Breast Anatomy
Four quadrants
Parenchyma
  Alveoli ------Lobules--------Lobes
Three tissue types
  Glandular epithelium
  Fibrous stroma and supporting structures
  Fat
Cooper ligaments
  Fibrous continuations of the superficial fascia, which span the parenchyma of the breast to the deep fascial layers
Terminal duct lobular unit

Structure of the breast and its secreting unit

Vasculature
Arterial supply
- Internal mammary artery (60%)
- Lateral thoracic artery (30%)
Venous return
- Intercostals
- Axillary vein (primary)
- Internal mammary vein
Lymphatics
- Axillary chain
  - Level 1 - below & lateral to pectoralis minor muscle
  - Level 2 - along and under pectoralis minor
  - Level 3 - above & medial to pectoralis minor
Rotter’s nodes
Between pectorial minor and major muscles
Internal mammary chain (relatively minimal drainage)
Parasternal
medial
Nerves
Long thoracic nerve
Thoracodorsal nerve
Medial pectoral nerve
Lateral pectoral nerve

Triple Assessment:

Any lump that persists through a menstrual cycle is best assessed by a specialist. Any patient with a breast lump should be subjected to rapid "triple assessment". The triple assessment actually involves the following:
1- Clinical assessment- a detailed history and physical examination,
2- Radiological assessment ;an imaging of the breast using mammography, ultrasound and MRI scanning if required.
3- Biopsy - a needle biopsy of any specific area of concern.

Fig. 17.3  Examination of the breast. (a & b) Position for inspection. (c) Palpation of axilla. (d) Position for palpation of the breast.
Mammographic signs of breast cancer

FNA-+ U/S guide

Needle aspiration of a breast mass
FNA-results:
1-Benign disease
2-Malignant cells detected
3-Suspicious- Excision
4-Inadequate cytology –repeat

**Presentations of breast diseases**

![Venn diagram with Pain, Lump, and Discharge]

**Lump**
Definition; A feature which is distinguishable from its surroundings by:
- Sight &/or touch & is abnormal

**Lump in the breast**
**Aims:**
1- Be able to palpate the breast efficiently in order to determine whether a lump is present.
2- Distinguish between inflammatory & non-inflammatory lumps
3- Be aware of the relevance of the triple assessment.
4- Learn the principles of Dx & Mx of common benign lesions

**Breast lump:**
A- With inflammation:
B- With no inflammation

**Lump with inflammation:**
I- BREAST ABSCESS-cardinal symptoms & signs of inflammation-
Presentation:
- Tense, painful, diffuse or localized swelling + Induration of the breast,
- Skin reddening & tenderness
With or without pyrexia
Most patients are breast-feeding with an ascending duct infection most commonly with staph aureus secondary to an excoriated or cracked nipple
Breast abscess- usually obvious BUT may show minimal or no signs of inflammation or fluctuation despite the presence of pus deep within the breast tissue
Ultrasound(U/S); useful in outlining a deep abscess with needle aspiration of the pus

Rx
Conservative Rx-AB. Analgesics. Regular expression of milk from the breast or emptying with a breast pump (to avoid engorgement) in the early cellulitic phase.
Surgery-in most cases- incision & drainage breaking down all loculi to produce a single cavity.
Pus—C/S
Wall of abscess; for—HPE
Unless there is residual cellulitis or systemic disturbance- Abs are not required after op.
Dressing- to absorb the discharge
  To prevent secondary infection
  To delay skin healing until the cavity fills with granulation tissue
Advise the patient to express the affected breast manually while feeding is continued from the opposite breast.
Reassure the mother that the Abs secreted in the milk should have no adverse effect on the baby apart from occasional diarrhea.
If no pus is found when the breast is incised?? Causes?
  1- The inflammatory process, although infective, did not progress to suppuration
     A-in patients who had been on antibiotics
     B-is non-pyogenic as in ;a-periductal mastitis
        b-Tuberculosis
  2-neoplastic.-inflammatory carcinomatosis

Fig. 309. Mastitis carcinomatosa.
Therefore, a tissue specimen should be obtained for: HPE & bacteriological examination, including Acid fast bacilli
II- Plasma cell mastitis periductal mastitis:
Associated with; peri-areolar inflammation & may be complicated by non-lactational abscesses which discharge spontaneously through the skin, forming mammary (or mammary) fistula
Mechanism & pathogenesis:
due to hormonally induced changes in the breast -causing—ductal obstruction, dilatation (ectasia) & rupture, with extravasation of inspissated secretions ---that provoke a chronic inflammatory response with prominent plasma cell infiltration

Mammary duct ectasia X periductal mastitis? two separate or related conditions?
periductal mastitis —
often occurs in: young female
Smokers
Mammary duct ectasia:
Probably an age-related involutional phenomenon, common near menopause
Not associated with smoking
Clinical features of: nipple discharge
Painless lumpiness in the subareolar region
Localized reddening & tenderness &
Nipple retraction

DXD- an abscess or Carcinoma
Condition rapidly resolves with broad spectrum Abs, although it is likely to recur in persistent smokers.
Drainage is avoided as a mammary fistula will result.
Mammography may show diagnostic features.
When doubt remains a biopsy is required.
When the changes are extensive – subareolar excision of all the major ducts may be necessary

**Lump with no inflammation:**

Traumatic-
- hematoma,
- hematocele,
- fat necrosis (hard irregular lump + skin dimpling & is clinically indistinguishable from Ca. Definite Dx on excision biopsy

fibroadenomas < 30 years
Fibroadenosis 25-45
Cysts;
Traumatic- hematoma. hematocele
Degenerative-Bloodgood cyst
Infective - Breast abscess
Parasitic-Hydatid cyst
Lymph cyst
Stagnation-milk- galactocele
Serocystic disease of Brodie
Neoplastic-cystic necrosis in breast cancer

Malignant disease

Hard swellings in the breast:
DXD-
    - Antibroma
    - Ca.
    - Calcified hematoma
    - Fat necrosis
    - Fibroadenoma – hard variety

**Highlights**
1- discrete breast lumps require Dx by triple assessment
2- in young women with dense glandular breast tissue , U/S is appropriate imaging modality, whereas in post-menopausal women mammography is os of greater benefit.
3- Breast abscess is often encountered in lactating women, may complicate peri-ductal mastitis, particularly in smokers.
4- U/S is useful for detecting deep seated breast abscess when clinically not apparent.
5- Incision/drainage of peri-ductal mastitis may be complicated by a mamillary fistula & should be avoided
6- A breast cyst is treated by needle aspiration, BUT excision biopsy if the :
    a-cyst fluid is blood-stained after aspiration
    b-there is residual lump or
    c-the cyst recurs
7- fibroadenoma is better excised, particularly in females > 35 years of age

**Nipple discharge**

**Aims**
1- Distinguish surface discharge(dermal) from ductal discharge.
2- Discriminate between discharge from a single duct & that from several ducts.
3- Distinguish between physiological & pathological discharge
4- Understand its Mx

**Complaint of discharge from the nipple:**

**A-Dermal**

Discharge from the surface of the nipple**(DERMAL)**
1- Ulceration of the nipple:
    a- Eczema- itchy, superficial scaling involving the areola too.
Bilateral with skin excoriation ----serous or blood-stained discharge.
Resolve rapidly on topical steroids.
If Rx fails, exclude Paget’s disease of nipple by skin biopsy
b-Paget’s disease—
external lesion is slowly spreading scaling erosion
starting on the nipple & extending onto areola,
often associated with underlying occult duct Ca.

Differences between eczema of nipple & Paget’s disease

<table>
<thead>
<tr>
<th></th>
<th>Paget’s disease</th>
<th>Eczema</th>
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<tbody>
<tr>
<td>Side</td>
<td>Unilateral</td>
<td>Bilateral</td>
</tr>
<tr>
<td>Edges are:</td>
<td>Distinct</td>
<td>Indistinct</td>
</tr>
<tr>
<td>Itching</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Age</td>
<td>In menopausal women</td>
<td>During the time of lactation</td>
</tr>
<tr>
<td>Vesicles</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Nipple is usually</td>
<td>Destroyed</td>
<td>Intact</td>
</tr>
<tr>
<td>Underlying lump</td>
<td>Usually present</td>
<td>no underlying lump</td>
</tr>
</tbody>
</table>

Fig. 310. Paget’s disease of the nipple.

2-Discharging foci:
a-mammillary fistula
b-minor septic lesions –
due to;
Trauma or
Infection of; local sebaceous glands or Montgomery’s tubercle in the areolar skin
Mammillary fistula-
Repeated attacks of inflammation, subsiding spontaneously after the discharge of a periductal abscess. Local signs are more florid & distinguishable from the other minor septic lesions
Rx-Excision of the blocked duct or en bloc excision of all major ducts for recurrent inflame & fistulation

Discharge from(within) the nipple(DUCTAL)
Physiological
Lactation
Normal minute daily secretion ,women unaware of it(in Adult female) -onto nipple surface—removed by evaporation, by contact with clothes or by washing
Occasionally ,secretion ---excessive & noticeable at one or both nipples . Exclude pathological cause.
Search for underlying disorder:
Findings on examination:
1-Nature of discharge
Milk-clear, colorless or yellow discharge – homogenous& slightly sticky in consistency
or else white is usually but not necessarily physiological
Pathologic nipple discharge is persistent and spontaneous and is not associated with nursing.
Requires further evaluation
Galactorrhea
Bilateral, milky discharge occurs
Obtain s. prolactin levels, if highly elevated, suspect pituitary adenoma as one of causes.
Bloody nipple discharge
Most common cause is intraductal papilloma

Cancer present 10% of time.
Cytologic exam on discharge
Mammogram to rule out associated mass
Bleeding per nipple
Duct papilloma – carcinoma
Restricted to one duct
Search for a lump → present → FNAC
→ absent → ductography

2-Site of origin
A-Bilateral or unilateral
B-Multiple ducts(diffuse origin) or Single duct

Diffuse origin
1-Milky discharge Galactorrhea-persistent milky discharge in a non-lactating women –hyperprolactinemia due to ant. Pituitary tumor or drug-induced
2-Not milky discharge:
a-Physiological nipple discharge- characteristics of physiological secretion & breast examination is normal & is not always equally prominent in both side.
A discharge from only one breast does not rule out physiological discharge
Rx-reassure the patient
Advise to ignore it &stop squeezing or expressing the nipple which perpetuates the symptom
b-duct stagnation:
Mammary duct ectasia- in a decade before menopause- pre-menopausal involutional changes in the breast
Excessive secretion or periodic ductal obstruction with spontaneous resolution & ejection of inspissated secretion containing particulate debris
Colour of Discharge: usually **green** because of cholesterol content
Purulent or blood-stained due to secondary infection.
O/E clinically & mammography- absence of any other abnormality.
Associated signs of periductal mastitis or mammary duct fistula

**Localized origin_single duct**
Duct papilloma: benign hyperplastic, usually impalpable lesion.
  Cytology of discharge.
  Ductogram-may confirm the presence of ductal tumor
  Rx –microdochectomy.
Ductal Ca. in situ(DCIS)
Invasive carcinoma.

**Mastalgia**

**Aims**
1-To distinguish cyclical from non-cyclical mastalgia
2-To appreciate that cyclical mastalgia usually responds to reassurance.
3-to recognize that in most patients with non-cyclical mastalgia, the cause lies outside the breast.

**Breast pain-** No lump :persistent mastalgia (over 6 months)
A-Cyclical (60 %)    B-Noncyclical (40%)

**Cyclical mastalgia:**
Relationship of pain & tenderness to menstrual cycle, maximal in the luteal phase, especially the week or so before the onset of menses
Severe mastalgia- > 7 days/cycle. uncontrolled with simple analgesia & interfere with patient’s lifestyle

**Breast pain chart**

**Daily Breast Pain Chart**
Name
Please record the amount of breast pain you experience each day by shading in each box as illustrated:
Severe pain □(black) Mild/Moderate pain □(1/2 black) No pain □(dot in center)
Please note the day your period starts each month with the letter “P”

<table>
<thead>
<tr>
<th>Month</th>
<th>Day of month</th>
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<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</td>
</tr>
</tbody>
</table>
Hormonally induced glandular activity within the breast tissue, not inflammation or infection, is the mechanism for pain, tenderness & nodularity in female breast.
In 90% pain mild to moderate. Careful Hy, clinical examination & reassurance is all that is necessary.
In 10% with severe pain, needs medical Rx- Placebo 40% effective
Evening primrose oil & Efamast (both contain gamma-linen acid) 50% effective
Bromocriptine & Danazol slightly better response BUT in 1/3rd – SE
Other hormones: LHRH-agonist-Goserlin, by monthly depot inj
Tamoxifen & testosterone

**Non-cyclic pain**

In older patients
Rarely, may be the only symptom of Ca. breast

*Non cyclic pain is caused by a cause:*
- **A- Inside breast** (1-Specific/2-Non specific)
  - Non specific causes inside the breast (15%) are estrogen replacement or the continuous cyclic type.
  - Specific causes are divided into:
    - Benign (8%) causes (Duct ectasia, mastites, abscess, trauma and Mondor disease) or
    - Malignant causes (2%).

**B- outside breast.**
Causes outside breast are neuromusculo skeletal referred pain, Tietze syndrome, supra diaphragmatic (pleuritis, angina, pericarditis) or infra diaphragmatic (esophagitis, cholecystitis, diaphragmatic irritation).

In patients >30y. with persistent localized breast pain, triple assessment to exclude underlying cause.
In >1/2, the pain is not related to the breast, BUT is of musculoskeletal origin from:
chest wall due to arthritis, rib injury or costochondritis, or from shoulder girdle muscles
Cause arising outside breast- Rx as indicated
Cause in the breast – treat as cyclical
Drugs can be effective placebo
NSAIDS may help
Avoid caffeine and wear a supportive bra

- Cancer must be excluded through examination, mammogram, and ultrasound if the pain is localized.
MASTALGIA OR MASTODINIA
Most common complaint associated with disorders of the breast.
It denotes the symptom of pain in the breast parenchyma or stroma in the absence of any specific physical or pathological abnormality.
It can be cyclical or non cyclical.
The cyclical type is often associated with nodularity. Occurs in both pre and post menopausal woman with nodularity being less prominent in post menopausal group.

MASTALGIA : ETIOLOGY
Cyclic pain ; caused by a relatively high estrogen, low progesterone and by target organ hypersensitivity to these hormones.

MANAGEMENT OF MASTALGIA
Underlying pathology needs to be excluded – biopsy lumps or radiology investigations (mammography) for non- palpable disease.
Always reassure the patient that she does not have cancer, as this is mostly the fear driving them to seek medical help.
The patient must be encouraged to start a pain dairy(pain chart) to determine whether or not the pain is cyclical in nature. She must also grade the daily pain on a pain scale.
For mild pain, good supportive underwear is recommended.
The pt must stop all methylxantine (caffeine) intake and also stop any oral hormone intake. If the patient however wish to stay on oral contraceptives, switch to higher progesterone pills.
For severe pain, start with evening primrose oil (Efamol caps I tds po) as a 1st line treatment.
If this fails, use hormonal treatment as a 2nd line:
- Ladazol or Danazol (Decrease FSH and LH. Hirsutism an occasional side effect)
- Tamoxifen
- Parlodel (Bromocriptine)

ABERATIONS IN THE NORMAL DEVELOPMENT AND INVOLUTION OF THE BREAST (ANDI)

INTRODUCTION
ANDI is a term used to describe most benign breast diseases. It is based on the fact that most benign breast disorders are relatively minor aberrations of the normal processes of development, cyclical hormonal response and involution.
Benign pathological states account for approximately 90% of the clinical presentations related to the breast. These diseases are more common in females 30-50 years old, thus it is hormonal in nature.

ANATOMY / HISTOLOGY
Breast tissue components include subcutaneous fat, stromal and parenchymal tissue
supported by fibrous bands known as Cooper suspensory ligaments, blood vessels, nerves, and lymphatics.

The pigmented areolar tissue contains:
- hair follicles,
- apocrine sweat glands,
- small raised nodular structures; Morgagni tubercles, (sebaceous) glands

The nipple contains:
- sensory nerve endings and
- smooth muscle bundles,
- 8 to 20 major ducts opening to the surface.

Lactiferous ducts extend proximally to the lactiferous sinuses leading to terminal ducts that enter a lobe composed of 20 to 40 lobules.

Subcutaneous fat surrounds the lobes and is found predominantly in the superficial and peripheral regions of the breast.

The glandular nodularity of breast tissue is most pronounced in the upper out quadrant of the breast.

During the estrogen-stimulated proliferative phase of the menstrual cycle, the nodularity and texture of the breasts can wax and wane as the stromal tissue becomes edematous with venous congestion.

**DEVELOPMENT AND INVOLUTION**

In adolescence the breast tissue comprises of:
- fibrous stroma and scattered ducts.

At around 12 years of age:
- maturation of these hormone dependant tissues occurs.
- Increases in fat deposition.
- formation of new ducts by branching and elongation
- development of lobular units are responsible for the growing breast.

The mature or resting breast contains:
- fat, stroma, lactiferous ducts and lobular units.

**Cyclic stimulation** with hypertrophy is responsible for the clinically observed changes in the breast morphology during menses and administration of exogenous hormones.

**Adenosis of pregnancy** stimulated by estrogen, progesterone and prolactin lead to milk production and increase in lobular size.

**Involution** during the climacterium is characterized by:
- the disappearance of these lobular units.

With **administration of exogenous hormones**, hyperplasia of ductal epithelium occurs.

**ETIOLOGY OF ANDI**

The etiology of ANDI is divided into:
- I- endocrine
- II- non endocrine causes.

**The endocrine causes:**
- Disturbance of the hypothalamic- pituitary gonadal steroid axis with an increase in circulating hormone levels.
- The altered prolactine profile is responsible for the production of galactorrhoea in some cases.
Non endocrine causes include:
uses of methylxanthines,
stress,
Diet rich in saturated fat (altered essential fatty acid profile causes super sensitivity to normal levels of Estrogen and Prolactin)
Iodine deficiency

CLINICAL FEATURES OF BENIGN BREAST DISORDERS
There is sound clinical evidence that many benign breast conditions, especially pain, nodularity and cysts are likely to have their pathogenesis in hormonal events during reproductive life. An attempt made to devise an accurate and comprehensive terminology that aids understanding and teaching led the Europeans to develop the ANDI terminology.
I. Physiological swelling and tenderness
II. Nodularity
III. Mastalgia (breast pain)
IV. Dominant lumps
   A. Gross cysts (macro cysts)
   B. Galactoceles
   C. Fibroadenoma
   V. Nipple discharge
      A. Galactorrhea
V. Abnormal nipple discharge
VI. Breast infections
   A. Intrinsic mastitis
      1. Postpartum engorgement
      2. Lactational mastitis
      3. Lactational breast abscess
   B. Chronic recurrent subareolar abscess
   C. Acute mastitis associated with macrocystic breasts
   D. Extrinsic infections

A useful classification system emphasizing the variety of benign breast disorders seen by clinicians has been described by Love et al and is based on symptoms and physical findings represented in the following table:

ANDI CLASSIFICATION OF BENIGN BREAST DISORDERS:
I-DISORDERS OF DEVELOPMENT
☐ Polymastia and polythelia (exposed to the same scope of disease as normal breast tissue)
Accessory (axillary) breast

Congenital inversion of nipples
Macromastia
Fibroadenoma
Phyllloides tumor
Adolescent hypertrophy - gross stromal hyperplasia at time of development, of unknown origin
II-DISORDERS OF CYCLICAL CHANGE
Mastalgia and nodularity
III-DISORDERS OF INVOLUTION

Fibrocystic breast disease /fibrocystic change /chronic cystic mastitis /mammary
dysplasia.
This includes a variety of changes in the glandular and stromal tissue
in response to the levels of Estrogen and Progesterone and often presents with
cyclical breast pain (mastalgia).

Fibrocystic changes:
• Cysts
• Fibrosis
• Sclerosing adenosis
• Duct ectasia with periductal mastitis

1. FIBROADENOMAS
• Well-defined, mobile benign tumor of breast
• Composed of both stromal and epithelial elements in the breast
• Can be diagnosed by FNA and followed if < 2-3 cm and age < 35
• Otherwise Dx by excision. At operation are well-encapsulated and detach
easily.

ANDI as arise from a whole lobule & not a single cell
Most common benign tumors of the female breast
Peak incidence at 20-30 years of age.
Composed of stromal and glandular tissue.
Often contain estrogen receptors and are therefore hormonally influenced, with regression after
menopause .increases in size in the late phase of menstrual cycle.
Clinically fibroadenomas ;
painless,
well circumscribed,
freely movable tumors
with arounded, lobulated, or discoid configuration.
They are usually rubbery and firm, but when calcified, they may be stoney hard.
According to a prospective study by West General in Edinburgh, a short term (2 year)
follow up of 219 fibroadenomas confirmed with Ultra sound and FNA,
55% of fibroadenomas showed no change,
8% increase d in size (all of these excised fibroadenomas),
12% decreased significantly in size and
25% resolved.
Roughly 50% will disappear in 5 years
Giant fibroadenomas occur and are bigger than 10 cm according to some authors, other authors suggests bigger than 5 cm. These tumors are multiple in 10-15% of cases.

Phyllodes tumors (cystosarcoma phyllodes)
- Giant fibroadenomas
- Rarely malignant
- Treat with wide local excision

MANAGEMENT OF FIBROADENOMA
Can be managed either conservatively or surgically. Conservative management requires histology (FNA or core needle biopsy), clinical examination and imaging (US/mammography). There must be no family history of breast cancer. The patient must understand the pathology and do regular self examination in the correct way. These cases need annual follow up. Surgical management entails Lumpectomy (always with histology) or cryoablation or
ultrasound guided percutaneous suctioning.

CARCINOMA IN FIBROADENOMA
Invasive carcinoma may secondarily involve fibroadenomas. at a mean age of 43 years (2 decades after mean age of fibroadenomas).
It ranges from a small focus within a fibroadenoma to complete replacement of the epithelial component with lobular carcinoma in situ more common than intraductal cancer.
The intraductal cancer arising in a fibroadenoma usually grows with comedo or cribriform growth patterns.

MANAGEMENT OF PHYLLOIDES TUMORS
These are usually large, benign tumors of epithelial and mesenchymal origin that occur primarily in the perimenopausal era.
However they may be observed in any age group.
Phyllodes tumors have a fairly dramatic clinical presentation and an aggressive histological pattern, although they usually exhibit benign clinical behavior.
Histological confirmation is necessary with primary excision with a margin of normal tissue the treatment of choice.
For local recurrence, re-excision or simple mastectomy can be done.
Poor results are obtained with chemo- and radiotherapy for recurrence or metastasis.
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- Parlodel (Bromocriptine)

BREAST CYSTS

Cystic disease and its clinical presentation
Gross cysts, or macro cysts are the most common dominant lump found in the breast most are often found in women between 35 – 50 years of age. Is a fluid filled sac within the breast tissue.
Clinically, gross cysts may be:
- silent or
- painful and
3- may cause palpable lumps or
4-be seen only on mammography or ultrasound.
5-The consistency depends on the pressure of the fluid within the cyst and the amount of normal breast tissue surrounding it.
6-They are often solitary, but can be multiple, feeling like a cluster of grapes on palpation.
7-Nipple discharge can be associated with gross cysts

MANAGEMENT OF CYSTS
Most importantly, they must be differentiated from a cancerous mass.
Ultrasound is the investigation of choice.
"Complex cysts” can be difficult to diagnose without aspiration of the cyst.
For painful cysts aspiration with collapse often relieves pain.
The aspirate of drained cysts must be sent for cytological examination, especially if it is bloody in nature.
Cyst > 4 cm –op (removal)
Aspirate- bloody-op
  - Cytology malig cell –op
  - = suspicious cell-op
    Cyst-disappear- follow up
    Reappear after aspiration –op

FIBROSIS
Occurs when there is a rupture of a cyst into the adjacent stroma, causing an inflammatory reaction with scarring fibrosis and palpable firmness.

SCLEROSING ADENOSIS
Caused by reduplication of the acini with increased numbers of distorted and compressed acini.
Acini numbers are increased at least twofold per terminal duct in comparison to the uninvolved lobules.
The stromal fibrosis may compress the lumens of the acini giving them the appearance of solid cords of double strands of cells which verges on the appearance of carcinoma

DUCT ECTASIA
Periductal mastitis is the primary condition that often precedes duct ectasia.

**Clinically** present with:
- non cyclic mastalgia,
- nipple retraction or discharge,
- periareolar abscess,
- subareolar mass,
- thick cheesy nipple secretion or lactiferous duct fistula.

The cause of periductal mastitis is most likely bacterial (particularly anaerobic organisms). Organisms most often identified are S. aureus and streptococcal bacteria.

If duct ectasia progresses to an abscess, it is usually superficial and associated with cellulitis. The disease is more common at 5th to 6th decade of life, usually multiparous women and is not associated with cigarette smoking.

On cytology the most common findings are heavy infiltrates of lymphocytes and histiocytes. Fibrosis may follow with nipple retraction, that can be confused with carcinoma

**MANAGEMENT OF DUCT ECTASIA**
Always exclude cancer: do a biopsy if a mass is present,
do cytology of any nipple discharge.
If it presents as an abscess, simple drainage is often insufficient,
recurrence is common, the causes of which appear to be multifactorial.
- a primary inflammatory process of the periareolar and areolar components (sweat and sebaceous glands) and accessory mammary glands are involved in the process.
Oral antibiotics should be used for the mastitis picture.
Excision of affected duct(s) is often helpful.

PERIDUCTAL MASTITIS/ RECURRENT SUBAREOLAR ABSCESS/ SQUAMOUS METAPLASIA OF THE LACTIFEROUS DUCTS
This usually occurs outside the postpartum period.
It presents with a painful subareolar erythematous mass that commonly recurs if treated with I&D alone.
The recurrent type forms fistulas from under the smooth muscle of the areola extending to the skin edge of areola.
The underlying pathology is keratinizing squamous epithelium extending deep into the ducts, with keratin trapped in the ductal system.
This causes dilation that lead to rupture that cause an intense chronic granulomatous inflammatory response.
Treatment involves removal of the causative epithelium.

PROLIFERATIVE BREAST DISEASE
Epithelial hyperplasia is an increase in the layers of cells, due to increased proliferation or failed apoptosis.
It involves apocrine metaplasia, ductal metaplasia and lobular dysplasia.
The ductal and lobular dysplasia can also present as atypical dysplasia resembling carcinoma in situ.

TUMORS
Stromal tumors consist of intralobular, breast specific tumors, fibroadenomas and phyllloides as well as interlobular, general connective tissue tumors, lipomas and angiosarcomas.
Epithelial tumors include the large duct papillomas.

CONCLUSION
☐ Benign breast diseases are common
☐ Never treat any lump conservatively without histology
☐ Histology is relative and not an absolute risk factor for future malignancy
☐ Uncertainty still exists on the etiology
☐ Special attention to patients with benign disease and family history of malignancy
☐ Good education of SBE
☐ Be aware of benign disease co-existing with c

**Breast trauma:** Physical damage to a breast. If a breast is injured by trauma, tiny blood vessels may rupture to cause localized bleeding (a hematoma). The hematoma can be felt as a lump. Trauma to the breast can also damage the fat cells in the breast tissue, a condition called fat necrosis. Fat necrosis can form a lump in the breast. This type of lump is not cancer.

**Benign Breast Disease:**
1. Infectious and inflammatory
2. Benign lesions
3. Nipple Discharge
4. Mastalgia

**Infectious and Inflammatory Breast Disease**

1. Cellulitis, mastitis
   - Usually associated with lactation-lactational mastitis
   - Treat with 10-14 day course antibiotics to cover *Staphylococcus* and *Streptococcus*
2. Abscess
   Treated by surgical drainage
3. Chronic subareolar abscess
   Occurs at base of lactiferous duct, and squamous metaplasia of duct may occur.
   Sinus tract to areola develops
   Treatment requires complete excision of sinus tract
   Recurrence is common
4. Mondor’s disease
   Phlebitis of the thoracoepigastric vein
   Palpable, visible, tender cord along upper quadrants
   Ultrasound may be helpful in confirming this diagnosis.
   Treatment self-limited, can use anti-inflammatories if necessary
Benign Lesions of the Breast

2. Fibrocystic breasts:
   - Broad spectrum of clinical and histologic findings
   - Loose association of cyst formation, breast nodularity, stromal proliferation, and epithelial hyperplasia.
   - Appears to represent an exaggerated response of breast stroma and epithelium to hormones and growth factors.
Dense, firm breast tissue with palpable lumps and frequently gross cysts, commonly painful and tender to touch.
No consistent association between fibrocystic complex and breast cancer.

3. **Cysts**
   - Fluid-filled, epithelium-lined cavities
   - Influenced by ovarian hormones
     - Explains sudden appearance during the menstrual cycle, their rapid growth, and their spontaneous regression with completion of the menses.
   - Three colors by needle aspiration
     - Simple cyst, clear or green fluid and is benign.
     - Milk-filled cyst, called galactocele and is benign.
     - Bloody cyst is a cause of concern for malignancy.
   - Tx depends on whether the cyst completely resolves after aspiration
     - Complete resolution, will follow up to ensure it does not recur.
     - Incomplete resolution, Treat as breast mass and excise. Fluid-filled, epithelium-lined

4. **Fibroadenoma**
   - Well-defined, mobile benign tumor of breast
   - Composed of both stromal and epithelial elements in the breast
   - Common in younger women, and is most common tumor in women younger than age 30 years
   - Can be diagnosed by FNA and followed if < 2-3 cm and age < 35
   - Otherwise Dx by excision. At operation are well-encapsulated and detach easily.

5. **Phyllodes tumors (cystosarcoma phylloides)**
   - Giant fibroadenomas
   - Rarely malignant
   - Treat with wide local excision

6. **Sclerosing adenosis**
   - Proliferation of acini in the lobules, which may appear to have invaded the surrounding breast stroma.
   - Can simulate carcinoma both grossly and histologically.

7. **Epithelial and atypical hyperplasia**
   - Involves ducts or lobules
   - If greater than moderate hyperplasia then indicates higher risk of breast cancer

8. **Papilloma**
• Polyps of epithelium-lined breast ducts
• Located under the areola in most cases
• When under the nipple and areolar complex it often present with a bloody nipple discharge.
• Treatment is total excision through a circumareolar incision.
• Need to rule out invasive papillary carcinoma.

9. Mammary duct ectasia
• Generally found in older women.
• Dilatation of the subareolar ducts can occur.
• A palpable retroareolar mass, nipple discharge, or retraction can be present.
• Tx involves excision of area.

10. Fat necrosis
• Associated with trauma or radiation therapy to breast.

Malignant Diseases of the Breast
• A woman has a 1 in 8 chance of developing breast cancer at some point in her life.
• Risk factors
  o Increased age, family history, History of breast, ovary, or endometrial cancer, >30 age at first pregnancy, high socioeconomic status, nulliparity, early menarche, and late menopause
• Symptoms
  o Lumps
    ▪ Presenting symptom in 85% of patients with carcinoma
  o Pain
    ▪ Must completely evaluate to rule out carcinoma
  o Metastatic disease
    ▪ Axillary nodes
    ▪ Distant organ symptoms, such as neurological
  o Asymptomatic
    ▪ Why we advise yearly SBE and yearly mammogram after age 50

• **Non-invasive breast cancers**
  o 10% of all types of breast cancer
  o Good prognosis
  o Ductal carcinoma in situ, lobular carcinoma in situ, and Paget’s disease

• **Invasive breast cancers**
  o Favorable histologic types (85% 5-year survival rate)
    ▪ Tubular carcinoma (grade 1 intraductal), colloid or mucinous carcinoma, and papillary carcinoma
  o Less favorable types
- Medullary cancer, invasive lobular cancer, and invasive ductal cancer
  - Least favorable type
  - Inflammatory breast cancer

**Ductal Carcinoma in Situ**
- Seen as microcalcifications on mammogram
- Confined to ductal cells.
- No invasion of the underlying basement membrane.
- Chance of recurrence 25-50% in 5 years, of these 50% will be invasive
- Tx
  - Mastectomy an option if there is a substantial risk of local/regional recurrence
  - Wide local excision and radiation reduce local recurrence to 2%
  - Wide excision alone suitable if <25mm, favorable histology, and the margins are clear
  - Node dissection not necessary (nodal disease < 1%)

![Image of normal breast with ductal carcinoma (IDC)]

Normal breast with invasive ductal carcinoma (IDC) in an enlarged cross-section of the duct.  
**Breast profile:**
- **A** ducts
- **B** lobules
- **C** dilated section of duct to hold milk
- **D** nipple
- **E** fat
F pectoralis major muscle
G chest wall/rib cage

**Enlargement:**
A normal duct cells
B ductal cancer cells breaking through the basement membrane
C basement membrane

Lobular Carcinoma in Situ
- Not detectable on mammography
  - Most commonly found incidentally
- Risk of invasive breast cancer in 20 years is 15-20% bilaterally
- Tx
  - Careful follow-up
  - Bilateral mastectomy may be considered if other risk factors are present such as family history or prior breast cancer, and also dependent on patient preference.

**Paget’s Disease**
- Uncommon
- Usually involves the nipple
- Histologically, vacuolated cells are seen in the epidermis of the nipple and result in an eczematous dermatitis of the nipple.
- It is generally associated with an underlying intraductal or invasive carcinoma.
  - Mammography should be performed
- About 30% of patients have axillary node metastasis at diagnosis.
- Mastectomy is the standard of treatment
  - 80% have a 10 year survival rate if there is no mass present and no axillary nodes are involved.

**Invasive Breast Cancers**
- Favorable histologic types (85% 5-year survival rate)
  - Tubular carcinoma (grade 1 intraductal), colloid or mucinous carcinoma, and papillary carcinoma
- Less favorable types
  - Medullary, invasive lobular, and invasive ductal carcinoma
- Least favorable type
  - Inflammatory breast carcinoma
- Staging, prognosis, and treatment

**Favorable histologic types**
- Tubular carcinoma
  - 2% of all invasive breast cancers
  - Generally diagnosed by mammography
Distinctive under microscope
Long-term survival approaches 100%
- Mucinous (colloid) carcinoma
3% of all invasive breast cancers
Generally confined to elderly population
Bulky, mucinous tumor with characteristic microscopic features
5 and 10 year survival rates are 73 and 59 percent, respectively
- Papillary carcinoma
<2% of all invasive breast cancers
Generally presents in seventh decade, and is a slowly progressive disease
5 and 10 year survival rates are 83 and 56 percent, respectively

**Less Favorable Histologic Types**
- Medullary carcinoma
4% of all invasive breast cancers
Soft, hemorrhagic bulky presentation
Diagnosed microscopically (lymphocytic infiltration)
Metastases to axillary nodes in 44%
5 and 10 year survival rates are 63 and 50 percent respectively
- Invasive ductal carcinoma
Most common and occurs in 78% of all invasive breast cancers.
Metastases to axillary nodes in 60%
5 and 10 year survival rates are 54 and 38 percent respectively
- Invasive lobular carcinoma
9% of all invasive breast cancers
Metastases to axillary nodes in 60%
5 and 10 year survival rates are 50 and 32 percent respectively
Higher incidence of bilaterality

**Inflammatory carcinoma**
- 1.5-3% of breast cancers
- Characteristic clinical features of erythema, peau d’orange, and skin ridging with or without a palpable mass.
- Commonly mistaken for cellulitis.
- Will generally fail antibiotics before being diagnosed
- Disease progresses rapidly, and more than 75% of patients present with palpable axillary nodes.
- Distant metastatic disease also at much higher frequency than the more common breast cancers.
- 30% 5 year survival rate
- Requires chemotherapy treatment immediately

**Diagnosis**
• Fine-needle aspiration  
  o Sensitivity is 80-98%, specificity 100%  
  o False negatives are 2-10%  
• Core-needle biopsy  
  o More tissue, however still possibility of false “negative” and could represent sampling error  
• Incisional biopsy  
  o For large (>4 cm) lesions for whom pre-op chemotherapy or radiation will be desirable.  
• Excisional biopsy  
  o Removal of entire lesion and a margin of normal breast parenchyma

**Staging and Prognosis**

• Primary Tumor  
  o T1 = Tumor < 2 cm. in greatest dimension  
  o T2 = Tumor > 2 cm. but < 5 cm.  
  o T3 = Tumor > 5 cm. in greatest dimension  
  o T4 = Tumor of any size with direct extension to chest wall or skin  
• Regional Lymph Nodes  
  o N0 = No palpable axillary nodes  
  o N1 = Metastases to movable axillary nodes  
  o N2 = Metastases to fixed, matted axillary nodes  
• Distant Metastases  
  o M0 = No distant metastases  
  o M1 = Distant metastases including ipsilateral supraclavicular nodes  
• Clinical Staging and prognosis  
  o Clinical Stage I  
    Prognosis (5 year surv. Rate)  
    T1 N0 M0  
    Stage I  
    93%  
  o Clinical Stage IIA  
    T1 N1 M0  
    I  
    72%  
  o Clinical Stage IIB  
    T2 N1 M0  
    II  
    41%  
  o Clinical Stage IIIA  
    T1 N2 M0  
    III  
    18%  
  o Clinical Stage IIIB  
    T4 any N M0  
  o Clinical Stage IV  
    any T any N M1

**Nottingham prognostic index (NPI)**

NPI = 0.2Xsize(cm) + Grade + Nodal Status  
NPI  10Y survival(%)  Prognostic Gp  <2.4  95  Excellent  
   2.4-3.4  85  Good
3.41-4.4 70 Moderate 1
4.41-5.4 50 = 2
>5.4 20 Poor

Prognostic Features
- Tumor size important prognostic factor
- Poor prognostic features of tumor:
  - Presence of edema or ulceration of skin, mass fixed to chest wall or skin, satellite skin nodules, peau d’orange (dermal lymphatic invasion), skin retraction and dimpling, and involvement of medial portion of inner lower quadrant involved.
- Axillary node status:
  - Best source of predicting survival or outcome
  - N0 has 10 year survival rate of 60%
  - N1 has 10 year survival rate of 50%
  - N2 has 10 year survival rate of 20%
  - If 10 or more nodes are diseased (N3) 10 yr surv. Rate is 14%
  - Poor prognostic feature of nodes:
    - Capsular invasion, extranodal spread, and edema of arm
- Distant metastases is very poor prognostic indicator
- Positive estrogen and progesterone receptor indicates likely response to hormonal treatment and is a positive prognostic indicator

Treatment
- Modalities (palliative vs. curative)
  - Surgery
    - Local treatment
  - Radiation
    - Local treatment
  - Chemotherapy and hormonal therapy
    - Systemic treatment

Surgery

- **Breast conservation therapy**
  Stage I, stage II, and sometime stage III carcinomas
  Lumpectomy, axillary lymphadenectomy, and postoperative radiation therapy
  Contraindications: tumors > 5 cm, gross multifocal disease, and diffuse malignant microcalcifications
  Local recurrence more than mastectomy so follow up important
- **Modified radical mastectomy** (most common mastectomy procedure for invasive breast cancer)
Entire breast and axillary contents are removed
Pectoralis muscles remains
- **Halsted radical mastectomy**
  Removes breast, axillary contents, and pectoralis major muscle
  Cosmetically deforming
  Only indicated when pectoralis muscle involved
- **Simple mastectomy**
  All breast tissue is removed, axillary contents not removed
  Treatment for non-invasive breast cancer

  Radiation
  - Utilized for primary and metastatic disease
  - Useful in breast conservation therapy to reduce rate of recurrence.
  - Radiate entire breast
  - Chemotherapy and Hormonal Therapy

  Chemotherapy
  - Eradicates risk of occult distant disease in stage I and stage II patients.
  - All patients with axillary node involvement are candidates along with patients with negative axillary node involvement who are high risk by other prognostic indicators.
  - Example treatment is 6 months of cyclophosphamide, methotrexate or adriamycin, and fluorouracil along with paclitaxel.
    - Improvement in disease free interval and overall survival
  - Hormonal therapy
  - Tamoxifen
    - Generally taken for five years in patientss with estrogen receptor positive tumors.
  - As effective as chemotherapy in post-menopausal patients with estrogen receptor positive tumors

**The Male Breast**
- **Gynecomastia**
  - Prepubertal gynecomastia
    - Rare, adrenal carcinoma and testicular tumor can cause this.
  - Pubertal gynecomastia
    - Occurs in 60-70% of pubertal boys.
  - Senescent gynecomastia
    - 40% of aging men have this to some degree.
    - Drugs, such as steroids, digitalis, hormones, spironolactone, and antidepressants can cause this.

- **Male breast carcinoma**
  - 0.7% of all breast cancers
  - <1% of male cancers
- Average age of diagnosis is 63.6 years old
- Painless unilateral mass that is usually subareolar with skin fixation, chest wall fixation, and ulceration.
- Mostly ductal carcinoma
- Males generally present at later stage than woman
  - Overall survival worse in men, however when compared stage for stage the survival rates are similar.

FNAC