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Breast Pathology

Overview and Approach

What is the breast?

- Modified skin appendage (sweat gland) –
- Terminal duct lobular unit – small ducts and lobules lined by specialized bilayered epithelium
- Myoepithelial – outer, against basement membrane
- Epithelial- inner – facing lumen – many epithelial proliferations and neoplasms arise from this
- Specialised intralobular stroma
- Can become neoplastic and induce proliferation of epithelial cells too → develop fibroepithelial neoplasms (eg. fibroadenoma, phyllodes tumour)
- These two components are hormonally responsive and may undergo morphologcal changes during various parts of the menstrual cycle, as well as during lactation

Large ducts and lactiferous ducts – larger ducts also lined by bilayered epithelium, the latter open into the nipple. Benign, in-situ and malignant neoplasms can also arise from these (may cause bloody nipple discharge)

Functions of the breast

- Produce milk and nourishment for offspring
- Provide immunological source of protection for offspring

Important clinical considerations

- As breast cancer is the commonest malignancy in women, one of the key questions when approaching a female patient with a breast complaint is: **Is this malignant?**
- Even benign lesions (eg. benign epithelial proliferations) may carry an increased **risk of malignancy**, so these need to be followed-up
- Family history and past history are very important when evaluating a patient for possible breast malignancy
- The **triple test** – a combination of clinical evaluation (History and physical examination); diagnostic imaging and tissue biopsy, is the mainstay of the diagnostic approach to breast cancer.

Main disease categories

1. **Inflammatory/Infectious**
2. **Traumatic**
3. **Benign epithelial lesions**
   - Arise from TDLU, some have increased risk of malignancy
   - These are subdivided into Proliferative vs Non-proliferative lesions; with or without atypia
4. **Neoplasms**
   - Benign vs Malignant (in-situ vs invasive)
   - Which component do they arise from – epithelium or stroma?
   - These are often picked up early because of our National Breast Screening Programme
5. **Developmental disorders**
6. **Hormone related conditions** (eg. gynaecomastia in males)

Mindmaps:
I. Overview of conditions of the breast
II. Neoplasms of the breast:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/breast-pathology/ii-main-diseases-of-the-breast/

Clinicopathologic Correlations

Refer to the table on the next page for examples of conditions and their clinical features.

Another very important clinical presentation is the **asymptomatic patient with imaging abnormalities from breast screening.**

- Why screen? – Detect smaller (earlier) lesions – threshold size for detection is around 1cm (compared to palpation which is around 2cm)
- 2 main parameters evaluated:
  1. Densities
  2. Calcifications (worrying: small, irregular, numerous, clustered; linear branching (DCIS))

Don't forget **Systemic symptoms** too, which can occur in advanced disseminated malignancy; or infections, as well as hormonal or developmental conditions.

Mindmap: Main clinical presentations
https://medicine.nus.edu.sg/pathweb/pathology-demystified/breast-pathology/breast-iii-clinicopathologic-correlation/

Figure out the underlying pathology for each lemon:
https://medicine.nus.edu.sg/pathweb/wp-content/uploads/2017/05/knowyourlemonsdotcom-12signs-29d918y.png

Talking POTS and Slides
https://medicine.nus.edu.sg/pathweb/pathology-demystified/breast-pathology/breast-talking-pots-and-slides/

Quiz
https://medicine.nus.edu.sg/pathweb/pathology-demystified/breast-pathology/breast-quiz/

Real Life Case Example
See how a team of doctors manages a patient with a breast lump. At each step, think about what your role would be if you were the GP, or the medical officer in the specialist clinic
https://medicine.nus.edu.sg/pathweb/pathology-demystified/pathology-in-action-real-life-cases/pathology-in-action-a-breast-lump/

Table on Clinicopathologic Correlations

Main clinical symptom	Clinical features	Aetiologic category	Example	Remarks
Lump (Note: Don't forget to check for axillary lymph nodes! They can be enlarged in inflammatory/infectious disease or malignancy)	Tender, red, warm skin	Infectious	Abscess	May be associated with lactation
	Discrete, mobile firm mass	Neoplastic	Fibroadenoma	
	Irregular, hard, non-tender, may be fixed to skin or chest wall. May have associated axillary lumps (lymoh nodes)	Neoplastic	Carcinoma	Age important - >50 y (malignant 60%)
	May be tender or correlate with menstrual cycle	Physiologic	Physiologic changes in breast parenchyma; Fibrocystic change	No discrete lump; general 'lumpiness'
Skin changes	Red, warm, tender	Inflammatory/infectious	Mastitis	Associated with lactation
	Red, warm	Neoplastic	Inflammatory carcinoma	Older patient, may have underlying mass, not responsive to antibiotics
	Pitted skin, like the peel of an orange (Peau d'orange appearance)	Neoplastic	Locally advanced carcinoma	Due to invasion into dermal lymphatics
	Puckering	Neoplastic	Skin overlying carcinoma	
		Traumatic	Fat necrosis	Puckering; May have prior trauma
Nipple changes	Discharge	Neoplastic	Large duct papilloma	Serosangionous, unilat, spontaneous
		Neoplastic	Carcinoma	
		Physiologic	Physiologic	Scant, correlates with menstrual cycle, associated with manipulation
	Galactorrhoea	Prolactin-related, probable neoplastic	Due to pituitary adenoma (producing prolactin)	Production of milk outside the context of lactation
	Retraction	Neoplastic	Carcinoma	
		Traumatic	Fat necrosis	
	Eczematous changes	Inflammatory	Eczema	
		Neoplastic	Paget's disease	Highly associated with underlying carcinoma or in-situ carcinoma
Pain (mastalgia; mastodynia)	Cyclic with menses, generalised	Physiologic	Hormone related physiologic tenderness	
	Non-cyclic, localised	Traumatic; Infectious	Ruptured cyst; Abscess	