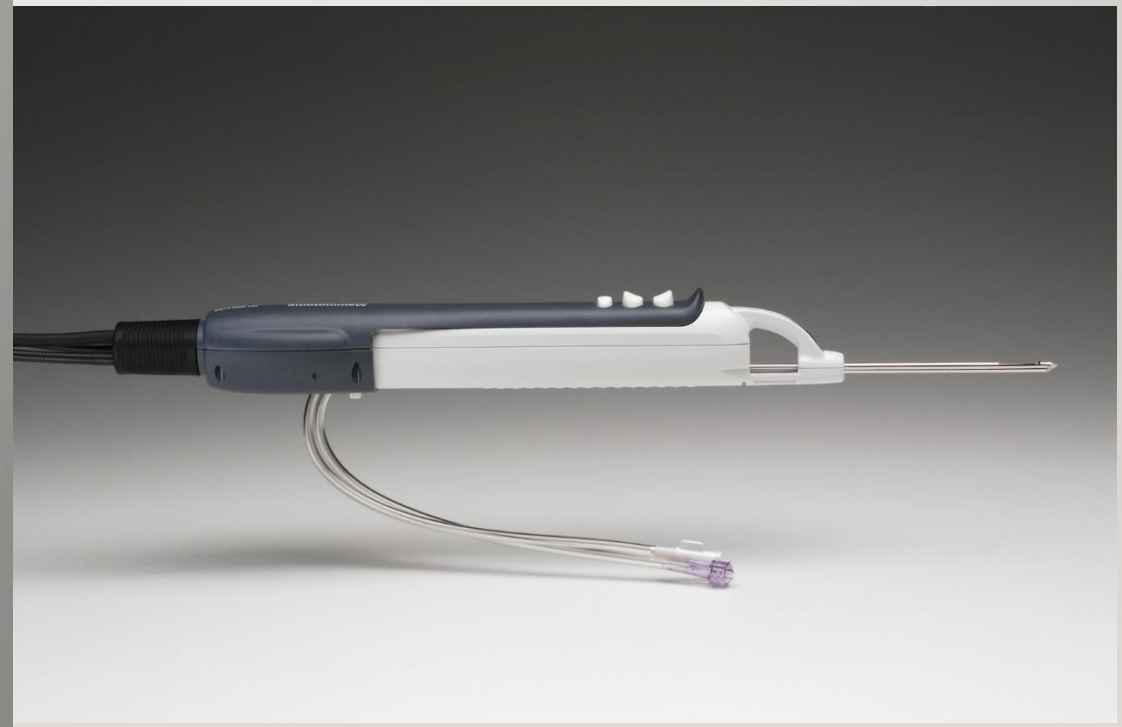


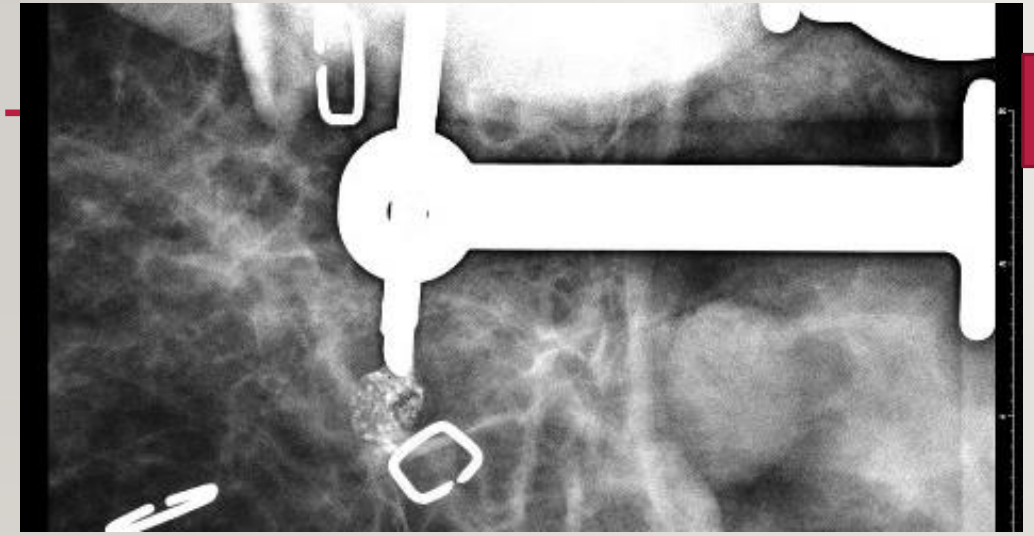
FIG. 4. A schematic of the parallax shift of a lesion on a fixed image receptor (x_{ls}) and its geometric relationship to the distance of the lesion from the image receptor (z_l).

STEREOTACTIC SET-UP

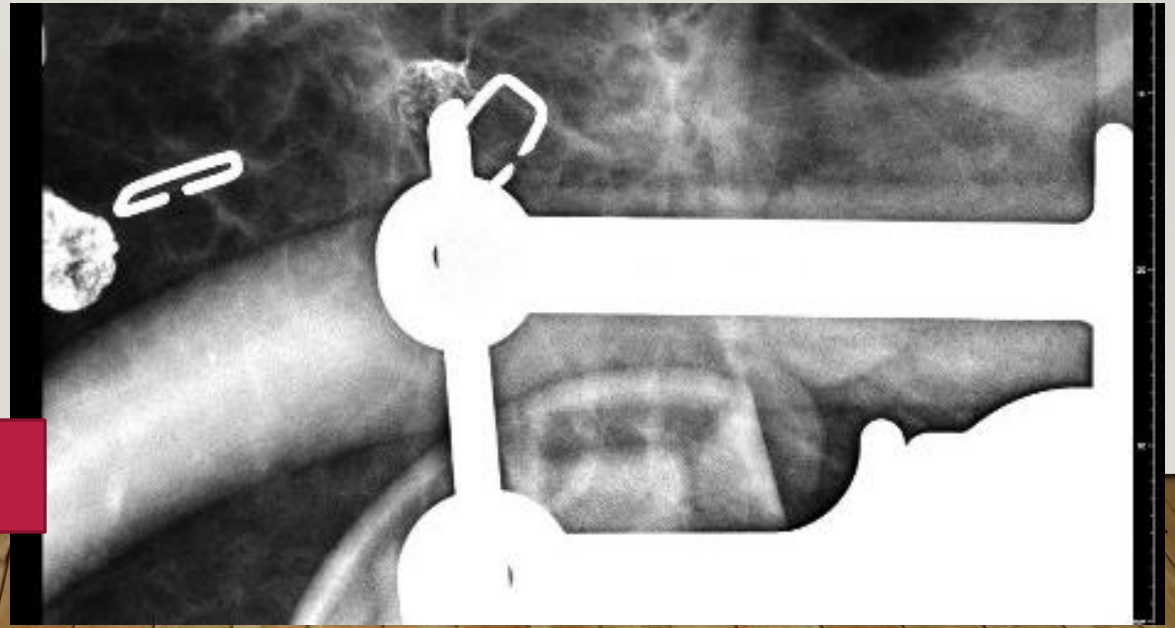
BIOPSY APPARATUS



PREFIRE

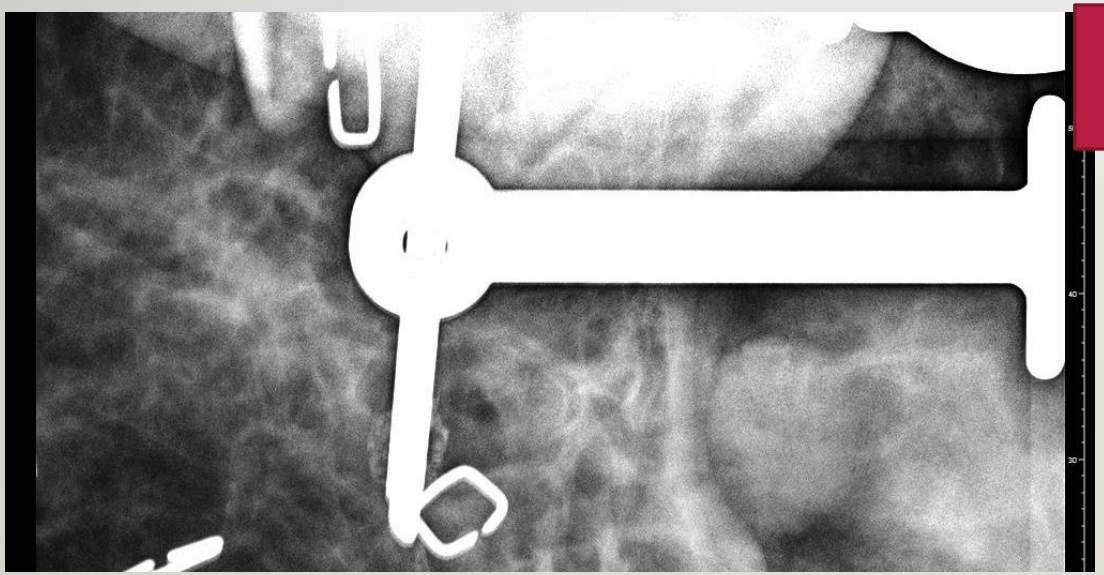


+15 DEGREES

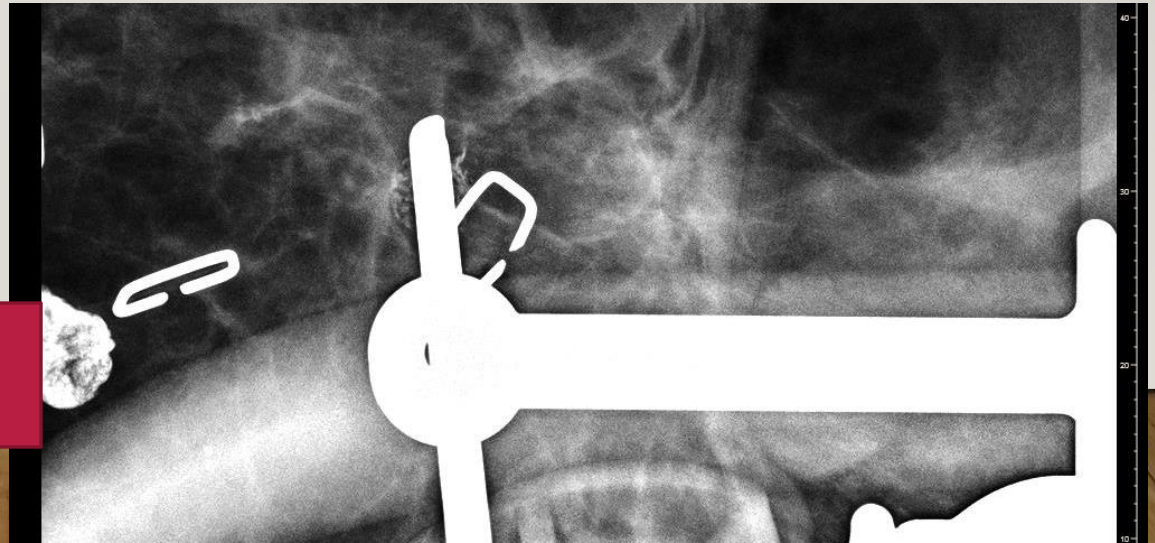


- 15 DEGREES

POSTFIRE

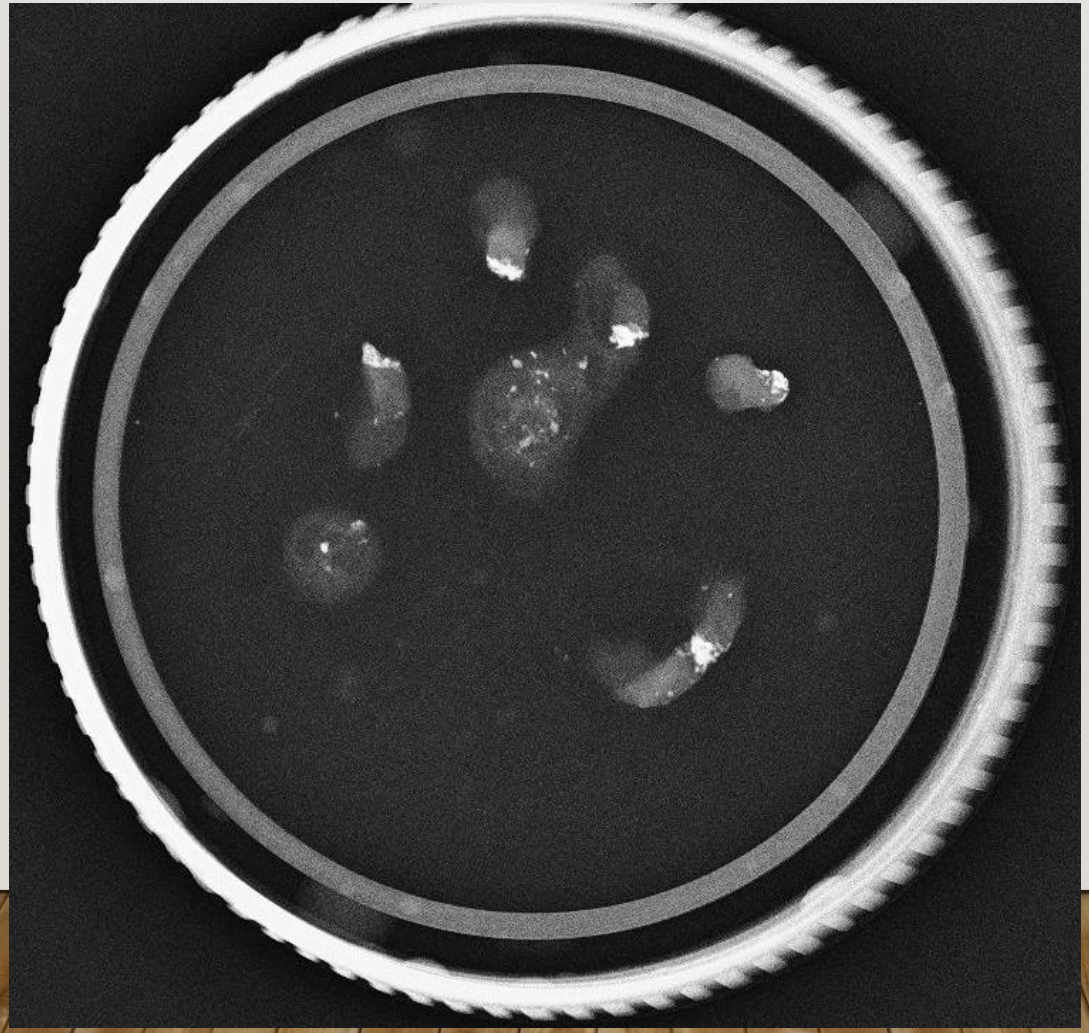


+15 DEGREES



- 15 DEGREES

SPECIMEN X-RAY



VACUUM ASSISTED BREAST BIOPSY

- USG Guided
- Mammography Guided / Stereotactic
- MR Guided
- Excision Biopsy - Fibroadenoma

M
B

Features

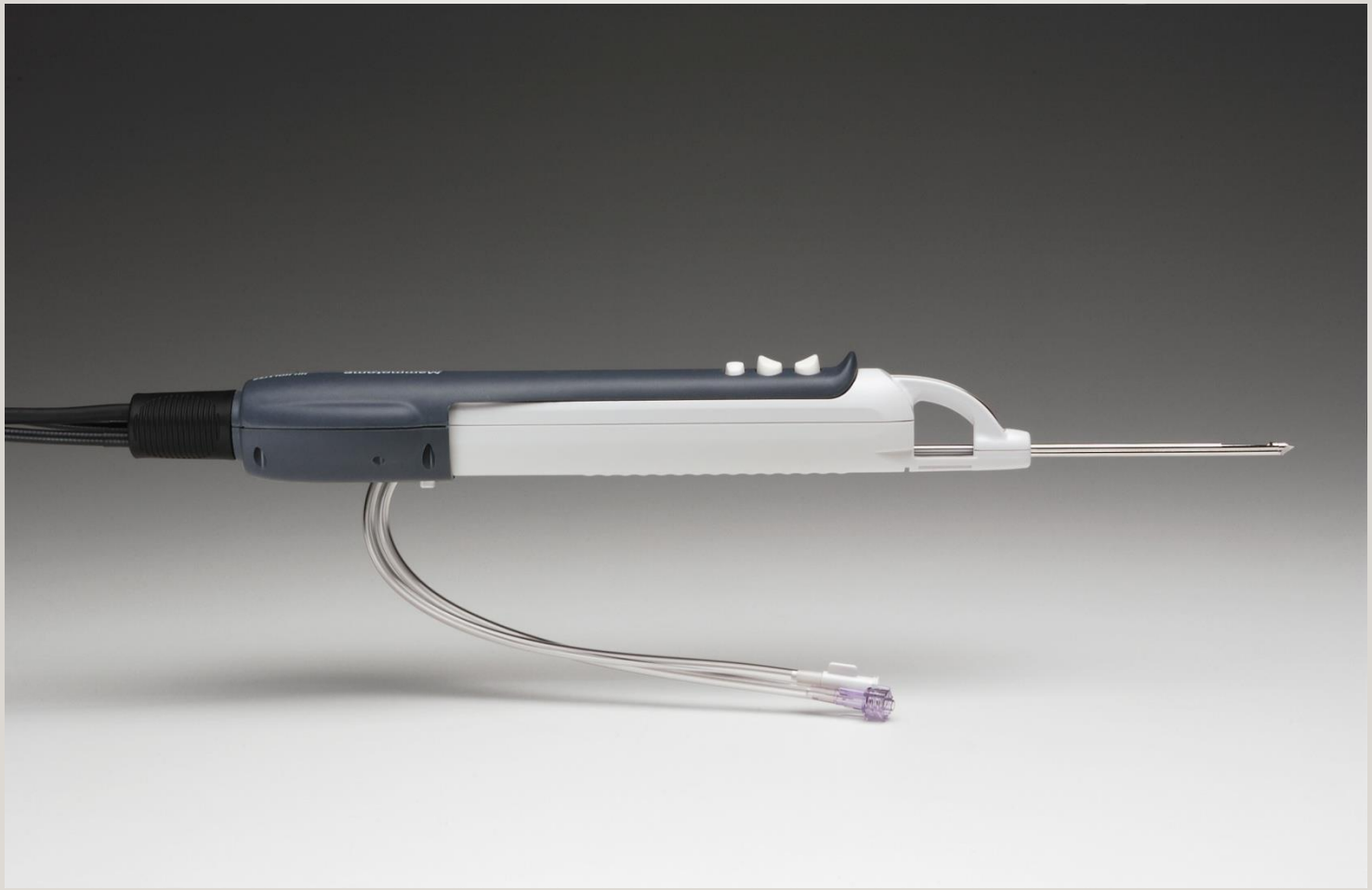
3 sizes of probes

- 14G
  Internal volume : 33 mm^3
  Avg Specimen weight : 39 mg

- 11G
  Internal volume : 71 mm^3
  Avg Specimen weight: 100 mg

- 8G
  Internal volume : 203 mm^3
  Avg Specimen weight : 300 mg

Breast Care




Mammotome
ETHICON ENDO-SURGERY
HH HOLSTER

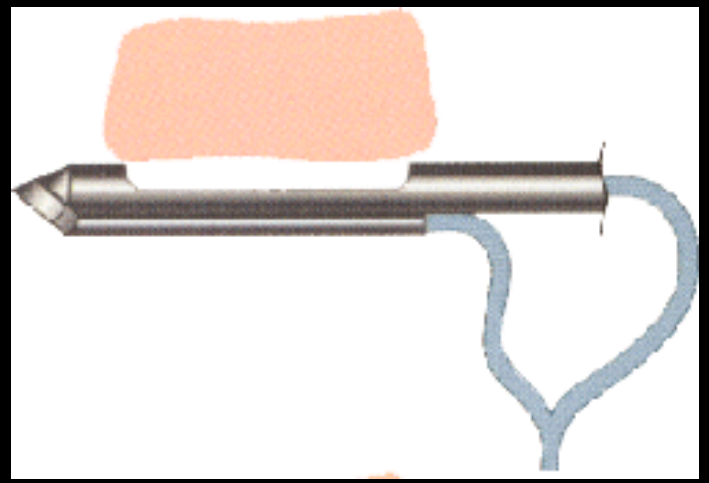
11 *GUAGE* NEEDLE TIP


ETHICON ENDO-SURGERY, INC.

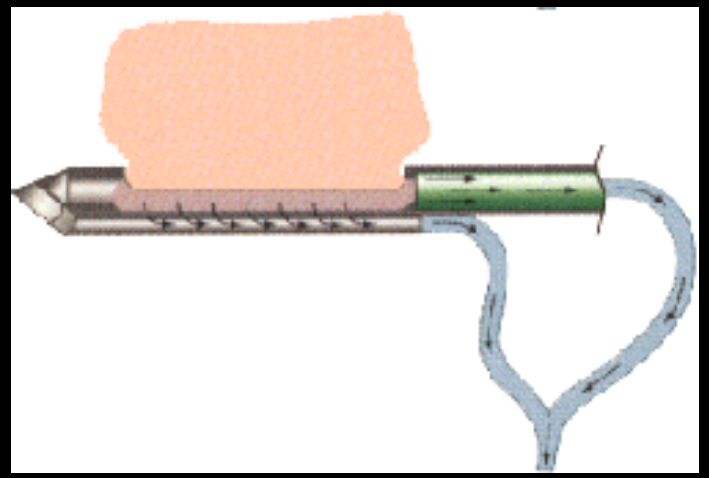
Mammotome®
Breast Biopsy System

How the Mammotome works

The probe is positioned in the breast to align the center of aperture with the center of the lesion.



The tissue is gently vacuum-aspirated into the aperture.

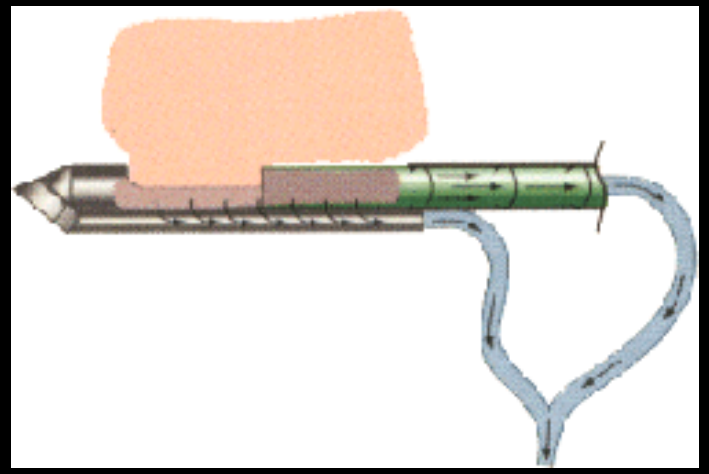


Breast Care

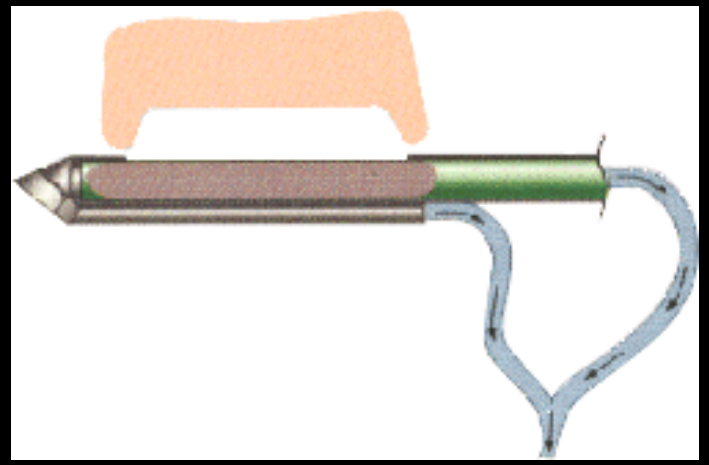
Mammotome®
Breast Biopsy System

How the Mammotome works

The rotating cutter is advanced forward, capturing a specimen.



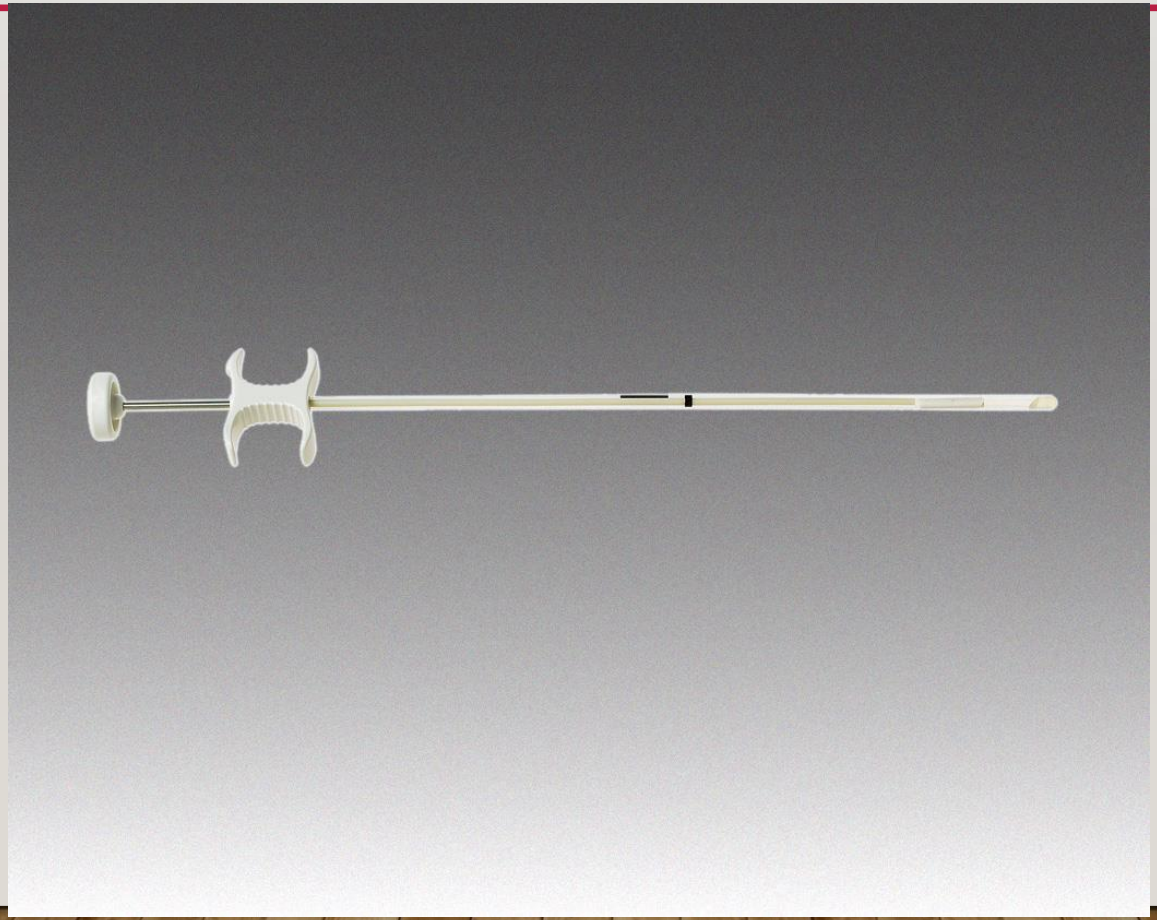
After the cutter has reached its full forward position, rotation ceases.

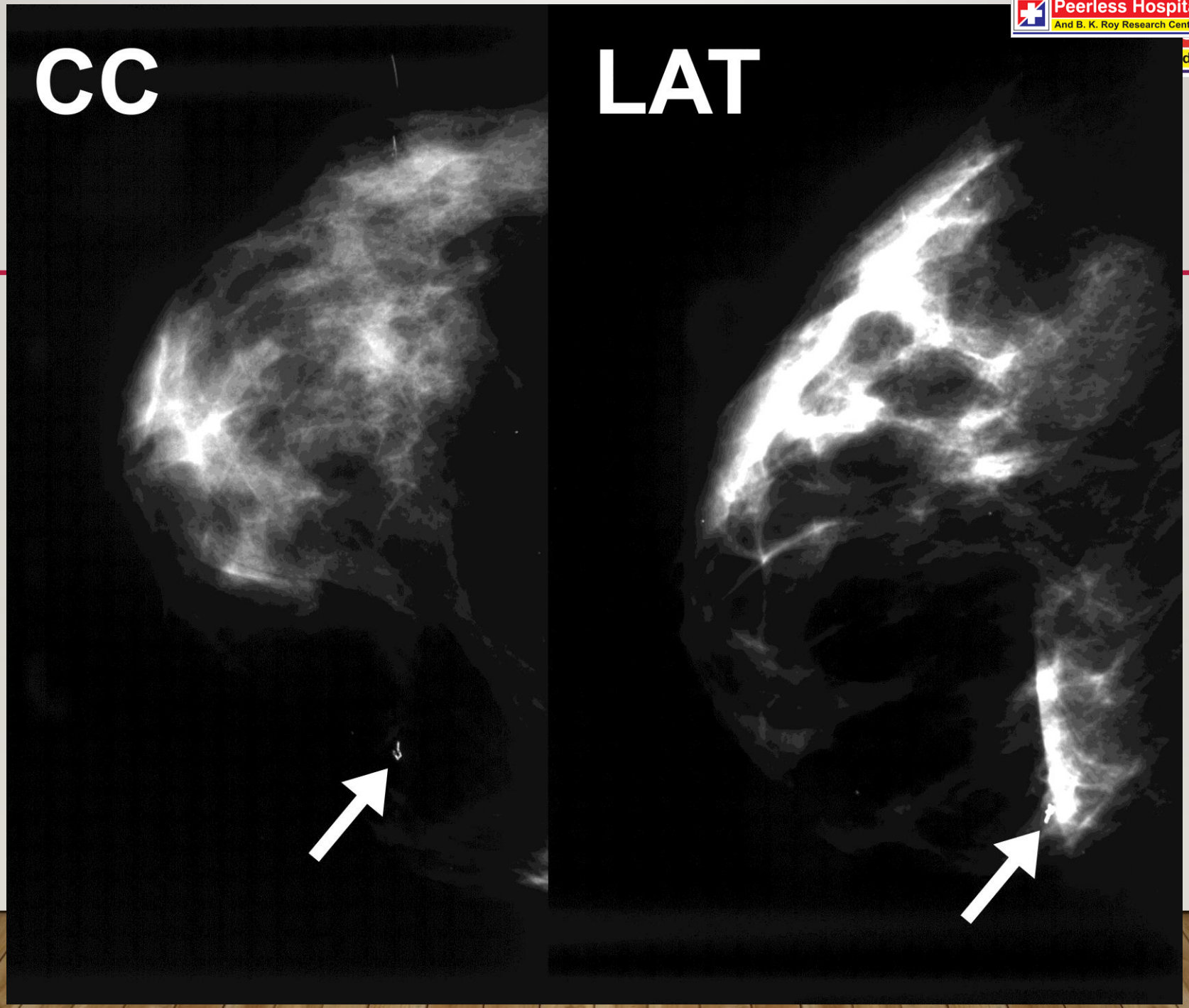


Breast Care

Stereotactic Wire Localisation

STEREOTACTIC MARKER CLIP INSERTION





BENEFITS OF DIGITAL MAMMOGRAPHY

- Low radiation dose
- Intelligent AEC optimizes the X-ray dose for each breast type
- Mammography is faster
- Easier to pick up cancers in dense breasts
- Easily stored and retrieved

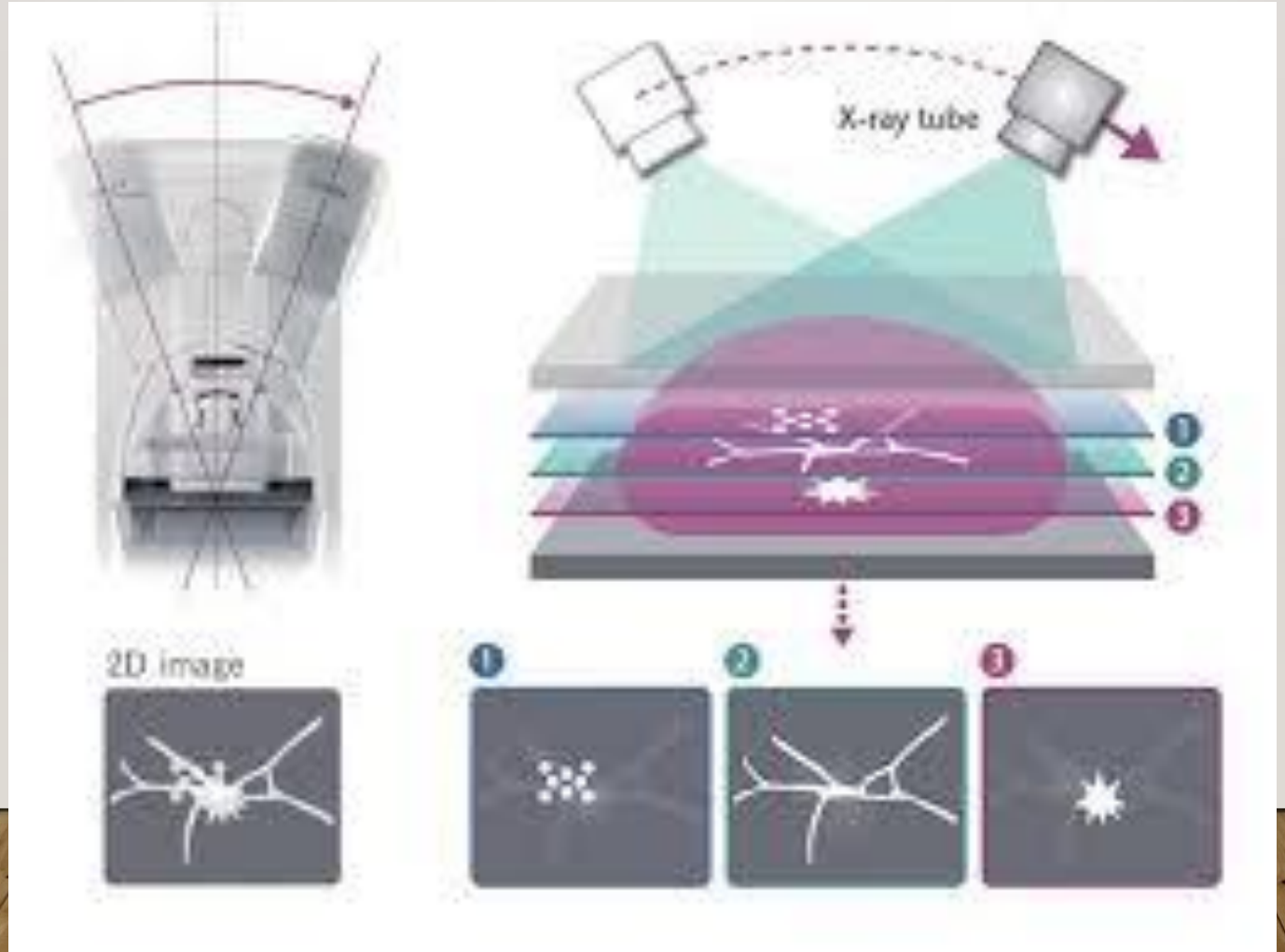
RADIATION DOSE

- Average dose to glandular tissue – 2 mGy per mammogram
- Risk of inducing fatal cancer – 20/million at age 30-50y
- Risk of inducing fatal cancer – 10/million at age 50-65y
- Strict Quality Assurance

TOMOSYNTHESIS

- Easier detection
- Reduces overlapping
- Earlier detection
- Better visualisation
- Fewer callbacks
- 3 D interpretation
- Better deliniation

TOMOSYNTHESIS



CESM

Contrast - Enhanced Spectral Mammography

CESM

- X-rays at multiple energies that create two separate but almost simultaneous exposures of the breast
- IV iodine contrast agent
- The contrast helps visualize localized increased blood flow pointing to areas of potentially cancerous lesions.
- Two mammographic images: one that looks like the standard mammogram and a second image that shows the contrast-enhanced areas that can help locate lesions.

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