SURGERY VOL-I

VERSION X

PrepLadder

Created by team PrepLadder based on SURGERY lectures on the Prepladder app

Revision friendly **Fully Colored Book/Structured Notes**

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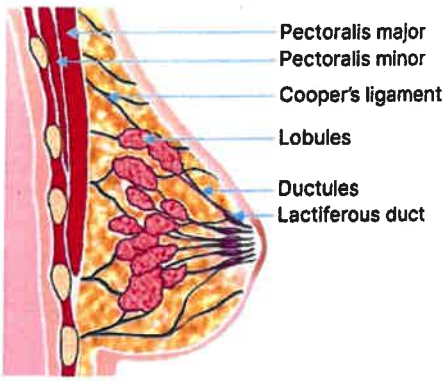
1. BREAST PART-1

ANATOMY

00:00:32

- Breast is a modified sweat gland
  - Extends from 2nd rib to 6th rib
  - Medial to lateral direction → Extends from the lateral border of sternum to anterior axillary line
- Two muscles in relation to breast
  - Pectoralis major & Pectoralis minor
- Involvement of Cooper's ligament → Dimpling
- Breast lobule is the basic structural unit of breast
  - Breast lobule empties into lactiferous duct via ductule
  - About 10 to 100 breast lobules empty into 1 ductule
- The number of lactiferous ducts in a breast is about 15 to 20
- Around the nipple is the areola, on which multiple sebaceous glands are present
- During pregnancy, the sebaceous glands enlarge → Montgomery tubercles




Normal Nipple


Montgomery's tubercle

Dimpling

- 85% of lymphatic drainage of the breast goes to axillary lymph nodes
- 15% of lymphatic drainage of the breast goes to internal mammary lymph nodes

NIPPLE DISCHARGE

00:04:35

CAUSES OF NIPPLE DISCHARGE

BLOODY NIPPLE DISCHARGE	SEROUS NIPPLE DISCHARGE
• Duct papilloma - M/c cause • Carcinoma • Duct ectasia	• Fibrocystic disease - M/c cause (associated cyclical mastalgia) • Carcinoma • Duct ectasia

GREENISH/BLACKISH/GRUMOUS/PULTACEOUS NIPPLE DISCHARGE

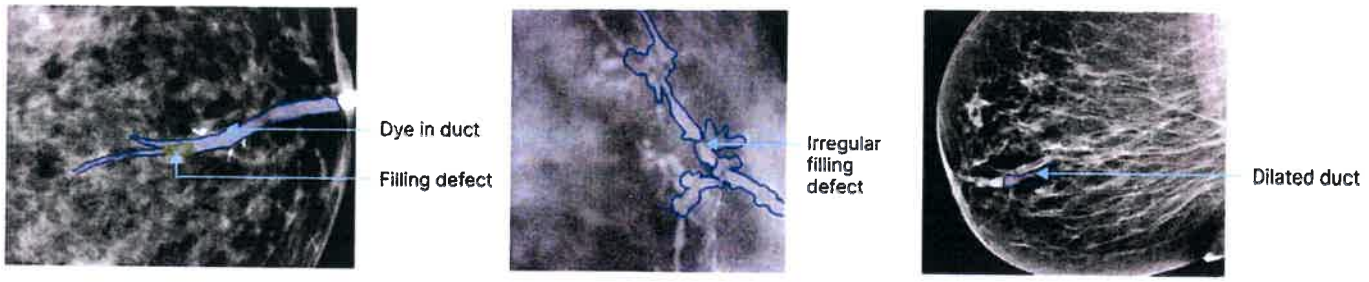
- Duct ectasia

- Any kind of nipple discharge is possible in Duct ectasia

INVESTIGATIONS

00:06:55

- First investigation done in case of a suspected case of breast cancer → Mammography
- In Bloody nipple discharge → Ductography

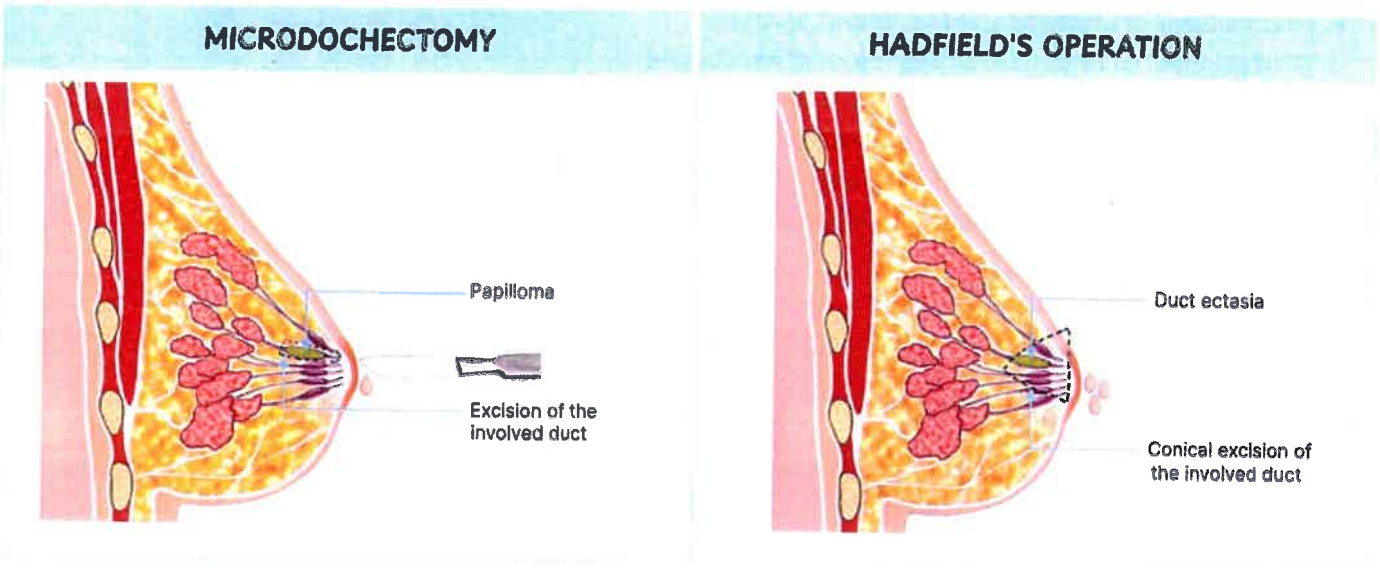


Papilloma | Carcinoma | Duct ectasia

Findings in Ductography

MANAGEMENT

00:08:28



RISK FACTORS FOR BREAST CANCER

00:11:08

- Advancing age
- Origin: Western countries
- High socio-economic status
- Alcohol intake
- High-fat diet → obesity
- State of hyperestrogenemia which causes
  - Early menarche
  - Late menopause
  - Nulliparity
  - Late first full-term pregnancy
- Positive family history: Maternal side
- Personal history of malignancy:
  - Carcinoma endometrium
  - Carcinoma ovary
- Genetic mutations

- BRCA1 mutation - Mainly in females
- BRCA2 mutation - Mainly in males

- Hormone replacement therapy
- History of therapeutic radiation exposure

SMOKING INCREASES RISK OF

00:15:39

- Carcinoma breast
- Duct ectasia
- Mondor's disease
  - Superficial thrombophlebitis of inframammary vein
  - AKA : String phlebitis
- Zuska's disease → Recurrent Periductal Mastitis

RISK ASSESSMENT MODELS OF CARCINOMA BREAST

00:16:59

GAIL MODEL (M/c used) (Mnemonic: NANA in Gail)	CLAUS MODEL

• **N**umber of breast biopsies
• **A**ge at menarche
• **N**umber of first-degree relatives with carcinoma breast
• **A**ge at first live birth
	• More information about family history
	• Based on
	  ○ Decades of life
	  ○ First and second-degree relative with breast cancer
	  ○ Age at diagnosis

WHO CLASSIFICATION OF BREAST CANCER

00:18:36

IN-SITU CARCINOMA	INVASIVE CARCINOMA	PAGET'S DISEASE OF NIPPLE
• DCIS (Ductal Carcinoma in situ) • LCIS (Lobular carcinoma in situ)	• Ductal carcinoma - M/c • Lobular carcinoma • Tubular (Cribriform) carcinoma -Least malignant with best prognosis • Mucinous (Colloid) carcinoma - Excessive mucin production • Medullary • Papillary (Least common) • Metaplastic • Inflammatory breast cancer - Most malignant with worst prognosis	

DCIS

- High risk of progression to ipsilateral invasive ductal cancer
- Ducts:
  - DCIS & Invasive ductal cancer are seen in both males & females

- Lobules
  - Lobular carcinoma is seen only in females

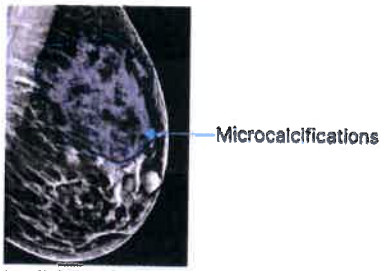
PATHOLOGY

- DCIS can be classified based on:
  - Nuclear grade
  - Necrosis

LOW GRADE DCIS	HIGH GRADE DCIS
• Cribriform • Papillary • Micro-papillary	• Solid carcinoma • Comedocarcinoma

INVESTIGATION

- Most sensitive investigation for
  - DCIS → MRI
  - Microcalcification → Mammography



Mediolateral oblique (MLO) view

MAMMOGRAPHY OF DCIS

- Mammography is the preferred investigation technique
- MRI is considered to be the best investigation method for DCIS
  - But MRI has poor sensitivity for calcification

TREATMENT

- Non-palpable DCIS : Excision by needle localization with specimen mammography
- Low-grade DCIS : Lumpectomy
- DCIS with limited disease or high grade : Lumpectomy + Radiotherapy

LCIS

- Origin : Arises from terminal duct lobular units
- Only seen in female
- Multicentric and bilateral - Marker for ↑ risk of bilateral breast cancer

PATHOLOGY

- Cytoplasmic mucoid globules
- Indian file pattern -Histologic hallmark
  - Tendency of tumor cells to invade in linear strand

CLINICAL FEATURES

- M/c presentation : Lump → ill-defined margins

DIAGNOSIS

- Neighborhood calcification can be found in mammography

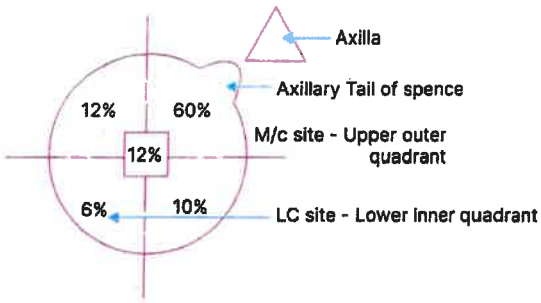
TREATMENT

- Observation or chemo-prevention
- Drugs : Tamoxifen and Raloxifene
- Prophylactic bilateral mastectomy can also be done

BREAST CANCER IN DETAIL

00:31:14

- M/c histological type: Adenocarcinoma
- M/c subtype: Invasive ductal cancer
- Least common subtype: Papillary
- Most malignant, having the worst prognosis: Inflammatory breast cancer
- Least malignant, having best prognosis: Tubular
- M/c site - Upper outer quadrant
- Left > Right breast
- Least common site - Lower inner quadrant



ROUTE OF SPREAD

00:32:55

- M/c route of spread in CA breast- Lymphatics
- M/c site of metastasis - Bones → Lumbar vertebra > Femur > Thoracic vertebra
- M/c cause of death in CA breast - Malignant pleural effusion

PATHWAY OF SPREAD

00:34:52

Breast cancer cells
↓
Posterior intercostal vein
↓
Invades the Batson plexus
↓
Through the Batson plexus, the malignant cells reach the Lumbar vertebra and the Dural venous sinuses
↓
Leptomeninges
↓
Brain

- M/c primary for leptomeningeal metastasis : Carcinoma breast
- M/c primary for brain metastasis : Carcinoma lung > Carcinoma breast

CLINICAL FEATURES

00:37:19

- M/c presentation - lump
- Architectural distortion
- Asymmetry
- Skin fixity
- Fixity to chest wall
- Nipple involvement

Retracted Nipple

- Nipple retraction
- Nipple deviation
- Ulceration

METASTASIS

- Headache
- Backache
- Dyspnea
- Jaundice
- Anorexia
- Weight loss

EXAMINATION FINDINGS

- Peau d'orange:
  - Lymphatic permeation /obstruction by tumor cells
  - Most conspicuous sign of breast cancer
- Wrinkling /Puckering and Dimpling: Involvement of Ligament of Cooper
- Multiple nodules and ulceration : Cancer-en-cuirasse

Peau d'orange

Dimpling

Puckering

Cancer en cuirasse

TRIPLE ASSESSMENT

00:43:10

- The positive predictive value of triple assessment : 99.9% (Almost 100%)
  - Clinical : Signs and symptoms are assessed
  - Imaging : Mammography or ultrasound is performed
  - Tissue sampling : FNAC/Biopsy is performed

INVESTIGATIONS

00:44:18

- First investigation done in a suspected case of breast cancer - Mammography
- IOC for diagnosis of breast cancer Biopsy/Trucut biopsy/Core cut biopsy/Needle biopsy

DIFFERENCE BETWEEN FNAC AND BIOPSY

00:45:08

FNAC	BIOPSY
• Size of the needle is 22-26 Gauge	• Size of the needle is 14-16 Gauge
• Experienced cytopathologist	• Diagnosis is made easily
• High chances for false positive/false negative results	• It is easy to differentiate DCIS from invasive ductal cancer
• Diffcult to assess hormone receptor status	• HR receptor status - Assessed easily

MAMMOGRAPHY

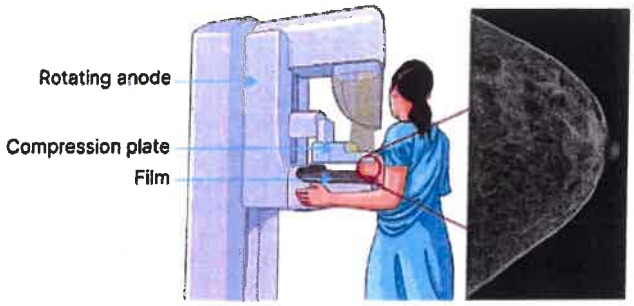
00:47:16

- IOC for screening breast cancer
- Screening should be started at 45 years and done annually
- Type of X-ray - Bremsstrahlung
- Radiation exposure: 0.1 cGRAY/study
- One mammography = 4 chest X-rays

MAMMOGRAPHY APPARATUS

CRANIO-CAUDAL VIEW

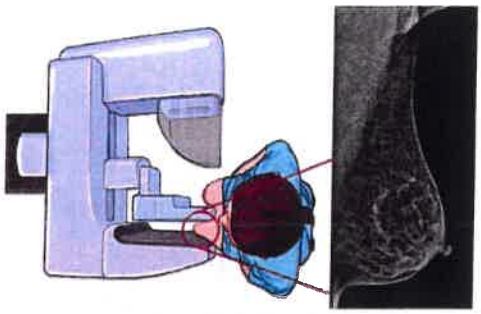
- The medial aspect is assessed
- Breast compression done



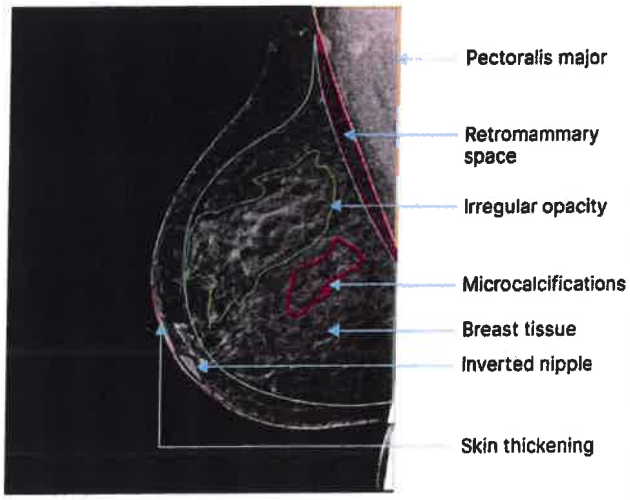
Craniocaudal (CC) view

MEDIOLATERAL OBLIQUE VIEW

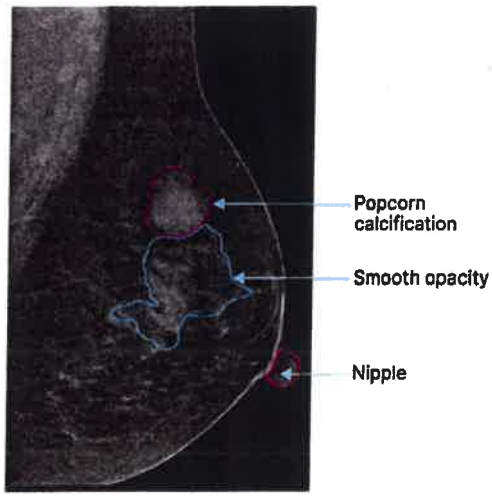
- Maximum amount of breast tissue is assessed
- The axillary tail of Spence is also assessed


Mediolateral Oblique (MLO) view

MAMMOGRAPHY-MALIGNANT FINDINGS



MAMMOGRAPHY -BENIGN FINDINGS



FEATURES	BENIGN DISORDER	MALIGNANT LESIONS
Opacity	• Regular smooth margin • Homogenous • Low density • Thin halo	• Irregular margin: stellate, spiculate, comet tail • Heterogenous • High density • Wide halo
Calcifications	• Macro-calcification: > 0.5mm	• Micro-calcification: < 0.5 mm

Associated changes	• Absent	• Nipple retractions • Skin thickening • Obliteration of retromammary space

BIRADS SCORE 00:54:40

- BIRADS - Breast Imaging Reporting and Data System

CATEGORY	DESCRIPTION	RISK OF MALIGNANCY
0	• Incomplete assessment • Additional imaging is required	NA
1	• Negative • Annual mammography is recommended	0%
2	• Benign • Annual mammography is recommended	0%
3	• Probably benign • Short-term follow-up is recommended	> 0-2%
4	• Suspicious → Biopsy is recommended o 4A- Low suspicion o 4B- Moderate suspicion o 4C-High suspicion	• 4A : > 2-10% • 4B : >10-50% • 4C : >50-95%
5	• Highly suggestive of malignancy • Intervention is recommended	>95%
6	• Biopsy-proven malignancy	

- BIRADS (Breast) : Based on mammography
- TIRADS (Thyroid) : Based on sonography
- PIRADS (Prostate) : Based on MRI

MRI 00:58:20

- IOC for screening breast cancer in high-risk females
  - o High-risk females
    - → Females having a positive family history
    - → Females having BRCA mutation
- IOC for diagnosis of implant-related complications
- IOC to differentiate scar from benign lesion

ULTRASOUND 01:00:43

- First investigation done in young females with age < 35 years with a lump

PET SCAN 01:01:02

- IOC for diagnosis of distant metastasis

- 18-F → Radiotracer used
- IOC to differentiate recurrence from scarring/fibrosis/necrosis

BONE SCAN

01:02:41

- IOC for diagnosis of bone metastasis
- Samarium-153 Isotope used for painful bony metastasis

TNM CLASSIFICATION

01:03:25

- **cTNM**: for clinical staging
- **pTNM**: for pathological staging
- **rTNM**: for recurrent tumors
- **mTNM**: for multiple primary tumors at same site
- **yTNM**: Staging is done when the patient has received neoadjuvant chemotherapy
- **ypTNM**: Pathological staging done after neoadjuvant chemotherapy

8th AJCC TNM CLASSIFICATION

01:05:15

STAGE	FEATURES
T_1	Size of the tumor is up to **2 cm**
T_2	Size of the tumor is **> 2 to 5 cm**
T_3	Size of the tumor is **> 5 cm**
T_{4a}	Extension to chest wall (Ribs+ intercostal muscles + Serratus anterior)
T_{4b}	• Skin changes: On same breast o Ulceration o Edema, including Peau d'orange o Satellite nodules
T_{4c}	$T_{4a} + T_{4b}$
T_{4d}	Inflammatory breast cancer

LYMPH NODE STAGING

01:07:51

- N_1 - Metastasis to ipsilateral axillary lymph node level I and II (mobile).
- N_{2a} - Metastasis to ipsilateral axillary lymph node level I and II (fixed/matted)
- N_{2b} -Clinically apparent internal mammary nodes
- N_{3a} - Metastasis to ipsilateral infra-clavicular lymph nodes
- N_{3b} - Metastasis to ipsilateral axillary + internal mammary lymph nodes
- N_{3c} -Metastasis to ipsilateral supraclavicular lymph nodes
- M_0 - No distant metastasis
- M_1 -Distant metastasis

STAGING

01:09:52

STAGE	DESCRIPTION
Stage I	T_1
Stage II_A	$T_{0-1}N_1$, T_2
Stage II_B	T_2N_1, T_3
Stage III_A	$T_{0-2}N_2$, T_3 N_{1-2}
Stage III_B	T_4 N_{0-2}
Stage III_C	T_{ANY} N_3
Stage IV	T_{ANY} N_{ANY} M_1

- If 2 lumps are present in the same breast, staging is done according to size of bigger lump
- If 1 lump is present in each breast, staging should be done separately
- Contralateral involvement of lymph node → metastasis

NUMBER OF LYMPH NODES REMOVED FOR ADEQUATE STAGING

01:13:50

Gall bladder	6
Breast	10
Colon	12
Rectum	12
Esophagus	15
Stomach	16

MANAGEMENT OF BREAST CANCER

01:14:52

EARLY INVASIVE BREAST CANCER

- Stage I, II_A, II_B
  - Breast conservation surgery (BCS) + SLN biopsy +RT
  - If contraindication to BCS → Simple mastectomy (Total) +Axillary LN sampling

INDICATIONS OF ADJUVANT CHEMOTHERAPY

01:15:54

- Size of tumor > 1 cm
- Lymph node positive
- Size is > 0.5 cm, lymph node negative with adverse prognostic factors
  - High histological grade
  - Lymphovascular invasion
  - Hormone receptor negative
  - HER-2-Neu positive

LOCALLY ADVANCED BREAST CANCER (LABC)

01:16:41

- Stage III_A, III_B & III_C
- Management of LABC: NACT + MRM + RT
  - Neoadjuvant chemotherapy (NACT)is given to downstage the malignancy
  - Modified radical mastectomy (MRM)
  - Radiotherapy (RT)

METASTATIC BREAST CANCER (STAGE IV)

- Prolong the survival
- Improve the quality of life

HORMONE THERAPY

- ER/PR positive
- Asymptomatic visceral metastasis
- Bony or soft tissue metastasis

CHEMOTHERAPY

- ER/PR negative
- Symptomatic visceral metastasis
- Tumor is hormone refractory

INDICATIONS OF RADIOTHERAPY

- Breast conservation surgery
- Locally advanced breast cancer (LABC)
- 4 or more positive lymph nodes
- Positive margins

CHEMOTHERAPY REGIMENS

01:20:07

CMF	CAF - 6 CYCLES OF CHEMOTHERAPY ARE GIVEN
Cyclophosphamide	Cyclophosphamide
Methotrexate	Adriamycin /Doxorubicin/Anthracycline derivative
5-Flurouracil	5-Fluorouracil

- Adriamycin-resistant breast cancer → Taxanes
  - Docetaxel
  - Paclitaxel
- Adriamycin & Taxanes resistant breast cancer → Ixabepilone

HER-2-NEU POSITIVE BREAST CANCER

- Herceptin/Trastuzumab → First-line agent
- Lapatinib → Second-line agent
- Sunitinib → Refractory and metastatic breast cancer
  - DOC for imatinib-resistant GIST
  - First-line agent for advanced and metastatic RCC

HORMONE THERAPY

01:24:00

THERAPIES	DESCRIPTION
Ovarian Ablation	• Bilateral oophorectomy • LHRH agonists (Goserelin, leuprolide)
Selective Estrogen Receptor Modulator (SERM)	• Tamoxifen • Raloxifene
Aromatase Inhibitors	• Non-steroidal o Letrozole o Anastrozole • Steroidal o Exemestane
Anti-Estrogens	• Fulvestrant
Progestins	• Megesterol • Medroxyprogesterone acetate

- DOC for hormonal therapy in pre-menopausal patients →Tamoxifen
- DOC for hormonal therapy in post-menopausal patients → Aromatase inhibitors

TAMOXIFEN

- Dose: 10 mg BD X 5 days
- Potent antagonistic action on
  - Breast cancer cells
  - Blood vessels
- Partial antagonistic action on
  - Pituitary
  - Bone
  - Uterus - ↑ risk of endometrial cancer
  - Liver

MCQ's

Q. A patient with invasive ductal carcinoma in situ presents with ulceration on the skin and inflammatory signs. Nipple retraction was also present. What is the stage?

a. Stage III
b. Stage IV with node positivity
c. T_{4b}
d. No metastasis

Ans : (a)

Q. A 59-year-old lady presents with a progressive, painless lump in the breast. What is the cause for the following skin change?

a. Infiltration of subdermal lymphatics
b. Infiltration of the lactiferous duct
c. Involvement of Cooper's ligament
d. Spread of the tumor to the anterior chest wall

Ans : (a)

Q. A 25-year-old woman presents with a breast lump, with no skin changes or indurations. On histology, there was a fibroadenoma. Which of the following categories does it fall under?

a. BIRADS 1 and 2
b. BIRADS 2 OR 4
c. BIRADS 2,3,4
d. BIRADS 2

Ans : (d)

Q. A Lump in the breast is observed in a female patient. Among the options listed below, all but one can be employed to exclude the presence of cancer. Which one is not applicable for this purpose?

a. Radiological investigations
b. PET scan
c. Clinical examination
d. Histology and cytology

Ans : (b)

Q. A 52-year-old female patient presents with HER-2-positive breast cancer that has become resistant to Trastuzumab treatment. The oncologist is considering the next line of treatment for the patient. Which of the following options would be the most appropriate choice?

a. Lapatinib
b. Sorafenib
c. Vemurafenib
d. Erlotinib

Ans : (a)

Q. What is the drug used for estrogen-dependent breast cancer?
a. Lapatinib
b. Sunitinib
c. Tamoxifen
d. Adriamycin

Ans : (c)