Breast Diseases

Objectives

- The student is expected to describe and explain the pathogenesis and clinical features of the following conditions:
  - Lump and nodularity
  - Pain
  - Nipple discharges
  - Nipple changes
  - Breast enlargement
- Breast skin changes and ulceration
- List the differential diagnosis of breast diseases

Colour Index

- Main Text
- Males slides
- Females slides
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- Doctor's Notes (439)
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- Important
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- Extra

Summary File

Editing File

Overview

Anatomy Of the breast:

- **Anatomical landmark:** Extended from clavicle superiorly to abdominal wall inferiorly .
- **Blood supply:** from lateral thoracic artery and perforating branches of internal mammary artery .
- **Functional Unit:** is the Terminal duct lobular unit .
- **Cooper's Ligaments:** suspensory ligaments extending through the breast to underlying muscle , Benign or malignant lesions may affect these ligament causing skin retraction or dimpling
- **Fatty tissue:** Subcutaneous and retromammary fat , Bulk of breast. No fat beneath areola and nipple.
  We start surgeries from the **inframammary fold**, we can't go beyond it because there is only fat (no breast tissue)
- **Internal anatomy:** lobules → lobes → ducts
- **Breast Modified Sebaceous Glands (Boundaries of the breast):**
  Upper border (clavicle inferior surface)
  Lower border (6th or 7th rib, upper part of the abdomen)
  Inner Border (Edge of sternum medially)
  Outer border (Mid/anterior axillary line)

External Anatomy of the Breast

01 **Nipple :** Pigmented, Cylindrical, 4th intercostal space * at age 18

02 **Areola:** Pigmented area surrounding nipple

03 **Glands of Montgomery (tubercle or nodule) :** Sebaceous glands within the areola, Lubricate nipple during lactation , sometimes it can be blocked but it's not a problem just a simple blockage رى حبوب الوجه

Axillary lymph nodes

01 **Level 1 , lateral :** anything below & lateral to the pectoralis , most external and our target in breast examination

02 **Level 2 , posterior:** anything below the pectoralis

03 **Level 3 , medial:** above the pectoralis till the clavicle

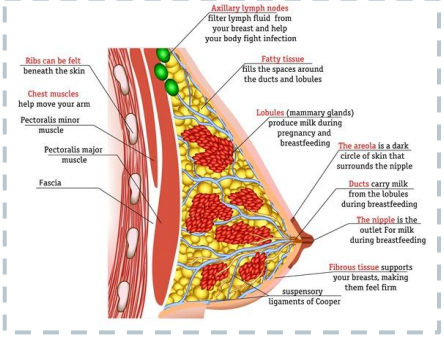
- Axillary lymph nodes defined by pectoralis minor muscle
- Main route of lymphatic spread is to axillary nodes below the axillary vein .
- It also drains to internal mammary nodes , and inter pectoral (Rotter's) nodes .
- **Why do we care about the levels?** for the prognosis when we have metastasis (Level 3 has worst prognosis)

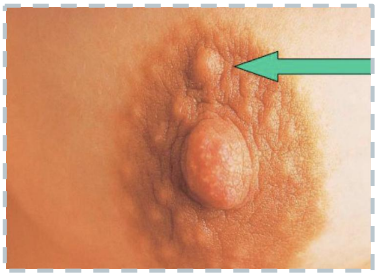
Nerve supply

01 **Long Thoracic Nerve :** Serratus anterior

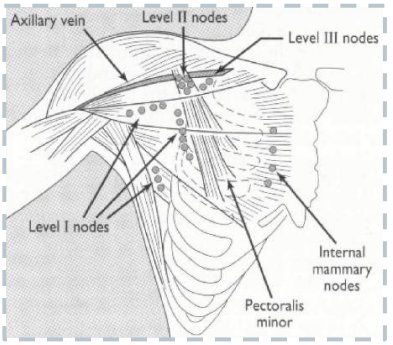
02 **Thoracodorsal Nerve:** Latissimus Dorsi

03 **Intercostal-Brachial Nerve:** Lateral cutaneous, Sensory to medial arm & axilla





Blocked Montgomery Tubercle



Overview

Development of the breast:

- Breast development and milk discharge might be seen in neonates (males & females) in first 2 weeks of life due to maternal hormones (oestrogens) crossing the placenta. This enlargement is normal and subsides within few weeks.
- **The breast life cycle:**

1st

Development & Early reproductive life:
Occurs at **puberty** and involves proliferation of **ducts, ductules & fat** associated with very rudimentary lobule formation, and regular changes in relation to the menstrual cycle.

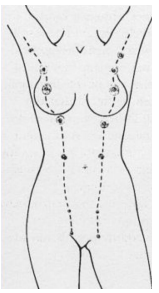
2nd

Mature reproductive life:
Occurs during **pregnancy**.
The breast enlarges with proliferation of the **ducts** and **lobules** in preparation for the production of milk.

3rd

Involution:
By 30 years of age, involution is evident and continues to menopause and beyond. During involution, both the glandular and fibrous tissue atrophy and the shape of the breast changes.

Congenital abnormalities / Normal variations:



- **Milk lines:** extend from the mid axillary line down to mid groin.
  - sites of **Accessory nipple**:
    - Within the breast itself or along the milk line
    - Usually not functioning but sometimes it can which create problems during lactation and breastfeeding, because it'll secrets minimal amounts of milk.
    - If there is two functional nipples, we have to interfere surgery by assessing the least functional nipple and then removing it
  - **Accessory Breast tissue**
    - It's a bulge of fat tissue with some ductal tissue , usually within the axilla or inframammary
- **Breast asymmetry**.
  - **Commonly seen during puberty.** We have to investigate if there is underlying pathology.
  - 50% of patients can present with normal breast asymmetry, but before passing the patient as normal you have to do at least ultrasound to make sure that there is no underlying pathology.
  - If **old women** presented with breast asymmetry you have to investigate it, especially if it was recent. but if the asymmetry was for a long time from puberty we can consider it normal
- **Hair**.
- **Inverted nipple since puberty**

Congenital abnormalities of the nipple:

1. Supernumerary nipple is a common congenital condition, which develops along a line extending from the anterior fold of the axilla to the groin (milk line).
2. Congenital absence of the nipple is rare and is usually associated with. congenital absence of the breast (amazia)
3. Duplication of the nipple on a normal areola is a rare congenital abnormality

Breast Investigations (Triple Assessment):

Triple assessment is the assessment of breast lump or other breast symptoms suspicious of carcinoma, where the diagnosis should be made by a combination of:

01 **Clinical Assessment** → 02 **Imaging** → 03 **Biopsy**

Common Breast Symptoms :

The majority of patients are complaining of:

1. Breast pain
2. Breast mass (lumb) → most common
3. Nipple discharge
4. Abnormal skin (inflammation, eczema or ulceration)
5. Nipple appearance(retraction).
6. Tenderness in the breast.
7. Change in the breast size.

Symptom	% of patients
Breast lump	36
Painful lump or lumpiness	33
Pain alone	17.5
Nipple discharge	5
Nipple retraction	3
Strong family history of breast cancer	3
Breast distortion	1
Swelling or inflammation	1
Scaling nipple (eczema)	0.5

History:

- The most important pointer to diagnosis is the age of the patient .
- Duration of the symptoms , other breast symptoms.
- History of risk factors should be obtained.

Full & complete history should be taken, particular attention should be paid to:

- Breast development starting from childhood to present.
- Endocrine status of patient mainly menstruation and oral contraceptives.
- Family history of breast diseases especially cancer & particularly in near relatives.
- Premenopause vs perimenopause (menopausal transition) or postmenopause.
- For postmenopausal women: hormonal replacement therapy & date of menopause.

- Size of lump in relation to menses.
- Pattern of pain in relation to menses.
- How regular the cycle is and quantity of blood.
- Age at menarche.
- Age at 1st birth.
- Premenopause vs perimenopause (menopausal transition) or postmenopause.
- For postmenopausal women: hormonal replacement therapy & date of menopause.

- Changes in breast during previous pregnancies e.g. abscess, nipple discharge, retraction of nipple.
- Number of pregnancies.
- Last menstrual period.
- Nipple discharge.
- Breastfeeding.
- Abnormalities which took place during previous lactation period e.g. abscesses, nipple retraction, milk retention.

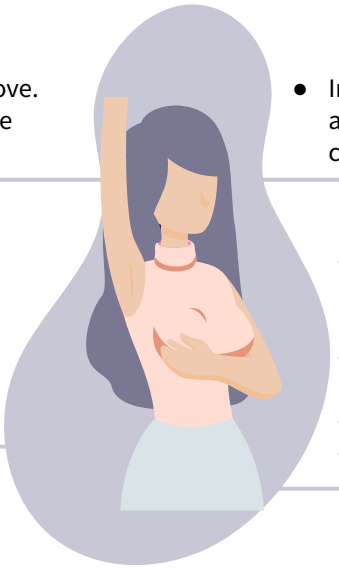
Breast Investigations (Triple Assessment):

01 **Clinical Assessment** → 02 **Imaging** → 03 **Biopsy**

Physical Exam:

01
- Disrobed from waist and above.
- Examine in sitting and supine position and 45° position.

02
- Always compare both breasts.
- **Examine the normal side first.**
- Before you comment on any changes on the appearance of nipples or chest, you must make sure that it's not congenital first.



03
- Inspection with arms by the side and above head: size, symmetry, skin changes, masses & nipple complex.

04
- Examine axilla, arm, SCF. by palpating Gland, Axilla, Supraclavicular spaces & Nipple-areola complex
- If you find a mass in breast = Examine axillary lymph nodes and vice versa.
- Examine abdomen.
- Examine the back.

Skin Dimpling and change in contour:

- Normally breast tissue is smooth and round.
- **Causes:**
  - carcinoma (malignancy)
  - Aging → due to fat loss
  - Breast Infection w/ redness and engorged breast
  - Previous Breast Surgery
  - Any inflammatory breast condition.

01 Clinical Assessment → 02 Imaging → 03 Biopsy

Ultrasound (Young)	★ **Can differentiate between solid and cystic lesions** (cysts show up as transparent objects while benign lesions tend to have well-demarcated edges and cancers usually have an irregular indistinct outline). • **Cancer have "irregular" edges and appear "hypoechoic" .** • **It is used to assess axillary lymph nodes.** • **Most often it is used for biopsy ,** Guides percutaneous biopsy for any suspicious axillary lymph node. • **Useful for diagnosis** of breast cancer, especially in **young** patients under the age of 40 (mammogram is difficult to interpret in young patients due to the dense breast tissue). • Localizes an impalpable breast pathology. • **Not useful screening** tool for breast cancer, can be used to assess response.
Mammography (Above 40)	• **Screening tool for age of 40 & above (older patient)** • **2 Views are obtained:** MLO (mediolateral oblique), CC (craniocaudal) • **Limited value in younger patients** • **Stereotactic device can be used to biopsy calcification** • Useful for diagnosis of breast cancer and assess response. • Safe (dose of radiation is low) but uncomfortable. • Sensitivity increases with age as the breast become less dense. • Normal mammogram doesn't exclude the presence of carcinoma. • Rarely of value in the age below 30, because the breasts are relatively radiodense. • **Calcification:** 1. Macrocalcifications: - Large white dots - Almost always non-cancerous and require no further follow-up 2. Microcalcifications: - Very fine white specks - Usually non-cancerous but can sometimes be a sign of cancer - Size, shape and pattern
MRI (Special)	• It has high sensitivity for breast cancer , and demonstrate extent of cancer . • **Indications:** ○ Screening high risk young women who carry BRCA1 or BRCA2 gene mutations ○ Assessing young women with dense breasts who have a lump or a cancer that is not well visualised on other imaging ○ To identify a breast cancer in women with a malignant axillary node where there is no obvious primary cancer seen on mammography and ultrasound ○ To assess response to chemotherapy or endocrine therapy ○ To assess breast implants for leakage and rupture ○ To assess treated breasts after surgery and radiotherapy. ○ Distinguishes scar from recurrent cancer after conservative breast surgery. ○ Assesses multicentricity and multifocality in lobular breast cancer. ○ Assesses the extent of ductal carcinoma in situ (DCIS).

01 Clinical Assessment → 02 Imaging → 03 Biopsy

BI-RADS:

To communicate with a radiologist use: **BI-RADS (Breast Imaging-Reporting and Data System):**

Final Assessment Categories			
Category		Management	Likelihood of cancer
0	Need additional imaging or prior examinations	Recall for additional imaging and/or await prior examinations	n/a
1	Negative	Routine screening	Essentially 0%
2	Benign	Routine screening	Essentially 0%
3	Probably Benign	Short interval-follow-up (6 month) or continued	>0 % but ≤ 2%
★ 4	Suspicious	Tissue diagnosis (biopsy)	4a. low suspicion for malignancy (>2% to ≤ 10%) 4b. moderate suspicion for malignancy (>10% to ≤ 50%) 4c. high suspicion for malignancy (>50% to <95%)
5	Highly suggestive of malignancy	Tissue diagnosis	≥95%
6	Known biopsy-proven	Surgical excision when clinical appropriate	n/a

Sensitivity of investigations in the diagnosis of symptomatic breast disease:

Test:	Clinical examination	Mammography	Ultrasonography	Core biopsy	Fine-needle aspiration cytology
Sensitivity for cancers	86%	86%	90%	98%	95%

01 → 02 → 03

Clinical Assessment — **Imaging** — **Biopsy/Dx**

"هذا لسنة خامس" :)

Fine-needle aspiration for cytological examination (FNA)	• Cytology → only shows cells • Mostly used for symptomatic simple cyst and for suspicious axillary lymph nodes . • Fast, inexpensive with 96% accuracy • Institution dependent , US guided • Unable to differentiate between in-situ vs invasive CA but can differentiate cystic from a solid lesion. Therefore, surgical procedure should not be performed according to the result of FNA. • This is now **rarely used** to diagnose palpable breast lumps. • **If a lesion is a simple cyst** on ultrasound, aspiration is indicated only for symptoms or reassurance. • Any fluid aspirated should be discarded unless it is evenly blood stained, then it should be sent for cytological analysis. • **FNA of nodes** should be performed under image guidance with use of local anaesthesia.

Core biopsy (Tru-cut biopsy)	• If you need to take out a biopsy do Tru-Cut biopsy.
	• **Advantages:**
	  ○ It can differentiate invasive from in situ disease
	  ○ Cancer type and receptor status can be assessed, which is important before commencing neoadjuvant therapy.
	  ○ It has an extremely low rate of false positives
	  ○ It has a very high sensitivity when image guided.
	  ○ Shows tissues
	  ○ Definitive preoperative diagnosis.
	• After injection of local anaesthetic several cores are removed from a mass or an area of microcalcification by means of a cutting needle technique.
	• Core biopsy can be performed using palpation to guide biopsy, although image-guidance using ultrasound is recommended for mass lesions and a stereotactic technique for calcifications. Vacuum-assisted core biopsy devices allow larger volumes of tissue to be removed and produce more reliable results in microcalcification biopsies.

Punch Biopsy	Done for nippleulceration or changes to diagnose Paget's disease of the nipple
Open Biopsy	Should be performed only in patients who have been appropriately investigated by imaging and core biopsy and FNA
Excisional biopsy	Needle localization
stereotactic biopsy	• Used if there's Suspicious mammographic abnormalities • Patients lay prone

Note

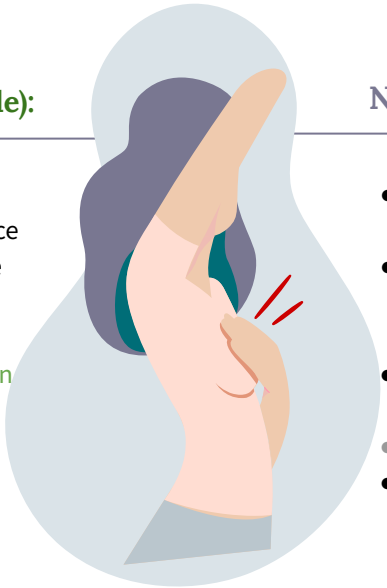
- **Common asked question in the clinic:**
  - if you do a biopsy you will transform the tumor to a malignant tumor (False)
  - If you biopsy a tumor, there is risk of spreading the tumor because of the biopsy (False except for liver biopsies)

Breast lumpiness and pain

Breast pain

Cyclical breast pain (related to the menstrual cycle):

- Dull, diffuse and bilateral
- Treatment: Reassurance,NSAIDS,advice to wear good supportive bra, Exercise to activate pectoralis muscle
- Cyclical breast pain is **very common.**
- Almost all females go through this pain with variable degrees of pain.
- Hormonal in origin.
- During the second half of the cycle.
- **Unilateral mostly** (but can be bilateral), Upper outer quadrant.
- The pain is usually reduced by the use of oral contraceptives
- **On Examination:**
  - **No** discrete lump.
  - There may be **tenderness**
  - **Diffuse** nodularity is common.



Non-cyclical breast pain:

- Noncyclical breast pain is much more common than cyclical pain
- Oral or topical nonsteroidal anti-inflammatory agents (NSAIDs) can be effective in improving chest-wall pain.
- Pathological, especially if it's associated with a mass, nipple discharge or skin changes.
- Usually resolves spontaneously.
- In elderly female careful examination is essential to exclude cancer (especially when the pain is described as 'prickling'.) and to make sure it's not musculoskeletal pain.
- Requires investigations after clinical **examination:**
  - Breast ultrasound.
  - Mammogram if the patient's age is >40.
  - MRI if patients is <40 y/o with strong family history of breast cancer.

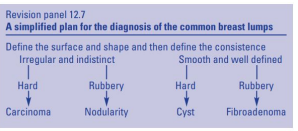
Lumps or nodularity

Overview :

- It can be throughout the breast or localized .
- Diffuse bilateral nodularity is normal .
- Benign focal nodularity is often reported that it fluctuates in size in relation to the menstrual cycle.
- Breast cancer should be excluded .
- Others: A galactocele is a cystic lesion that develops in lactating women and is full of milk.

Lumps and nodularity

Type of Lump:



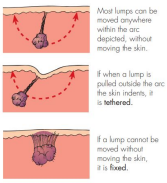
438	Age (years)	Pain	Surface	Consistency	Axilla
Solitary Cyst	40-55	Occasional	Smooth	Soft (simple) to hard (complex)	Normal
Nodularity	20-55 (the years of ovarian activity)	Often	Indistinct	Mixed	Normal
Fibroadenoma	15-55	No	Smooth and bosselated	**Rubbery**	Normal
Carcinoma	35+	Uncommon	Irregular	Hard	Nodes may be **palpable**

History

- The symptoms occur during the years of ovarian activity due to hormonal changes.
- One or more **tender** lumps with **variable size** and clearly **related to menses** (during the second half -second 2 weeks- of the cycle).

Examination

- Vary from a **diffuse** nodularity to quite **discrete** lesions.
- Most common site is Upper outer quadrants because this part has more breast tissue.
- Begin by assessing the asymptomatic breast to get an idea of its consistency
- **Not fixed or tethered** to the skin or the muscle. **Unlike cancerous lumps** which are fixed and associated with skin changes and tethering.
- **NO** lymph node enlargement



Investigation

- Breast masses must be investigated: most of the time is benign.
- Radiologically by breast ultrasound or mammogram as age indicates.
- Pathologically by ultrasound guided trucut biopsy.

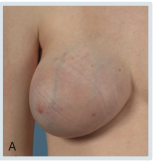
Benign Breast Conditions

Fibrocystic Changes

Clinical Feature	• The most common breast disease. • Fibrous and cysts formation caused by hormonal changes prior to menses • When estrogen surges, intralobular ducts increase in size, and they can compress each other causing cyst formation and pain and due to the stretch of the epithelial tissue which is attached to nerve endings, hence the pain. • Age 30-40/45 ○ **Benign features:** Cyclic pain, discomfort and engorgement, once the period comes the symptoms disappears.
Signs & Symptoms	• cysts with well-defined margins • Singular or multiple • May be symmetrical • Upper outer quadrant or lower breast border because that area has a lot of glands • **Cyclic Pain** and tenderness (common complaint) • Cysts may appear quickly and decrease in size and disappear to reappear elsewhere (Variable location) • Lasts half of a menstrual cycle • Subside after menopause
Diagnosis	• **History:** Patient will complain of pain before period (cyclic pain). • **Physical Exam:** bumpy lumpy breast tissue or nodular breast. No skin changes or dilated veins. • **Investigation: US** (modality of choice) → multiple variable microcysts with no calcification. If the women is over the age of 40 mammogram is needed to rule out malignancy and to see if there's calcification. • **No indication of biopsy** because it's variable in size and location (assuring sign). Variable location means that on each follow up the lumps appear at different locations, so they appear and disappear constantly, which is a reassuring sign. • **Histology:** Adenosis, Apocrine metaplasia, Fibrosis, Duct ectasia.

Management	• Aspirate cyst fluid
	  ○ aspirated once → follow up patient with ultrasound
	  ○ cyst refill again → aspirated second time , fluids should be sent for cytology each time
	  ○ cyst refilled a third time → should be removed to rule out malignancy
	• Lifestyle changes: reduce tea, coffee, chocolate intake (things that increase water retention).
	• Wearing a supportive bra and avoiding wired bras to reduces fluid accumulation.
	• Primrose oil tablet.
	• Exercise → to filter the fluid out
	• Vitamin E: unclear mechanism but thought to stabilize the breast tissue and decrease cyst formation.
	• Symptomatic treatment: Give analgesia (paracetamol every 6 hours).
	• The most important goal is to reduce cyst formation and increase the filtration of the breast (lymphatic filtration) with muscle contraction by exercising the hands and the pectoral major muscle, like stretching a band up and down or rolling.
	• In extreme cases: give Danazol (antiestrogen). However, it's not preferred because it can cause musclization (hoarseness of the voice, muscle gain, hair growth).

Fibroadenomas

Clinical Feature	 • Second most common breast condition, Common in young age group (15–25) (puberty to late 20s or early 30s) Rare after menopause. • It develop from a whole lobule and show hormonal dependence similar to that of normal breast tissue . • Fibroadenomas develop from a **whole lobule** rather than from a single cell, • and show hormonal dependence similar to that of normal breast tissue, lactating during pregnancy and involuting in the perimenopausal period. • usually well- circumscribed, firm, smooth, mobile lumps, and can be multiple or bilateral painless and nontender. • **Presentation:** Young female with small movable mass and occasional pain. No discharge or skin changes.
Diagnosis	• **History:** young females • **Examination:** well localized, **mobile** and non tender mass. Could be multiple. • **Imaging:** US → solid well encapsulated mass, variable in size it might rarely increase in size , and it might be large or giant (>5 cm), single or multiple. ★ Ultrasound is used to differentiate between fibroadenoma and cysts. • **Biopsy** is needed, **ultrasound guided trucut (core) biopsy** to differentiate between fibroadenoma and phyllodes.
Management	★ Fate of fibroadenoma: 50% disappear spontaneously, the other 50% either gets smaller or bigger or the stays the same. ★ **Transformation to malignancy = 0%** • Once a diagnosis of fibroadenoma has been established, options for management are **reassurance** with **no follow-up** or **surgical excision.** ★ **Indications for surgery:** ○ Any **fibroadenoma >4cm** (to ensure that a phyllodes tumor is not missed), & because 4cm occupies almost 2/3 of breast size. Also it doesn't get smaller with time ○ **Painful** and **rapidly growing** fibroadenoma. ○ **Family Hx** of malignancy (however there's no chance for fibroadenomas to be malignant, it's just to relieve the patient from stress). ○ **Unclear pathology** (e.g. the pathology report says fibroadenoma with hypercellularity, or phyllodes atypia). ○ **Unusual age group** (40-50 yo), First you're gonna perform US then Mammogram then eventually a biopsy to confirm your diagnosis, then remove it.
Subtypes	**Giant fibroadenoma:** >5cm and above **Juvenile fibroadenoma:** in an adolescent girl (9-13 age) undergoes rapid growth , difficult to diagnose because breast tissue is still developing

Phyllodes Tumor

- Rare fibro-epithelial neoplasms are mostly benign, but a small percentage are malignant.
- Variation of fibroadenoma rapid growth
- localized discrete single solid masses , tend to be larger (>4cm) and appear bosselated
- **It differs from fibroadenoma in that it has:**
  - More fibrous tissue component
  - **Malignant potential of <1%**
  - If not excised completely there is a high chance of recurrence.
- Getting another phyllodes tumor somewhere else in the body is different from recurrence in the same location. Why? Because of the hormonal stimulation.
- Phyllodes tumor can be graded to benign, mild and malignant (Sarcoma, which is a very nasty cancer, that rapidly grows and spreads via blood. Almost ¼ of malignant cases metastasise , most commonly to the lungs).

Phyllodes Tumor cont.

History

women aged 40+ or even 30+

Presentation

Similar presentation to fibroadenoma but single large (>4 cm) fibroepithelial mass, well localized, mobile and non tender mass.
Skin changes and discharge when malignant.

Investigation

Trucut biopsy is a must, after the US

Treatment

Complete surgical excision for both malignant or benign. While for larger lesions, mastectectomy may be needed. Might recurs locally following simple excision (the chance of malignancy increases with size).

Lipoma

Presentation

Soft, lobulated and radiolucent mass.
can be presented anywhere

Investigation

Diagnosed by clinical exam and imaging (US). Biopsy is not required in most of cases.

Treatment

Surgical excision.

Fat necrosis

History

trauma or surgery (impaction and disimpaction).
Necrosis of adipose tissue and hematoma

Presentation

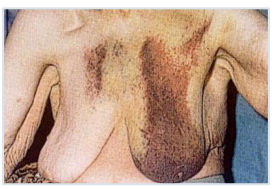
• **Painless solid mass**
Usually non-mobile ill-defined mass.
• Present later after 3-4 months from the injury as irregular, hard, non tender mass of dead or damaged breast tissue.

Investigation

Trucut biopsy

Treatment

★ **Reassurance** (resolves with time).



Breast Hematoma

Seat belt Trauma

Breast Cysts

- Cysts constitute 15% of all discrete breast masses.
- Most frequently seen in the perimenopausal period
- Symptomatic palpable cysts are treated by aspiration
- Patients with cysts do not have an increased risk of developing breast cancer.

Simple

- Cyst filled with **clear fluid multiple and recurrent.**
- **Presentation:** localized painful single mass.
- Hormonally influenced
- **Diagnosis:**
  - US → well circumscribed simple cyst filled with fluid lined with single layer of epithelium.
  - Aspiration (diagnostic and therapeutic) then send it for **cytology**. Blood could be malignant of traumatic.
  - Repeat US after 6 weeks: if the cyst refilled, aspirate it for the second time and send it for cytology (if it's benign → follow up in 6 weeks)
  - If it refills for the third time it needs to be excised, because the epithelial lining can have malignant potential.

Complicated / Complex / Pathological

- **Complicated cyst:** cyst with **turbid fluid**
- **Complex cyst:** cyst with **solid component or septation**
- **Diagnosis:**
  - Trucut biopsy is needed from inside the cyst because it's more suspicious for malignancy
  - → if it's benign just asprate it.
  - → there is atypia then excise it

- **Pathological cyst:** US finding it is constant all the time and in the same location, must be aspirated to rule out malignancy

Galactocele

- Milk containing cystic lump which contains milk, develops in **lactating women** and usually resolves upon the cessation of breastfeeding but large ones may require repeated aspiration.
- **Non lactating women** → is secondary to pituitary adenoma.
- **Presentation:** slightly tender without fever or redness or leukocytosis
  - Aspiration must be fully aseptic because it can easily get infected turning into an abscess
- **Diagnosis & Treatment:** US guided aspiration
- **How to differentiate between galactocele and abscess?**
  - Galactocele mass is associated with slight tenderness with **no fever or rigors.**

Accessory Breast Tissue

- Located under the arm or breast, as extension of the axillary fat.
- Occurs during puberty, lactation or pregnancy.
- **Examination:** If you find a mass in the axilla, does the size of the mass changes with period? If yes, accessory breast tissue. Is the mass mobile & hard? If yes and does not change with period, then it's lymph node.
- **Diagnosis:** US and biopsy if needed.
- **Surgical indication:** if it's big enough to limit the movement of the patient arm or for cosmetic reasons.

Accessory Nipple

- Accessory nipples are usually found along the line of nipple development.
- looks like a nevus, might be unnoticeable.
- Some patients will have swelling and discharges during their period.
- Treatment is not needed unless for cosmetic reasons.

Mondor's disease

- A sudden thrombophlebitis of the **superficial veins of the breast and the wall of the anterior chest**
- Produces a **cord-like, linear skin puckering** that can alarm patient and clinician
- causes pain at an early stage and subsequently becomes a painless fibrous band
- It Resolve spontaneously

Epithelial hyperplasia

- Increase in the number of cells lining the terminal duct lobular unit .

If the hyperplastic cells revealed cellular atypical this condition called atypical hyperplasia 4-5 times increase in risk of developing Breast Cancer , after biopsy results you should perform frequent screening

Congenital abnormalities of the breast:

1

Amazia
This is the congenital absence of the breast. It may occur on one or both sides. Poland's syndrome is defined as the absence or hypoplasia of the breast in association with the absence of the sternal part of the pectoralis major muscle.

2

Polymazia
This is the accessory breast that functions during lactation. It has been reported most frequent in the axilla, and rarely in the groin, buttock, and thigh.

3

Diffuse hypertrophy
occurs due to alteration of the normal response of the breasts to the estrogenic hormones.
It may reach a huge size and rarely unilateral or may be limited to one part of the breast.

- **It occurs sporadically at:**
  - Puberty in healthy girls (benign virginal or juvenile hypertrophy).
  - During the first pregnancy (much less common).
- **This condition can be treated by:**
  - Anti-estrogens therapy to reduce the breast size.
  - Reduction mammoplasty.

The Nipple

The symptoms associated with the nipple are:

01 **Nipple discharge**

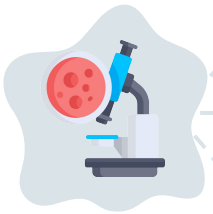
02 **Nipple inversion**

03 **Skin changes**

04 **Congenital abnormalities**

Nipple discharge:

- It occurs in any age group , commonly during reproductive life.
- It could be thick or thin, cloudy or clear, or bloodstained. Unilateral or bilateral , spontaneous or induced, single duct or multiple ducts.
- Will be considered pathological if it's unilateral & spontaneous (coming out by itself without squeezing the nipple) from a single duct or associated with pain or mass.
- **If the discharge is:**
  - **Milk** → usually benign, and if it's related to pregnancy or lactation it's considered normal. If not then investigations are needed.
  - **Serous or bloody** → always requires investigating.
  - **Investigations include:**



01 Culture and cytology of the discharge.

02 Radiology by breast ultrasound or mammogram or MRI depending on the patient's age.

03 If it's associated with mass then biopsy is needed.

	Pathology	Discharge Characteristics	Management
Duct Ectasia (Explained in details in the next slide.)	• **Most common cause of nipple discharge.** • **Inflammatory condition that causes dilatation of the duct beneath the nipple.**	★ **Variable color** and consistency. • Multiple ducts discharging.	• Reassurance • Excision of the ducts
Duct Papilloma	★ **Intraductal papilloma is the most common cause of blood-stained discharge.** • The bloody discharge is due to shedding of the head of the intraductal papilloma and growth inside the duct • Benign neoplasm arise from the ducts under the nipple and can be single or multiple. • May show minimal malignant potential. • Slow-growing • Overgrowth of ductal epithelial tissue	• Watery, serous, serosanguinous, or bloody discharge • Spontaneous or by pressure **(diagnostic)** • Usually unilateral • Single duct. • Usually not palpable	• Test for occult blood • Breast ultrasound / mammogram • MRI breast • Ductogram • Biopsy if there is mass **Treatment**: • Most of the time it's self limiting. • sloughs out by it self **If persistent:** Microdochectomy to make sure that the papilloma doesn't harbor DCIS.

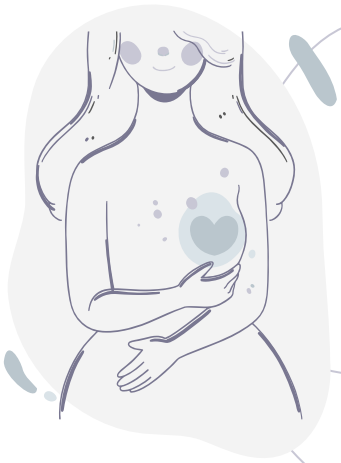
Nipple discharge cont. :

	Pathology	Discharge Characteristics	Management
Carcinoma in situ (DCIS)	• **Least common cause of nipple discharge.**	• Bloodstained, spontaneous persistent, serous discharge. • Single duct.	Image-guided biopsy, or Microdochectomy.
Prolactinoma	• Benign hormone-secreting pituitary tumor that produces the hormone prolactin.	• Milky, **bilateral**. • Multiple ducts.	Reassurance & Endocrine evaluation. No need of surgical intervention for the breast.

Nipple inversion :

- Usually associated with significant disease and always merits full assessment.
- ⭐ When is nipple inversion worrisome? If the onset is **recent**, if the inversion is **unilateral** and if upon examination you **can't evert** the nipple.
- Retraction of the nipple can occur at the age of puberty (simple nipple inversion), with unknown etiology (benign horizontal inversion). It may predispose to breast infection during breastfeeding, due to the retention of secretions.
- Chronic periductal mastitis and duct ectasia can cause a slit-like nipple retraction, but circumferential nipple retraction, with or without an underlying breast lump, may indicate the presence of an underlying carcinoma

Paget's Disease



01

Pathology :

- Paget's disease of the nipple is caused by cancer cells migrating or spreading along the duct system & the subdermal layer of the areola, from an underlying breast carcinoma situated deeply in the breast, which in the early stages is usually confined to the epithelium (DCIS).
- Patches of skin first become red and then encrusted and oozy.
- Any patient coming to the clinic complaining of nipple inversion and skin changes around the nipple, **always** assume that it's paget's disease until proven otherwise. Because if the diagnosis of paget's disease is missed, the cancer will progress.

02

Investigations & Treatment:

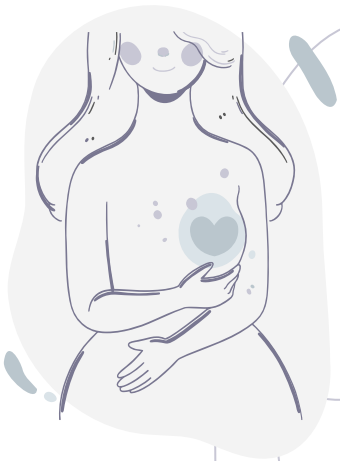
- **Investigations:** Skin biopsy.
- **Treatment:** mastectomy.

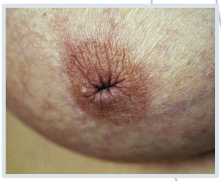
03

- Patients may present with symptoms mimicking Eczema:

Eczema	VS	Paget's Disease
• Bilateral • Sometimes lactating • Itches • Vesicles • Nipple intact • No lumps		• Unilateral • Older females • Does not itch • No vesicles • Nipple may be destroyed • May be an underlying lump. If you can't feel a lump that doesn't rule out cancer!

Duct Ectasia





01 Pathology :

- Common inflammatory condition of **unknown aetiology**.
- Dilatation (1mm) of the mammary ducts (2-3mm) up to more than 4 cm.
- Because of inflammation, ducts become fibrosed, shorter and wider
- It is often associated with periductal inflammation. The pathogenesis is due to dilation in one or more of the large lactiferous ducts and fills with a stagnant greenish or brownish secretions which may discharge. These stagnant fluids cause an irritant reaction in the surrounding tissues leading to periductal mastitis.

02 Presenting features:

- **Multi-colored discharge**
  - Thick, pasty (like toothpaste)
  - White, green, greenish-brown or serosanguinous
- Intermittent, no pattern
- Bilaterally from multiple ducts
- Nipple itching
- **Nipple inversion**, **transverse slit appearance.**
- Difficulty in breastfeeding.

03 Complications:

- Anyone can get duct ectasia. However the **complications** are seen in **smokers**.
  - Infection due to secretions stasis
  - Mammillary fistula between the skin and the ducts
  - Chronic low-grade infection of the periareolar area.
  - Periductal abscess

04 Investigations & Treatment:

- **Investigation:**
  - **US:** is diagnostic and to rule out malignancy
  - Over the age of 40 mammogram is needed to exclude malignancy.

- **Treatment:**
  - Reassurance, local cleaning externally and avoid squeezing the nipple as it will only increase the chance of trauma and retraction.
  - If there's fever, pain and tenderness, excise the dilated ducts surgically to avoid the risk of developing periductal mastitis and abscess.
  - Diabitic patient with duct ectasia are at increased risk for periductal abscess.

Extra: fistula is an opening between two epithelial surfaces. While sinus is a blind-ended tract that extends from the surface of an organ to an underlying area or abscess cavity.

Breast Infection

- It most frequently affects sexually active, reproductive age group (18-50), Pregnant women aged 18–50 years.
- Can be divided into **lactational** and **non-lactational**.
- The principles of treatment:

Give appropriate antibiotics early to **prevent** abscess formation.

Confirm Abscess by **ultrasound** then **aspirate** if small **or** surgically drain if too big the through a small incision

Exclude breast cancer by taking a biopsy from the walls of the abscess. Because some types of breast cancers present with abscess formation.

After it resolves **reassess** the patient to make sure there's **no residual mass** that was hidden by the abscess.

Mastitis

- The most common variety of mastitis is the bacterial mastitis.
- It is associated with lactation in most of the patients.
- Breast infection when bacteria enter the breast via the nipple, Ducts infected.
- Fluid stagnates in lobules
- Usually during lactation
- **Staphylococcus aureus common cause**
- **Sign and symptoms:** Pain, Nipple discharge, Localized induration, Fever
- Initially, the patient present with a generalized breast cellulitis, but later abscess will form. The fluctuation is a late sign. The patient will present with an Clinical features classical symptoms and signs of acute inflammation
- **Treatment:**
  - Antibiotics, Continue breastfeeding, Close follow-up

Lactating infection:

- Usually develops **within the first 6 weeks** of breastfeeding secondary to bacterial infection contracted from the baby's mouth which is colonized by staph aureus that can enter through nipple cracks and skin abrasions on the mother's breast.
- Present with **pain**, **swelling**, **tenderness** and a **cracked nipple or skin abrasion.**
- **Most common pathogen: Staphylococcus aureus.**
- ★ Women should be **encouraged to breastfeed** because the milk comes from the lactocytes which's nowhere near the infection. Stop breastfeeding **only** if the baby is quiet, or having diarrhea because the antibiotic can be excreted in the milk. But she has to pump her breast and discard it so that the breast won't become engorged and tender and milk production won't stop.
- **Treatment:** as mentioned above. First give antibiotics (IV antibiotic against staph aureus: floxacillin, erythromycin, cloxacillin, augmentin for 24 hrs then continued orally) and if at any point they develop an abscess you have to confirm it by US then drain it.
- Infection can't resolve spontaneously so If left untreated the body will try to fight it off and an abscess will be formed (filled with necrotic debris and inflammatory cells walled by fibrous tissue)
- ★ Abscess presentation is more acute, with **way more tender breasts**, **sky high fever and rigors.**

Non-lactating infection:

Types of non-lactating infections:

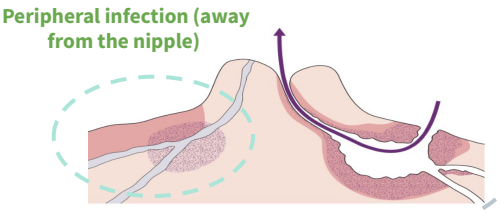
- Central (periareolar) infection:
- Peripheral non-lactating abscesses.
- Tubercular mastitis.
- Skin-associated infection.

Central (periareolar) infection:

- **A complication of duct ectasia.**
- Commonly **seen in young women**, with periductal mastitis (inflammation and infection of the ducts) not related to breastfeeding.
- **Smoking** is an important **etiological factor**[1].
- **Presentation:** Breast pain, erythema, swelling and tenderness.
- **Treatment:** Antibiotics, aspiration or incision and drainage. if there's recurrent periductal mastitis then the area of recurrent infection should be surgically excised

Peripheral non-lactating abscesses:

- A general infection similar to any other skin infection.
- Some are associated with an **underlying condition**, such as diabetes, Rheumatoid arthritis, steroid treatment or trauma immunocompromised
- Treatment: recurrent aspiration with antibiotics or incision and drainage.



Tubercular mastitis:

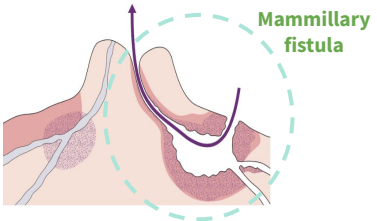
- Reproductive age group with **painless lump** can present as fibroadenoma or breast cancer
- They don't have open TB but they have history of TB themselves or history of contact with TB patients.
- Confirm TB with FNA or needle Biopsy, culture and imaging
- A prolonged course of antitubercular treatment is preferred. No need for surgical intervention unless they develop an abscess.

Skin associated infections:

- Anyone can get this infection regardless if they have underlying conditions or not.
- Commonly affects the lower half of the breast (inframammary area) and can be recurrent.
- **Intertrigo:** Within the inframammary fold related to friction present with redness itching and pain. No need to antibiotics Advice the patient to keep the area clean and dry.
- **Epidermoid (sebaceous cysts):** often forms within sebaceous glands. found anywhere in the body e.g Skull , chest , back
- **Hidradenitis suppurativa:** seen in the axilla, groin and inframammary area. vary from extensive skin changes nodularity disfiguring with discharge to very mild. requires dermatologist treatment and follow up with antibiotics and surgical excision of the skin involved.

Mammary duct fistula:

- Fistula between skin and the subareolar duct Occurs when a periductal abscess formed due to not treated and recurrent periductal mastitis infection, discharge or periductal mastitis ruptures (or is drained externally) and stays in communication with the duct system.
- **Treatment:** excision of the fistula and diseased duct(s) under antibiotic cover.



1. Remember: the **etiological factor of duct ectasia** is **unknown**. However the **complications** of duct ectasia are caused by **smoking**.

Gynaecomastia

- **Abnormal** development of both the **ductal** and **stromal** elements of the breast in males.
- Presentation:

01

Transient in male **infants**: is due to **maternal hormones** that pass through the placenta.
- No need for intervention, it resolves on its own.

02

Breast development in **adolescents**
-below 15 years- is due to **hormonal** changes during puberty, and it is **Bilateral.**
- you have to wait till hormones stabilize

03

Breast enlargement in **middle-aged** adults: is usually associated with bilateral **trauma** to the breast. Not caused by hormones!
- Testicular **tumor** can produce estrogen which a commonly missed cause or Steroid abuse for bodybuilding

04

Breast enlargement in **elderly males**: is Benign -but you must exclude malignancy- usually caused by **medications** as a side effect.

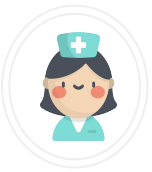
05

Inappropriate **hormone** secretion: with liver diseases or cancers that secrete hormones such as testicular tumors or adrenal gland tumors.

History:

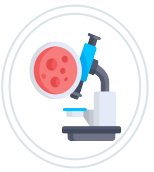
- **Painless** enlargement of one or both breasts.
- Taking a **drug history** is essential.
- Rule out taking steroids, endocrine hormones, obesity.

Examination:



- **In young patients:** Palpable rounded hard disc of breast tissue.
- **In elderly patients:** More diffuse, with fatty elements.
- Axillary lymph glands will **not** be enlarged. If enlarged, suspect cancer.
- General examination, especially of the abdomen scrotum and testes.

Investigation:



- Ultrasound (mainly)
- Mammogram, and biopsy if there is a mass.

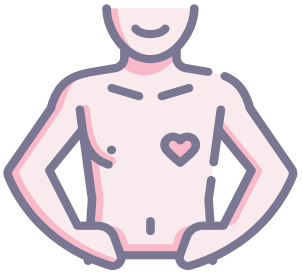
Treatment:

- Liposuction in case of **Adult** pt. after excluding malignancy and medications use
- If **pre-puberty**
  - Wait to see if it resolves.
  - Change medication
  - Treat underlying illness

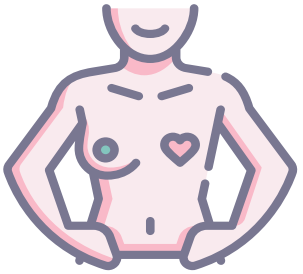
Occurs in families with genetic mutation Colon, prostate cancer

Breast Cancer

Epidemiology:



Male represent <1% of patients with breast cancer



The most common malignancy in women, comprising 18% of all female cancers.

Risk factors:

Age:
The risk is higher in young age groups, but the incidence increases with age until menopause. It's extremely rare below the age of 20 years.

Geographical variations:
Higher in developed countries (Caucasian, Western Europe and Australia).

Menstrual and pregnancy factors:
Early menstruation, late menopause, nulliparous women , late first childbirth after the age of 30 are at higher risk.
The highest risk is in women having a first pregnancy over the age of 40.
Early first delivery and breastfeeding may protect against breast cancer.

Radiation:
Women treated by mantle radiotherapy for Hodgkin's or non-Hodgkin's lymphoma during adolescence and teenage are at significant risk of developing early-onset breast cancer. Breast exposure due to thyroid treatment

Benign disease:
Severe atypical hyperplasia is associated with increased risk of breast cancer.

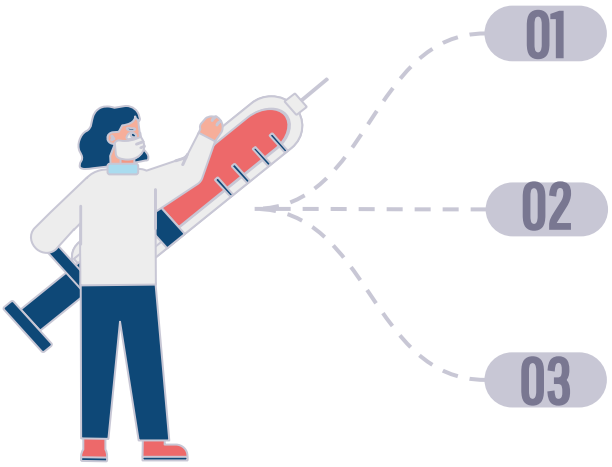
Diet:
High alcohol intake and saturated fat increases breast cancer risk.

Exogenous hormones:
Hormonal Replacement Therapy and Oral Contraceptive Pills increase the risk, but combined Progesterone and estrogen HRT is associated with a greater risk than preparations containing estrogen alone.

Physical activity, weight and height:
Moderate physical activity reduces the risk, obesity High BMI increases the risk in postmenopausal women while may reduce the risk in premenopausal women, and taller women have higher risk.

Genetics:
Many genes involved in breast and ovarian cancers are DNA repair genes (Mutations, insertions or deletions).
High Risk Genes: The vast majority of families having members with breast and ovarian cancers are linked to **BRCA1** & **BRCA2** genes.
Mutations in the p53 gene and mutation of PTEN can also lead to breast cancer.
Li Fraumeni syndrome → only have 75% of the gene TP35, they will have different types of cancer for e.g. thyroid Carlin breast brain
Cowden's syndrome → thyroid & breast

Management for high risk women:



Bilateral risk reducing surgery (Bilateral Mastectomy): removal of as much breast tissue as possible +/- nipple. This reduces risk by at least 95%. The uptake rate of this surgery is increasing as are the cosmetic results of surgery .

Regular screening: involves MRI in younger women and mammography +/- MRI in older women with 6 months apart between each modality. doesn't reduce the risk but only improve the detection rate
-General population: screening mammogram after the age of 40 but above 50 is more beneficial

Chemoprophylaxis: tamoxifen (young), raloxifene and the aromatase inhibitors (older) given for 5 years reduce the rate of breast cancer development.

Pathology of breast cancer:

- Breast cancers are derived from epithelial cells that line the terminal duct lobular unit.
- Breast cancer is classified into:
  - **In situ (noninvasive)** → confined within the ducts or lobules (e.g DCIS must be treated)
  - **Invasive** → outside the duct or lobules
  - Pre cancer (non invasive) → LCIS and ALH , increased risk of cancer ,only require follow up.

- Both **in situ** and **invasive** cancers have characteristic patterns by which they are classified.
- The most commonly used classification of **invasive** cancers divides them into **ductal** and **lobular** types and is based on the belief that ductal carcinomas arise in ducts and lobular carcinomas in lobules.
- This is now known to be incorrect, as almost all cancers arise in the terminal duct lobular unit. The two types behave differently, so the classification remains in use.

- **Breast cancers can be graded.**
  - Grade I have the best prognosis.
  - Grade II have an intermediate prognosis.
  - Grade III or high-grade cancers have a poorer prognosis than Grade 1 or 2 cancers
- Grading (SRB) → One is well differentiated, two is moderately differentiated , three is poorly differentiated.
- The nuclear protein Ki67 is an established prognostic and predictive indicator for the assessment of biopsies from patients with cancer. Clinically, Tumors with a high Ki-67 index have a larger number of proliferating cells

Prognostic Factors: ★

- Stage of the tumour at diagnosis: its size and involvement of the axillary lymph nodes or the presence of any metastases.
- Biological factors: histological grade, histological type, presence of lymphatic and/or vascular invasion, hormone receptor and HER2 status.
- Genomic

Hormone and growth factor receptors:

ERs & PgRs

- Estrogen receptors (ERs) and progesterone receptors (PgRs) are expressed in breast tissue and expressed in much greater amount in breast cancer cells.
- Breast cancer **positive for ERs or PgRs** is associated with **better prognosis**[1].
- It'll be a target for the hormonal therapy[2].
- GF receptors[3]

overexpression of HER2

- The most important growth factor is human epidermal growth factor receptors (HER2)[4]. Breast cancer with overexpression of HER2 is associated with worse prognosis.
- It'll be a target for the monoclonal antibody therapy (trastuzumab).

Triple negative

- Triple negative cancer (ERs, PgRs, HER2) is associated with the worst prognosis.
- Triple negative cancers are more common in BRCA1 gene mutation carriers.
- Limited treatment by chemotherapy only , usually aggressive tumors with advanced stages and high metastasis rate.

Take a Break

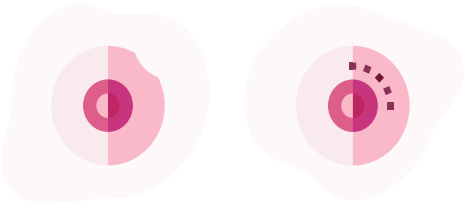
1. Treatment depends on the receptor presence or absence, if they are present the patient can have multiple management plans e.g. chemotherapy with hormonal or immunotherapy , if they're absent the patient will have a limited management with only chemotherapy.
2. Hormonal → The presence is considered to be good.
   - +ve → Give tamoxifen or Raloxifene (younger) Aromatase (Elderly).
3. It's presence in general is bad but it gives a treatment option, but its absence is even worse because it limits the management.
4. +ve → Anti HER2 (Herceptin) one dose every month for a year.

Presentation[1]:

01

Skin Ulceration:

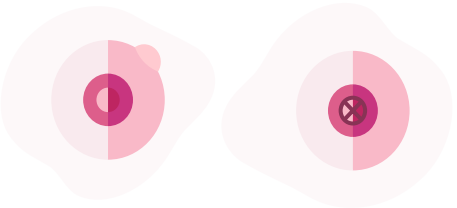
- can be a sign of advanced breast cancer and should always be checked immediately. The ulceration associated with breast cancer is painless and develops gradually (over months or even years).



02

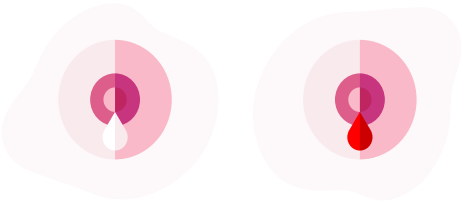
Lump:

- Most common presentation
- Upper outer quadrant
- Irregular painless mass, variable in size, usually unilaterally but it may present bilaterally.
- Fixation of a lump to the skin or the muscle is almost diagnostic of a carcinoma.
- Palpable axillary lymph node.



03

Serous discharge



04

Texture change:
- Dimpling/Tethering[2]
- Peau d'orange[3]

- dry scaling or red weeping appearance of the nipple
-palpable axillary nodes or with signs or symptoms of distant metastatic disease

05

Nipple inversion

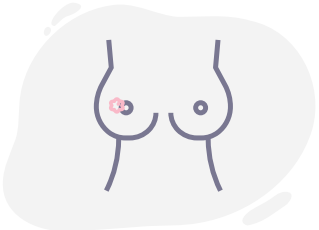
06

Bloody discharge

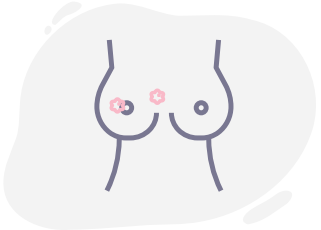
Diagnosis:

- US: solid mass with irregular border.
- Mammogram: calcification , lymph nodes involvement are screening and mammographic features
  solid mass with or without stellate features, irregular borders of the mass, asymmetric thickening of breast tissue, clustered microcalcification (presence of fine, stippled calcium in and around a suspicious lesion is suggestive of breast cancer).
- Randomized controlled trials have shown that screening by mammography can significantly reduce mortality from breast cancer by 20% in women aged over 50 years.
- Cancer most commonly appears as a dense opacity with an irregular outline from which spicules pass into the surrounding tissue
- Trucut biopsy is a must.

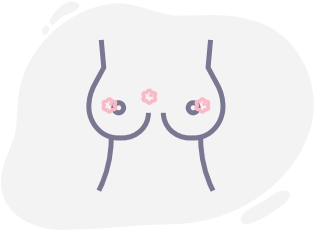
Staging:



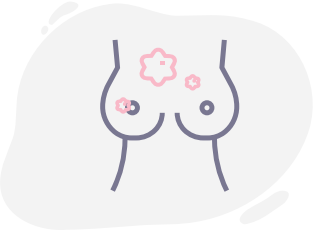
Stage 01
less than 2 cm with no lymph nodes involvement.



Stage 02
2-5 cm with presence of one mobile lymph node in the axilla



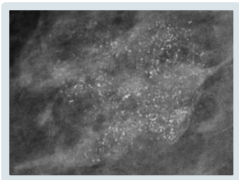
Stage 03
>5 cm, skin involvement, nipple retraction, fixed lymph node.



Stage 04
anything with metastasis (CT scan chest, abdomen, pelvic, bone scan).

1. Presentation of breast cancer: Palpable or detectable lymph nodes without any breast lesions, pain or pathological fractures that are secondary to breast masses.
2. Tethering is a feature of cancerous lumps and it's pulling of the overlying skin inward causing a visible dimple.
3. Peau d'orange (orange peel appearance): characterized by Edema, sunken nipple, pitting areas and redness. and results from blockage of lymphatic drainage. The infiltrated skin is tethered by the sweat gland ducts where it cannot swell, leading to an orange skin like appearance.

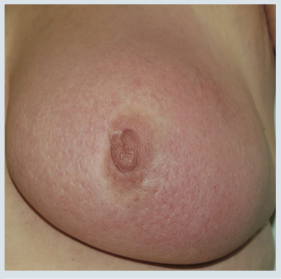
Noninvasive cancer:

	Ductal carcinoma in situ (DCIS)	lobular intraepithelial neoplasia (LIN).
Types	• is the most common form of non-invasive cancer, making up 3–4% of symptomatic and 17–25% of screen-detected cancers. • Screen-detected DCIS is most commonly associated with microcalcifications on mammography, which can be either localised or widespread.  Microcalcification	• **Lobular carcinoma in situ (LCIS) and atypical lobular hyperplasia (ALH)** have been combined into a single diagnostic condition called **lobular intraepithelial neoplasia (LIN).** • It is usually an incidental finding and is treated by regular follow-up and US observation, as these women are at significant risk of developing invasive cancer in either breast.

Invasive cancer:

- **The majority of invasive cancers are** of no special type and are often referred to as **ductal cancers**.
- Certain invasive carcinomas show distinct patterns of growth and are classified as tumors of 'special type'; this includes
  - lobular, tubular, cribriform, papillary, mucinous, medullary and inflammatory cancers.
- The presence of tumour cells in lymphatics or blood vessels is associated with an increased risk of both local and systemic recurrence.

Invasive lobular	Invasive Tubular, cribriform, mucinous	Invasive Medullary	Inflammatory breast cancer (IBC)
• **Invasive lobular** cancer accounts for up to 10% of invasive cancers and is characterised by a diffuse pattern of spread that causes problems with clinical and mammographic detection. • These tumours are often large at diagnosis.	• **Tubular, cribriform and mucinous** cancers are well differentiated and have a better than average prognosis. • **Mucinous** cancers are rare circumscribed tumors characterised by tumour cells that produce mucin; these also have a good prognosis.	• **Medullary** cancers are circumscribed and soft, and consist of aggregates of high-grade pleomorphic cells surrounded by lymphoid cells, and this type of cancer is seen more often in BRCA1 carriers.	• is a specific type of invasive breast cancers that's highly aggressive. • IBC often does not produce a lump that can be felt within the breast. Instead, it is a Chronic condition presented with edema ,redness. No tenderness or rigor with with widespread **peau d'orange**, due to edema from obstruction of dermal lymphatics by tumour cells. • It mimics infective mastitis or breast abscess. • Biopsy confirms the diagnosis. • **Inflammatory carcinomas** are uncommon but they're fast-growing and have the **worst prognosis of all invasive cancers.** • It's a rapidly fatal breast cancer that needs aggressive chemo-radiotherapy followed by surgery.



Inflammatory breast cancer

Treatment:

Operable Breast Cancer

- All invasive and non-invasive cancer must be completely excised.
- There are two accepted methods of local therapy for operable breast cancer:

1 Breast-conserving surgery:

- Wide local excision → removal of the rim of normal tissue surrounding the cancerous legion
- Breast conserving surgery is done when there is **no evidence of metastasis beyond the axillary nodes**, and it includes **wide local excision to clear histological margins.**
- Should be combined with **sentinel node biopsy or axillary clearance.** Sentinel lymph node biopsy has reduced the complications that were seen after axillary clearance such as **lymphoedema** (A long-term swelling of the arm after axillary surgery or radiotherapy to the axilla).
- Wide excision should be followed by **radiotherapy** to reduce the local recurrence which is too high after treatment by local excision only.
- The aim of this procedure is to remove the breast cancer completely in as small volume of breast tissue as possible with the best cosmetic outcome.

2 Mastectomy:

- This is an alternative method for the local treatment of operable breast cancer.
- Mastectomy includes the **removal of all breast tissue** (usually including the nipple) but leaves the muscles of the chest wall intact.
  - classical → removal of everything (flat chest)
  - skin sparing mastectomy SSM → only removal of the nipple with intact skin envelope
  - nipple sparing mastectomy NSM → only removal of the tissue inside
- Should be combined with **sentinel node biopsy or axillary clearance.**
- Indicated in the following situations:
  - Radiotherapy isn't available.
  - The desire of the patient to avoid radiotherapy.
  - if the patient can't tolerate the adjuvant radiotherapy (e.g. heart diseases, skin diseases, lung diseases etc.)
  - The desire of the patient to have mastectomy.
  - Incomplete excision after breast conserving surgery.
  - Large cancer (>4 cm) in comparison to the size of the breast.
  - Multifocal breast cancer.
  - Inflammatory breast cancer.
  - Localized invasive cancer with a large area of surrounding non-invasive disease.
  - Central breast cancer involving the nipple or directly underneath it.
  - Pregnancy.
  - Large areas of DCIS
- Women with high risk of local recurrence should get radiotherapy following mastectomy.
- Risk factors for local recurrence after mastectomy include:
  - Involvement of axillary lymph node (>3 nodes).
  - Lymphatic invasion.
  - Vascular invasion.
  - Grade III cancer.
  - Tumor >5 cm (pathological measurement).
  - The tumor involves the pectoral fascia or pectoral muscle.

3 Axilla surgery:

- There is clear metastasis by all means , only for a level one and two lymph nodes
- Sentinel lymph node biopsy → to assess if there isn't clear lymph node metastasis after imaging and FNA , if +ve perform dissection
- Axillary Dissection .
- Sentinel Lymph node Biopsy

Treatment Cont. :

Adjuvant Systemic Therapy

- The aim of adjuvant systemic therapy is to delay recurrence or distant metastasis and prolong survival in a patient with micrometastatic disease.
- Indications for adjuvant systemic therapy:
  - Lymph node-positive.
  - Higher risk node-negative women.
  - Women with hormone receptor-positive cancers.

1 Hormone Therapy:

- **Tamoxifen**:
  - reduces the rate of recurrence, reduces the risk of tumors in the contralateral breast, preventative agent.
  - It's effective in premenopausal and postmenopausal women.
  - but is not in widespread use because of its side effects
- **Luteinizing hormone releasing hormone (LHRH) agonists (Goserelin)**:
  - induces a reversible ovarian suppression.
  - Only of benefit in premenopausal women with receptor-positive cancer.
- **Aromatase inhibitors (Letrozole, Anastrozole).**
  - For postmenopausal women and the tumor has +ve hormone receptor → tamoxifen & aromatase inhibitors, if for 5-10 years and then continue on it.

2 Chemotherapy:

- Combination of chemotherapeutic drugs is more effective than a single drug, Adjuvant / Neoadjuvant.
- Chemotherapy regimen include:
  - First generation chemotherapy (cyclophosphamide, methotrexate, 5-Fluorouracil-CMF).
  - Modern regimens (anthracycline, doxorubicin or epirubicin)
  - Newer agents (taxanes)

3 Anti-HER2 Therapy:

- **Monoclonal antibodies (trastuzumab - Herceptin).**

Neoadjuvant Therapy

- This's when chemotherapy, hormonal, or biological therapy is given before surgery to shrink the tumor
- To assess response e.g. if it is triple negative because it's the only therapy for it
- Must be preceded by core biopsy of the cancer and nodes (if involved).
- Should be considered in patients with large or locally advanced tumors that would otherwise require a mastectomy who may become suitable for breast-conserving surgery or in patients with inoperable cancer that may become operable.

Treatment Cont.:

Breast Reconstruction:

- reconstruction → from the abdomen or tissue expanding implants, it depends on the patient breast size and plastic surgeon preference
- Tissue expanders to maintain the shape and volume of the breast to reconstruct later with implants or from the abdomen
- Options include placement of an implant (silicon gel) at the time of mastectomy behind the pectoral muscle.
- Other options are myocutaneous flaps, and the most commonly used is latissimus dorsi myocutaneous flap with or without an implant, and the rectus abdominis myocutaneous flap alone. These are used if the skin at the mastectomy site is poor (e.g. following radiotherapy).

	Stage 1-2	Stage 3	Stage 4
Summary of management made by the doctor	Mastectomy or conservative breast surgery with radiation. Sentinel lymph node needs to be excised and assessed.	Neoadjuvant chemotherapy and surgical removal.	Chemotherapy and surgery and radiation and hormonal therapy (Tamoxifen).

Treatment Complications:

Surgery: Hematoma , Infection , Nerve Injury , Frozen shoulder , Lymphoedema .

Radiotherapy: Erythematous skin reaction , lung Fibrosis around shoulder. muscles, bones and heart everything is involved

Chemotherapy: Hair Loss , Fatigue , lethargy , Nausea , Vomiting , Cardiac failure. prone to infections , upper limb DVT

Hormone Therapy: Hot flushes , Vaginal dryness or discharge , Loss of lipido. same as Postmenopause

Hematoma: Due to anticoagulants

Nerve Injury:

- Intercostal nerve → Most common sense or nerve supplying the inner part of the arm, patient complains of numbness
- Long thoracic → supply serratus anterior lead to winging of the scapula with weakness
- Thoracodorsal → supply latissimus dorsi , lead to atrophy , this muscle must be preserved for breast construction

Frozen shoulder: after axillary surgery, due to severe pain it limits their movement

Lymphoedema: post axillary dissection, prevented by sentinel lymph node biopsy, affects the movement of the upper arm and hand , prone to lymphangiosarcoma.

DDx (438)

	DDx
A painless lump	• Carcinoma • Cyst • Fibroadenoma • An area of fibroadenosis
A painful lump	• An area of fibroadenosis • Cyst • Periductal mastitis • Abscess (usually postpartum or lactational) • Sometimes a carcinoma
Pain and tenderness but no lump	• Cyclical breast pain • Non-cyclical breast pain • Very rarely, a carcinoma
Nipple discharge	• Duct ectasia • Intraductal papilloma • Ductal carcinoma-in-situ • Associated with a cyst
Changes in the nipple and/or areola	• Duct ectasia • Carcinoma • Paget's disease • Eczema
Changes in breast size and shape	• Pregnancy • Carcinoma • Benign hypertrophy • Rare large tumours

Cases From the Doctor 438

01

- lactating female with breast mass and pain < mastitis (if signs of infection are present) or milk cyst (no signs of infection).

02

- Young female with cyclic breast pain, on PE you found a mass 2x2 in size < most likely fibroadenoma.

Summary From the Doctor (439)

Common breast disease symptoms :

Breast Pain

Cyclic or Non-Cyclic

- **The cyclin pain** → (comes in relation to period), associated w/ benign diseases
- **The non cyclic pain** → is more pathological especially if it is associated with mass or nipple discharge or skin changes
    - **Investigations:** after clinical examination either by breast ultrasound or mammogram if patient age > 40 **OR** MRI if patients younger < 40 with strong family history.

Breast Mass

- **Indicates investigation:**
    - Radiologically by breast ultrasound and mammogram
    - Depending on age it'll indicate pathological mass , investigate by ultrasound guided trucut biopsy

Nipple Discharge

- Considered pathological if → unilateral , spontaneous (coming by it self without squeezing the nipple) , from single duct or associated with pain or mass.
- **Investigation**: by taking discharge for culture , cytology , Radiology by breast ultrasound or mammogram or MRI depending on age if associated with mass the biopsy is indicated.

Abnormal Appearance

- Nipple retraction or deviation , skin tethering , retraction, Peau d'orange appearance visible mass or ulcer etc.
- Can be associated with infection , inflammatory disease or commonly associated malignant breast disease
- Should be evaluated clinically , Radiologically & pathologically by biopsy if there is mass

Benign breast diseases:

More common than malignant diseases

- ➔ Fibrocystic changes Pain (main presentation)
- ➔ Fibroadenoma mass (main presentation)
- ➔ Duct Ectasia → presented with bloody nipple discharge
- ➔ Breast infection abscess ,mastitis
- ➔ Galactocele
- ➔ Intraductal Papilloma bloody nipple discharge
- ➔ Fat necrosis
- ➔ Breast cyst simple or complicated or complex cyst
- ➔ Phyllodes tumor
- ➔ Adenoma , Lipoma

Summary From the Doctor (439)

Benign breast diseases:

fibroadenoma — 15-25 years

- ➔ **Location:** unilateral or bilateral,single or multiple of variables size
- ➔ Common presentation is breast mass
- ➔ No risks of malignant transformation
- ➔ **Dx:** Is by history and examination, breast ultrasound and ultrasound guided trucut biopsy
- ➔ 50% of fibroadenoma resolves by itself , other 50% can remain the same or become smaller or become bigger
- ➔ **Surgical excision indication:**
  1- painful fibroadenoma regardless of the size
  2- size > 4 cm
  3- unclear pathology e.g. fibroadenoma with phyllodes variations , hypercellular with atypia
  4- rapid growth increases in size during follow up
  5- unusual age (> 40-50 years)
  6- family history of malignancy (tho no chance of malignant transformation) just to relieve pt anxiety

Phyllodes tumor — 30 and above

- ➔ it is a variant of fibroadenoma but with more fibrous components
- ➔ 1% chance of recurrence if not completely excised
- ➔ about 1% chance of malignant transformation (sarcoma)which increase with increase in size
- ➔ **Tx:**
  1- if benign → complete excision
  2- intermediated type → excision with 1cm free margin
  3- if malignant → excision with 1cm free margin + Radiation therapy , it's not respondent to chemotherapy

Fibrocystic changes — 30-49 years

- ➔ **Common Sx:** pain in the form of fibrocystic changes , cyclic pain
  Pain maximizing before period then improves after that , some time associated with nipple discharge
- ➔ **Dx:** history and examination , lumpy bumpy nodular breast , tenderness
  - Breast ultrasound is diagnostic , multiple bilateral variable size cysts in absence of other pathology.
  - Pt = or > 40 years → mammogram is indicated to rule out malignancy
- ➔ **Tx:** reassure patient , and give her the advice in the from of:
  1- pain control by using simple analgesia (NSAID)
  2- Good supportive bra
  3- Exercise to activate pectoral muscle which helps in-moving fluids out of the breast by stretching rubber band vertical and horizontal
  4- Use vitamin E capsules for a month which my help in reducing symptoms if no improvement she can stop using it **Or** she can use Evening primrose oil capsules (nocturnal) for one month if no improvement she can stop using it.

Summary From the Doctor (439)

Benign breast diseases cont. :

Breast Cyst — Simple or Complex

- Pathological cyst → constant in one location and not getting smaller
- Simple **or** complex **or** complicated (indicates further investigation)
  - **Simple cyst** → 1- aspirated once → follow up patient with ultrasound
    2- cyst refill again → aspirated second time , fluids should be sent for cytology each time
    3- cyst refilled a third time → should be removed to rule out malignancy
  - **Complex cyst** → contains solid components , trucut biopsy should be done
- **Managements:** depends on the type of pathology results

Malignant breast diseases :

- Invasive ductal carcinoma
- Lobular carcinoma
- Malignant phyllodes → sarcoma
- Paget's disease of the nipple

Screening:

- Start at age of 40 years **unless** patient had potential risks of genetic disease the screening should start 10 years younger

➔ screening is by mammogram annually , Young patient can be screened initially by ultrasound or MRI

➔ **The risk of genetic disease:**

- History of breast cancer in the family at age less than 40 years
- Father had history of ca breast
- Bilateral breast malignant disease
- Uterine or ovarian malignancy
- More the 3 members of the family with history of malignancy

Clinical staging:

➔ < 2 cm no axillary lymph nodes **stage 1**
➔ 2-5 cm with mobile axillary lymph node **stage 2**
➔ > 5 cm , skin changes or fixed axillary lymph node **Stage 3**
➔ Any size with metastasis **stage 4**
➔ There are pathological staging and TNM staging.

Investigation:

➔ Breast ultrasound , mammogram and MRI as indicated
➔ Tissue biopsy by ultrasound guided trucut biopsy including receptors status (ER ,PR ,HER2 ,Ki 67)
➔ Metastatic screening by TC scan CAP (chest abdomen and pelvic)
➔ Bone scan

Malignant breast diseases cont. :

Management:

The Tx depend on the stage of the disease,size of the tumor , receptors status

Multiple modalities

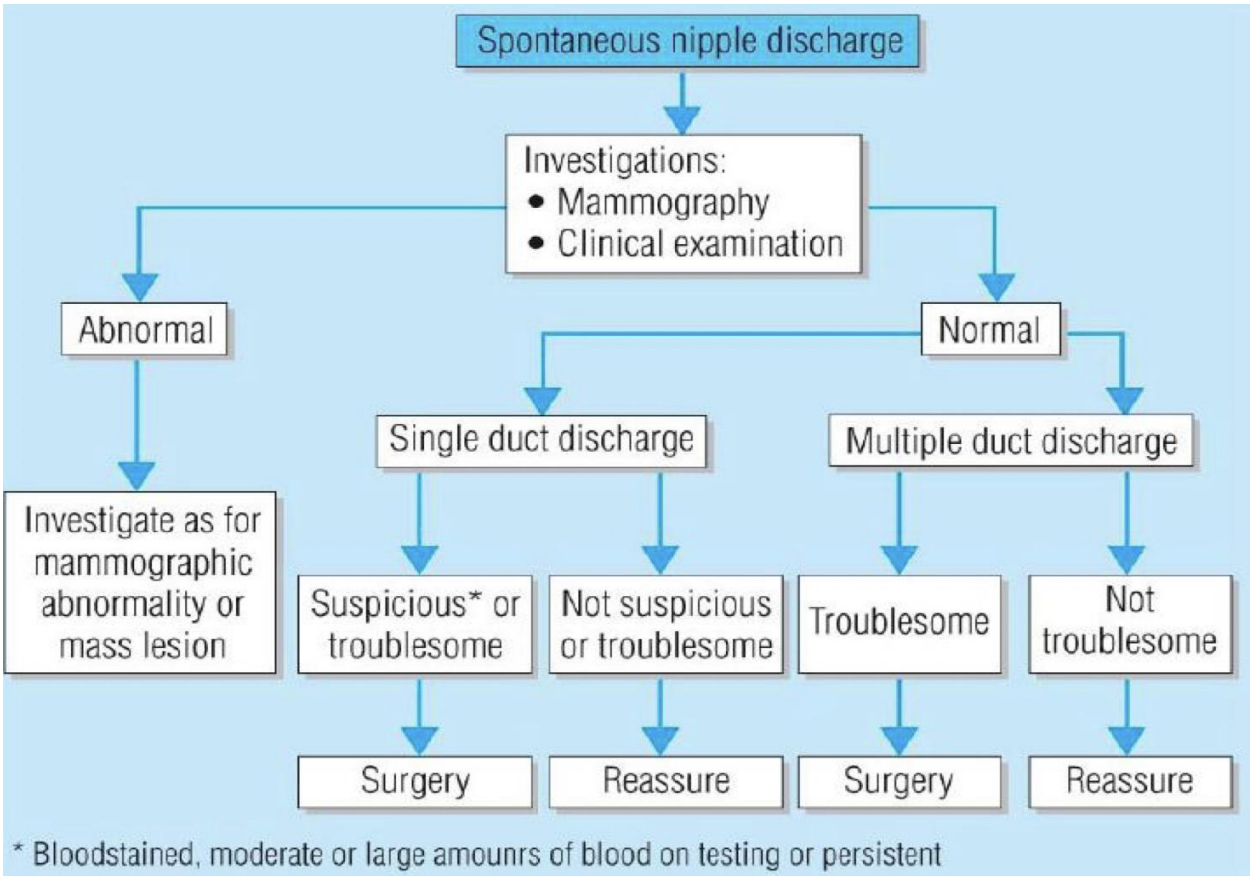
- ➔ **Surgery**
  - conservative (lumpectomy + sentinel lymph node or axillary lymph dissection as indicated) with Radiation therapy as must Rx
  - mastectomy +sentinel lymph node or axillary lymph dissection as indicated
- ➔ **Chemotherapy** as stage indicates
- ➔ **Hormonal therapy**
- ➔ **Monoclonal antibody**

Contraindications for conservatives surgery:

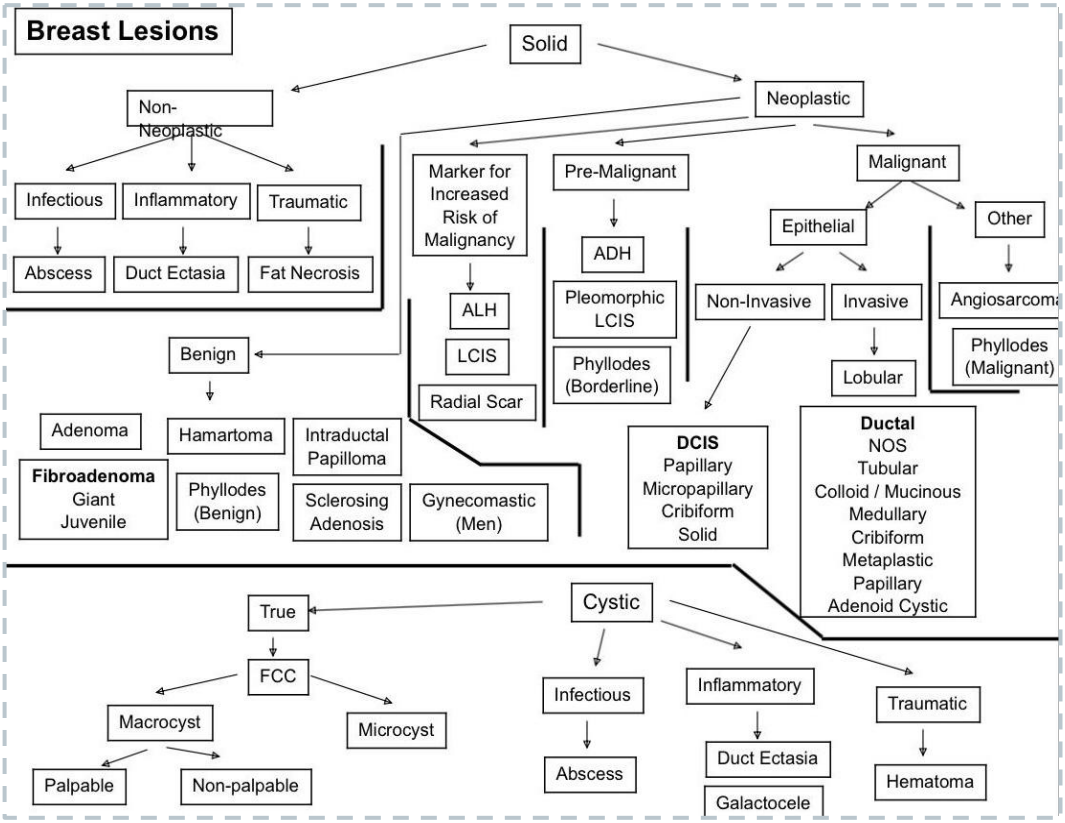
After patient wish

- ➔ Tumor size in relation to breast size if you can't get free tumor margins
- ➔ Multicentric disease
- ➔ Non availability of Radiation therapy or there is contraindications for Radiation therapy
- ➔ First trimester pregnancy
- ➔ Stage of the disease (stage 3)

Found in the slides :



Summary From the Doctor (438)



Recall

Q1: What option exists to decrease the risk of breast cancer in women with BRCA?

Prophylactic bilateral mastectomy.

Q2: What is the "TRIAD OF ERROR" for misdiagnosed breast cancer?

1. Age <45 years
2. Self-diagnosed mass
3. Negative mammogram

Note: >75% of cases of MISDIAGNOSED breast cancer have these 3 characteristics.

Q3: Why does skin retraction occur?

Tumor involvement of Cooper's ligaments and subsequent traction on ligaments pull skin inward.

Q4: What is the most common type of breast cancer?

Infiltrating ductal carcinoma.

Q5: What is the differential diagnosis?

- Fibrocystic disease of the breast
- Fibroadenoma
- Intraductal papilloma
- Duct ectasia
- Fat necrosis
- Abscess
- Radial scar
- Simple cyst

Q6: What follows a positive sentinel node biopsy?

Removal of the rest of the axillary LNs.

Q7: Is the fluid from a breast cyst sent for cytology?

Not routinely. However, bloody fluid should be sent for cytology.

439's Quiz

Q1: A 20-year-old female has a fine, discrete, mobile lump. Which of the following is most likely diagnosis?

A) breast cancer
B) lymphadenopathy
C) fibroadenoma

Q2: 36-year-old woman who recently immigrated from Russia complains of a 3-month history of discharged from the nipple at examination, small nodule is found deep to the areolar careful palpation of the nipple aruolar complex results in blood appearing at the three O'clock position, mammography is normal. What is the most likely diagnosis?

A) Intra ductal pepiloma
B) Carcinoma in situ
C) Breast cyst

Q3: A 34-year-old Ms. Rasha presented with breast mass noted on her self-examination. It was soft with mild tenderness and it was noted with changes in her menstruation more. What is most common diagnosis?

A) Galactorrhea
B) Papillary carcinoma
C) Fibrocystic changes

Q4: A20-year-old female with 1cm hard mobile breast mass in middle quadrant. She noticed it 2 weeks ago or more. Physical exam showed no axillary lymph node enlargement What is it most likely to be?

A) Breast carcinoma
B) Breast abscess
C) Fibroadenoma
D) Fibrocystic changes

Q5: 35 years old female present to the clinic with bloody spontaneous nipple discharge in her right breast. On examination, you noticed that the discharge comes out from single duct. What is the most common diagnosis?

A) Subareolar mastitis
B) Intraductal carcinoma
C) Paget disease of the nipple

Q6: 48 years old female with a painful left breast lump that has been growing For 1 week. The lump is smooth and tender. FNA and cytology show clear green fluid Ultrasound afterward shows no abnormality. What is the most likely diagnosis?

A) Periductal mastitis
B) Intraductal carcinoma in situ
C) Breast cyst

Answers

Q1	C	Q4	C
Q2	A	Q5	B
Q3	C	Q6	C

Extra Questions

439's Quiz

Explanations

Q2 Explanation: Most common cause of unilateral bloody nipple discharge: intraductal papilloma,, which is a benign proliferation characterized by unilateral serosanguineous or bloody nipple discharge, presented with subareolar mass.

Q3 Explanation: Fibrocystic changes are painful and Fibroadenoma is not.

438's Quiz

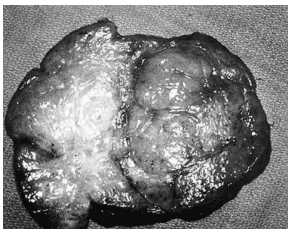
MCQ

Q1: Which of the following conditions have an increased risk of breast carcinoma?
A) Atypical ductal or lobular hyperplasia
B) Fibroadenoma
C) Duct ectasia

Q2: A 29-year-old woman presents with a 6-month history of erythema and edema of the right breast with palpable axillary lymphadenopathy. A punch biopsy of the skin reveals neoplastic cells in the dermal lymphatics. Which of the following is the best next step in her management?
A) Mastectomy followed by adjuvant chemotherapy.
B) Mastectomy followed by hormonal therapy.
C) Combined modality therapy with chemotherapy, surgery, and radiation.

Q3: A 35-year-old woman presents with a lump in the left breast. Her family history is negative for breast cancer. On examination the mass is rubbery, mobile, and nontender to palpation. There are no overlying skin changes and the axilla is negative for lymphadenopathy. An ultrasound demonstrates a simple 1-cm cyst in the area of the palpable mass in the left breast. Which of the following represents the most appropriate management of this patient?
A) Reassurance and reexamination.
B) Mammography and reevaluation of options with new information.
C) Immediate excisional biopsy.

Q4: A 14-year-old black girl has her right breast removed because of a large mass.
The tumor weighs 1400 g and has a bulging, very firm, lobulated surface with a whorl-like pattern, as illustrated here. Which of the following is the most likely diagnosis?



A) Intraductal carcinoma
B) Fibroadenoma
C) Cystosarcoma phyllodes

Q5: A 33-year-old pregnant woman notices a persistent, painless lump in the left breast. On examination the left breast has a single mobile mass without evidence of skin changes or lymphadenopathy in the neck or axilla. An ultrasound demonstrates a solid, 1-cm mass in the upper outer quadrant of the breast. A core-needle biopsy shows invasive ductal carcinoma. The patient is in her first trimester of pregnancy. Which of the following is the most appropriate management of this patient?
A) Administration of radiation in the third trimester followed by modified radical mastectomy after delivery of the baby.
B) Mastectomy
C) Immediate administration of chemotherapy followed by modified radical mastectomy after delivery of the baby.

Q6: A 33-year-old, non-smoking, breastfeeding woman is 10 days postpartum. She has a 4-day history of a slight crack on the surface of her left nipple. She presents with a 2-day history of severe continuous pain in the left breast, spiking pyrexia up to 38.8 with rigours which has prevented her from sleeping. On examination, you find the outer quadrants of the left breast to be red, warm and tender with a hard 3 cm lump at the edge of the left nipple. The most likely diagnosis is
A) Periductal mastitis
B) Breast cyst
C) Breast abscess

Answers

Q1	A	Q4	B
Q2	C	Q5	B
Q3	A	Q6	C

Extra Questions

Good Luck!

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439	438
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A3, A4, A6 , B1 and special thanks to Homoud Algadheb

438

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