

Reactive and Non-Proliferative Lesions

Non-Proliferative Lesions

Fibrocystic Change "FCC"

Most common non-proliferative lesion of the breast!

No significant increased risk of cancer.

Most common in reproductive age.

Nodularity by palpation/imaging. Can be tender.

Likely hormone-related.

Cysts = fluid filled, dilated terminal duct lobular units. Often clustered. Epithelium may be attenuated. Still have inner epithelial and outer myoepithelial cells. Frequent apocrine metaplasia.

Rarely squamous metaplasia

May contain calcifications.

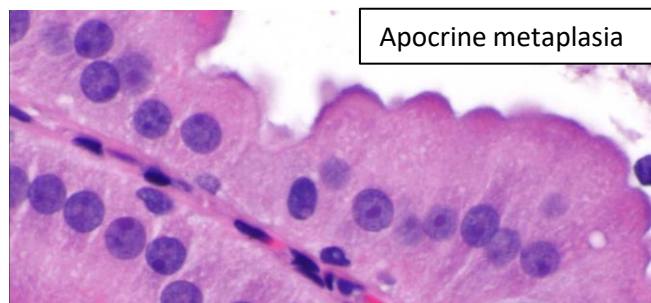
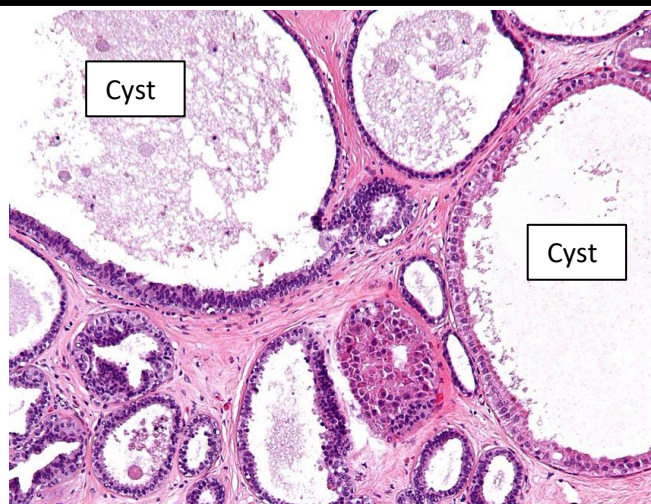
Cyst walls often contain areas of **fibrosis**

Apocrine metaplasia = enlarged epithelial cells with abundant, granular, eosinophilic cytoplasm and apical luminal blebbing. Round nuclei with prominent nucleoli. Can sometimes be papillary. Can enhance on MRI. ER (-), AR (+). Sometimes fewer myoeps.

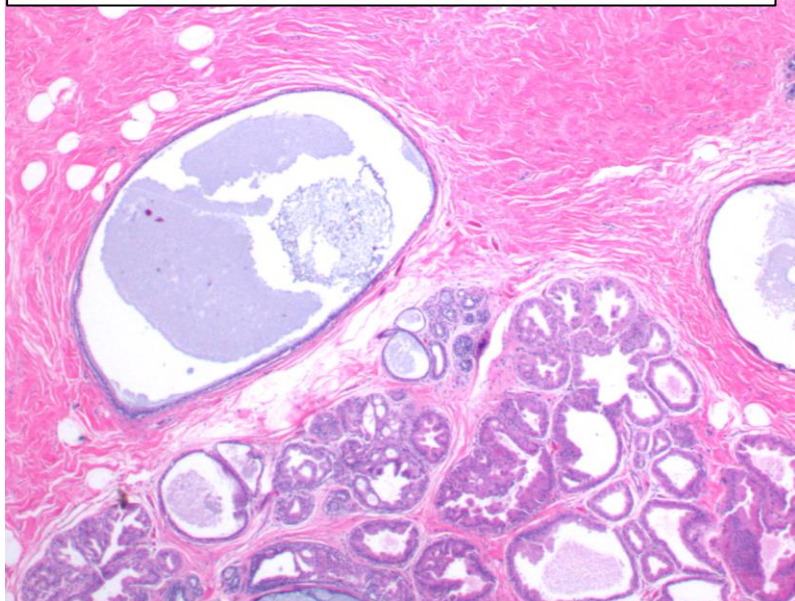
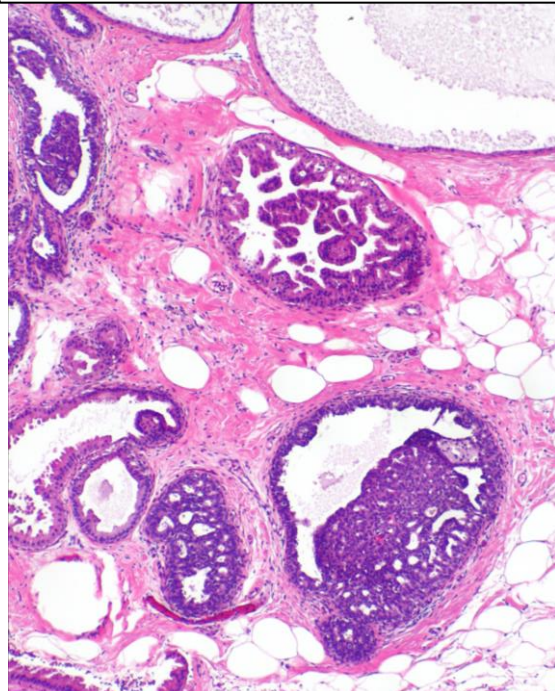
Although this isn't fully formally defined, some like to group into "proliferative" and "non-proliferative" FCC.

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"Non-proliferative" FCC = fibrosis, cysts, apocrine change, adenosis, and mild usual ductal hyperplasia



"Proliferative" FCC = FCC + marked UDH, sclerosing adenosis, radial scar, and papilloma



Inflammatory/Reactive Lesions

Biopsy Site Changes

Changes after a biopsy/prior surgery.
Similar to elsewhere in the body.
Appearance depends on interval from procedure.

Frequent changes include:

Organizing hemorrhage (with hemosiderin laden macrophages and blood)

Fat necrosis (with foamy macrophages)

Foreign body giant cells and/or foreign material
Granulation tissue

Scarring/fibrosis

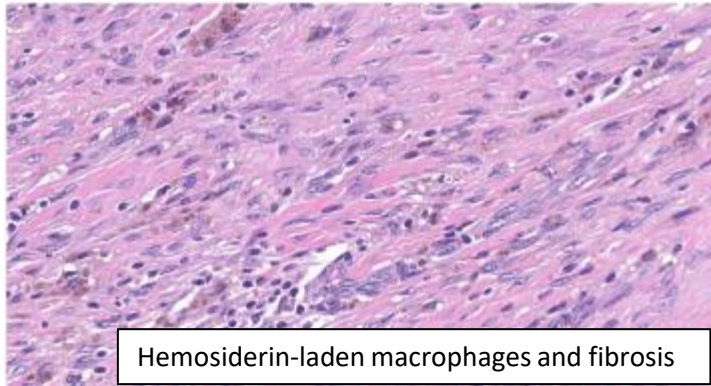
Acute and chronic inflammation

Squamous metaplasia of adjacent ducts/lobules

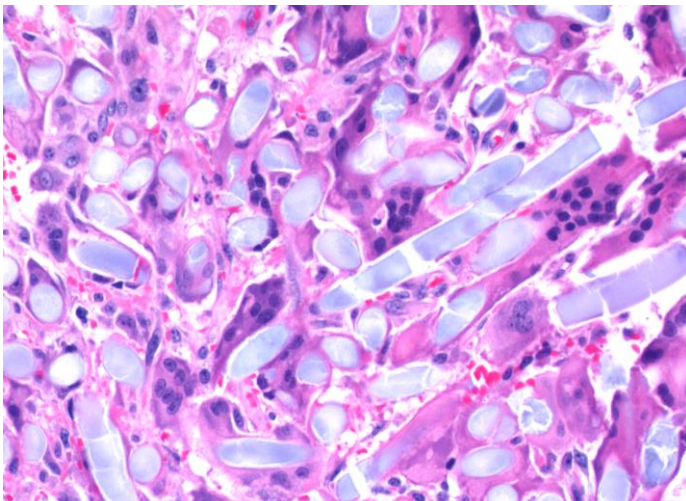
Can see infarction of some lesions.



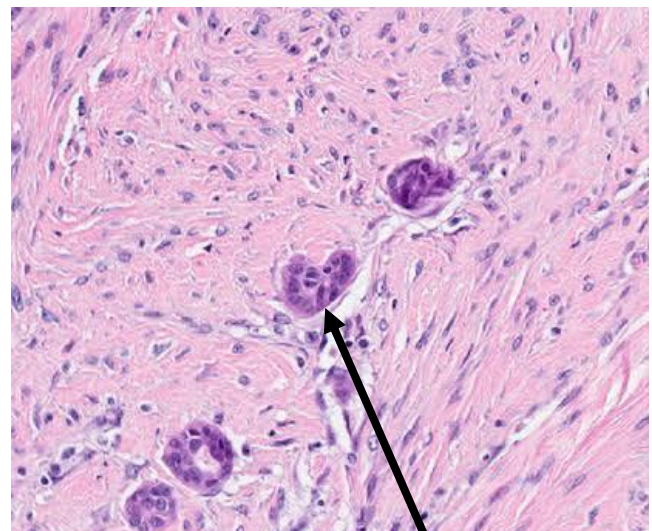
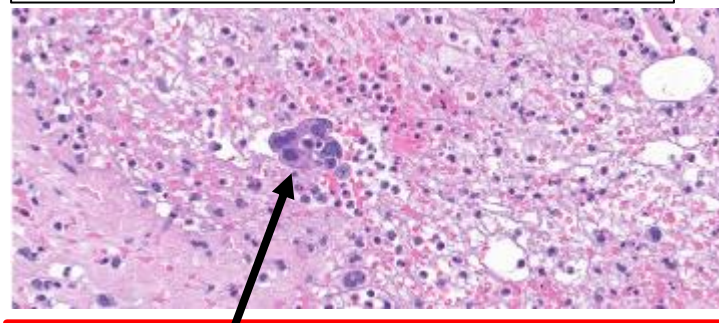
Foreign material in an area of fibrosis



Hemosiderin-laden macrophages and fibrosis



Refractile foreign material with a prominent foreign body giant cell reaction



"Epithelial displacement" of benign papillary epithelium into an area of scar [Virtual Slide](#)

Pitfall Warning: After a biopsy, there can be "**epithelial displacement**" where epithelium (benign or atypical) without accompanying myoepithelium can be found within the stroma and/or vascular spaces! This is particularly common with papillary lesions. This can result in the erroneous diagnosis of invasive carcinoma. When the epithelial fragments are confined to biopsy site, a diagnosis of epithelial displacement should be favored! A diagnosis of invasive carcinoma should only be made if epithelium is found in the stroma away from the biopsy site or if there are other characteristic findings.

Fat Necrosis

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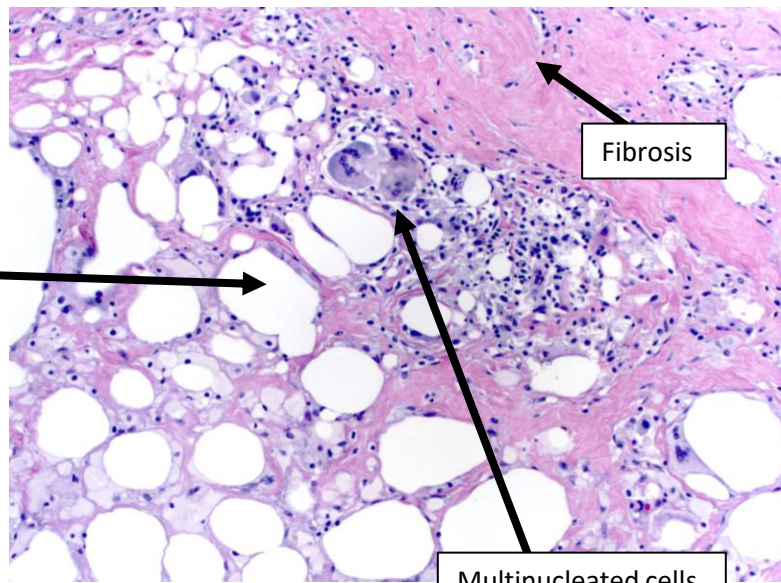
After injury (surgery, biopsy, or trauma).
However, up to ½ incident is not noted.
Can mimic malignancy clinically and/or radiographically

Cystic spaces surrounded by lipid-laden ("foamy") macrophages

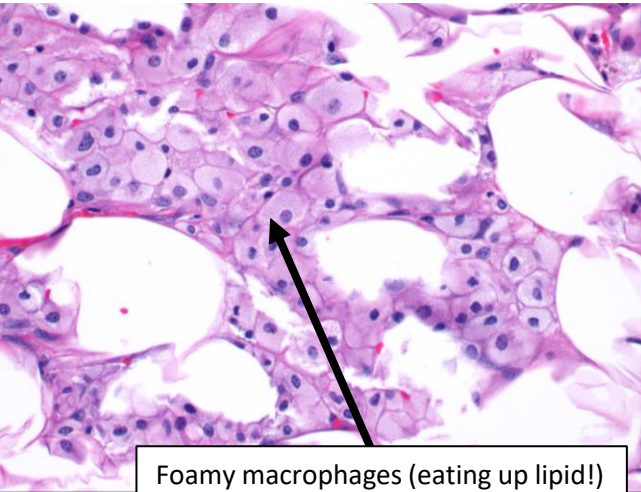
Variable acute and chronic inflammation
Frequent hemosiderin-laden macrophages
Frequent foreign body macrophages

Early → hemorrhage

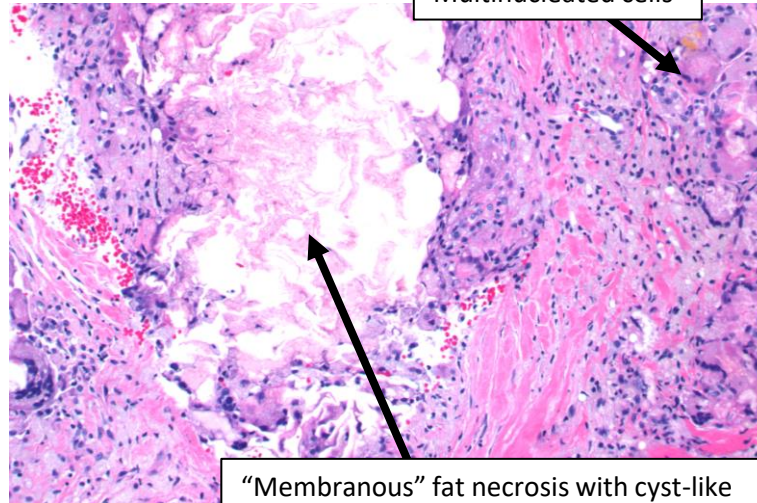
Late → fibroblastic proliferation and collagen deposition (scar/fibrosis)



Multinucleated cells



Foamy macrophages (eating up lipid!)



"Membranous" fat necrosis with cyst-like spaces lined by wavy, pink membranes

Duct Ectasia

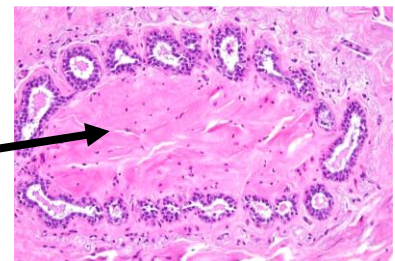
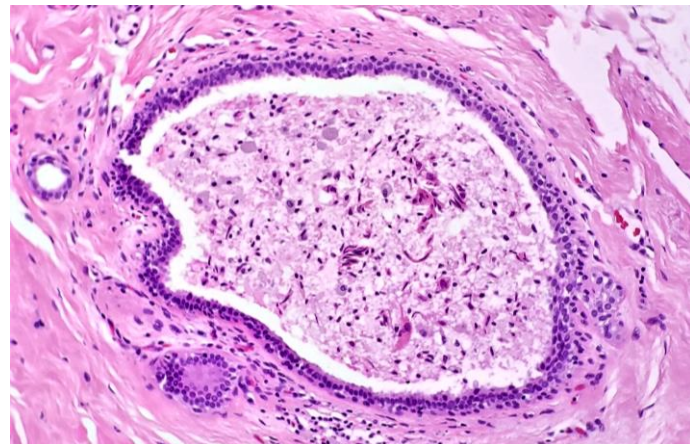
aka **Periductal Mastitis**

Primarily perimenopausal and post-menopausal women. Can present with pain, discharge, mass, or calcifications

Varying amounts of:

- Periductal inflammation
- Periductal fibrosis
- Duct dilation (can rupture too)
- inspissated lipid-rich material, with foamy macrophages that often infiltrate the wall
- Squamous metaplasia

Late: fibrosis can obliterate the lumen and the remnants of epithelium may form tubular structures around lumen making a **"garland pattern"**



Mucocele-like Lesion

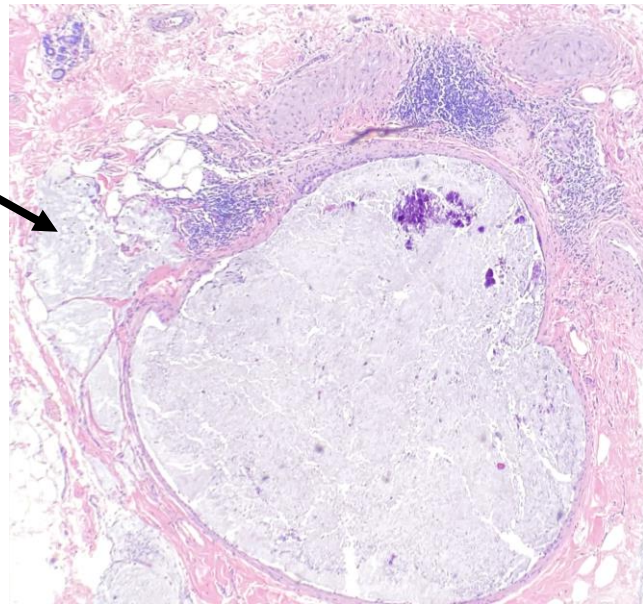
Cystically dilated, mucin-filled ducts.

Often associated with rupture and extravasation of mucin into the stroma.

Can have associated calcifications.
Epithelium may be attenuated or show a spectrum of hyperplasia. Should have maintained myoepithelial layer.
May have associated ADH or DCIS.

Epithelium may become detached and float in mucin, mimicking mucinous carcinoma. Features favoring benign are linear epithelium strips (like lining) and associated myoepithelial cells.

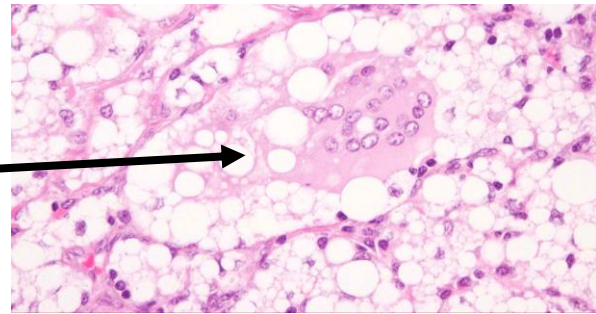
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Reactions to Foreign Material

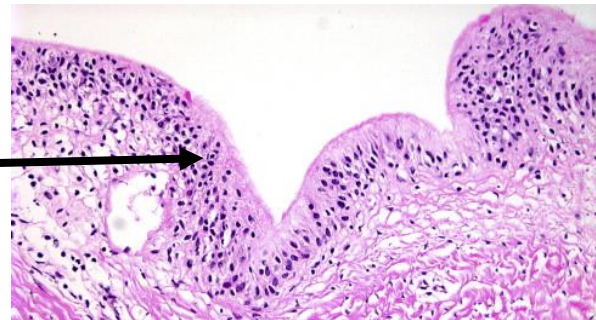
Silicone granuloma:

Silicone leakage can be seen even without frank implant rupture. Oval cystic spaces that appear empty or have amorphous pale material with histiocytes and giant cells. Can be present in capsule or in draining axillary lymph nodes.



Synovial Metaplasia:

Implant capsules can develop a lining essentially identical to synovium



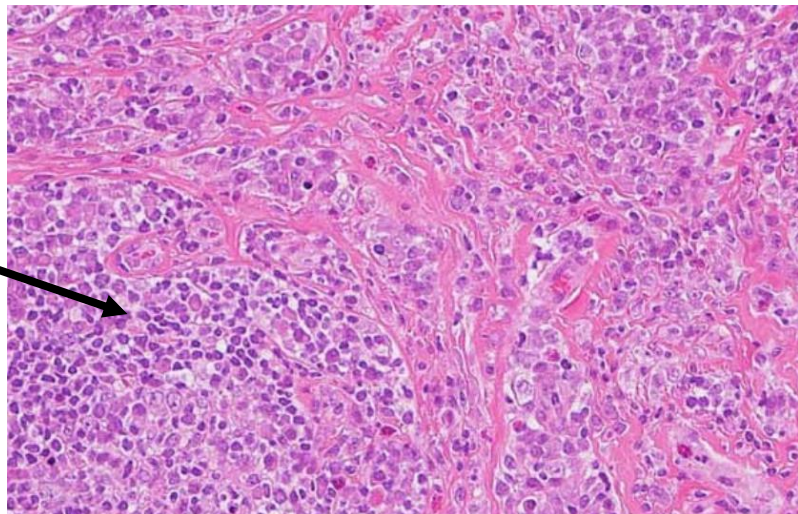
IgG4-related Mastitis

Rare in the breast. Painless mass.
Elevated serum IgG4.

Histologic findings:

- 1- **Dense lymphoplasmacytic infiltrate**
- 2- Storiform fibrosis (seems to be often only very focal in the breast)
- 3- Obliterative thrombophlebitis.

IHC: increased IgG4+ plasma cells with ≥ 10 per HPF



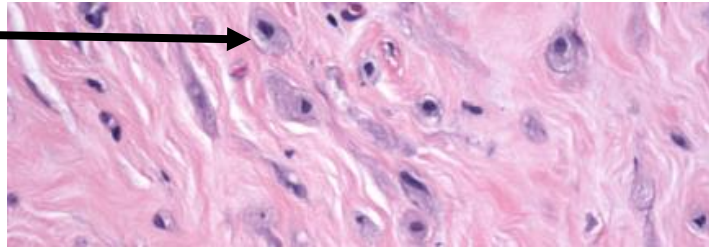
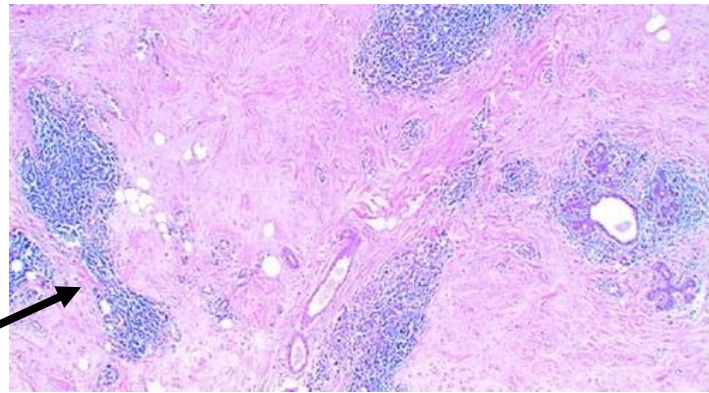
Lymphocytic Mastopathy

aka Diabetic Mastopathy

Typically **young to middle-aged women**, most often with **type 1 diabetes**, but can be seen with other autoimmune disorders, presenting with a mass.

Characteristic findings:

1. Dense, keloid-like fibrosis
2. Periductal, perivascular, and perilobular lymphocytic infiltrates (mostly B cells)
3. Epithelioid myofibroblasts in the stroma



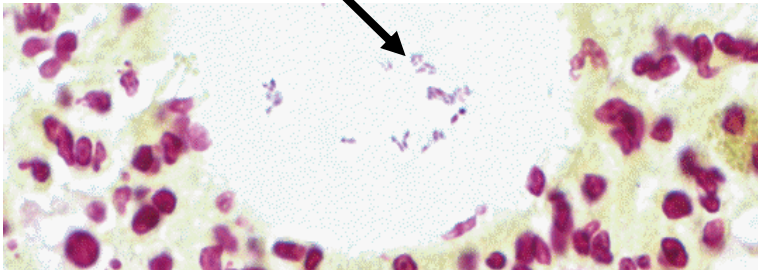
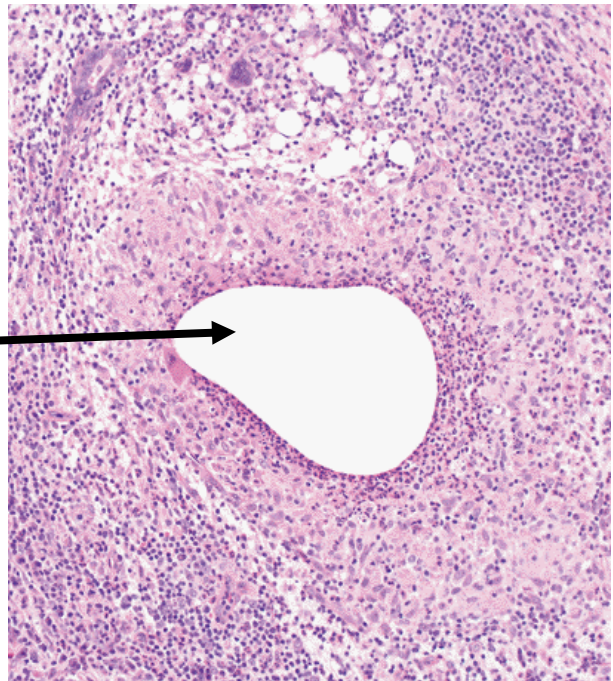
Granulomatous Mastitis

Granulomas can be seen with a variety of conditions including sarcoidosis, prior biopsy, duct ectasia, and infections (e.g., mycobacteria and fungi). **So, one must do bug stains!**

Sometimes it can be idiopathic.

Cystic Neutrophilic Granulomatous Mastitis:

Corynebacterium causes a granulomatous infection with abundant neutrophils and cystic central lipid vacuole



	Clinical info	Etiology/ Association	Pathology
Puerperal Mastitis/Abscess	Due to breast feeding. Tender and red with nipple discharge.	Staphylococcus most common	Typical abscess: acute/mixed inflammation with necrosis, granulation tissue and bacteria (Usually <u>diagnosed clinically!</u>)
Nonpuerperal mastitis/abscess	NOT breast feeding. Rare infections.	TB, fungi, parasites,	Variable, depending on cause.
Cystic Neutrophilic Granulomatous Mastitis	Mass. Nipple/skin retraction	Corynebacterium (see on gram stain in middle of fat vacuole)	Non-necrotizing granulomas. Lobulocentric. Lipid vacuole lined by neutrophils and epithelioid histiocytes.
Squamous Metaplasia of the Lactiferous Duct (SMOLD)	Painful, red, subareolar mass	Smoking	Mixed inflammation, foreign body giant cells, keratinaceous debris, squamous metaplasia in ducts,
Duct Ectasia	Peri/postmenopausal women. May be asymptomatic or nipple discharge with mass	Secretory stasis and wall weakening	Dilated ducts, periductal chronic inflammation, periductal fibrosis, intraluminal and intraepithelial histiocytes,
Fat Necrosis	Often asymptomatic mass. Possible retraction	Trauma	Degenerating adipocytes, foamy histiocytes, foreign body giant cells, chronic inflammation, fibrosis, and calcifications
Lymphocytic Mastitis	Younger. Often palpable masses	Autoimmune disease, usually type 1 diabetes mellitus	Periductal, perilobular, perivascular lymphocytic infiltrates, dense interlobular stromal fibrosis with keloidal features and epithelioid fibroblasts
IgG4-related Mastopathy	Painless mass. About ½ have extramammary disease	Often elevated serum IgG4	Dense lymphoplasmacytic infiltrate, fibrosis with at least focal storiform pattern, obliterative phlebitis, increased IgG4+ plasma cells with ≥10 per HPF

Modified from: [Turashvili and Li. Arch Pathol Lab Med \(2023\) 147 \(10\): 1133–1147.](#)
Article includes some helpful diagnostic algorithms.