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### **What are typical imaging features of an intraductal papilloma?**

Characteristic imaging features of a papilloma include a smooth-walled nodule in a dilated duct with a vascular feeding stalk on color Doppler imaging. Note that for the ABR core exam papillomas, although benign, should be excised as they are considered high-risk lesions.

Central papilloma: more anterior in the breast/closer to the nipple, more likely to be solitary, more likely to present with spontaneous clear or bloody nipple discharge.

Peripheral papilloma: more posterior in the breast/further from nipple, more likely to be multiple, more likely to harbor malignancy, less likely to present with spontaneous clear or bloody nipple discharge.

### **What are typical imaging and clinical manifestations of diabetic mastopathy?**

Diabetic mastopathy usually manifests clinically as a hardening or thickening of both breasts in a patient with long-standing diabetes, historically classic for Type 1 diabetes but, given the higher numbers of Type 2 compared to Type 1 diabetes as well as increasing numbers of patients with Type 2 diabetes, diabetic mastopathy cases may perhaps be seen equally or even more commonly in Type 2 diabetes. However, I hope that a board exam will not ask you which is most common on the ABR core exam because the historical answer to this question has been that Type 1 diabetes is most common, although in reality this may no longer be true. Diabetic mastopathy usually involves both breasts and classically consists of a diffuse fibrotic reaction of the breast tissue with lack of skin involvement.

### **What are several classic breast lesions that can arise in the setting of lactation?**

Galactocele. Galactoceles demonstrate fat-fluid levels on mammography, ultrasound and/or MRI. The layering fluid-fluid levels are key to diagnosis wherein the less dense fatty fluid is seen on top of the denser fluid within the expanded ducts.

Lactating adenoma. A lactating adenoma appears the same as a fibroadenoma with typical features of a circumscribed, hypoechoic, oval solid mass. Lactating adenomas are thought to be most common late in pregnancy or early lactation and is a pathologic diagnosis that can't be made definitively on imaging.

Abscess. Lactation increases the risk of breast abscess. Look for the heterogeneous complicated fluid collection with signs of infection on clinical examination and imaging including robust peripheral vascularity around the heterogeneous fluid collection.

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**Performing a core needle biopsy in the setting of lactation poses what unique risk(s) compared to a procedure in a non-lactating individual?**

The top risk to be aware of for core needle biopsy in the setting of lactation is a milk fistula in which milk can leak from the biopsy incision preventing healing and forming a fistulous tract from which milk leakage can occur. Many will resolve on their own but others may require cessation of breast feeding in that breast in order for the milk production to stop and the fistulous tract to resolve.

**What are some common causes of gynecomastia?**

Common causes of gynecomastia include a relative imbalance of estrogen and testosterone which, in younger age groups is more likely to be elevated estrogen and in older age groups is likely to be low testosterone. Contributing factors include renal and liver failure, many medications, classically several blood pressure and psychiatric medications, and marijuana and heavy alcohol use.

**What are characteristic features of a sebaceous cyst on mammogram and ultrasound?**

A sebaceous cyst is an inflamed hair follicle and most classically will be seen as a hypoechoic intradermal collection with a skin tract extending from the dermal-based collection to the skin surface. On mammography, this should appear as a very superficial lesion and may be inseparable from a skin lesion. On direct inspection one usually sees a superficial bluish to dark punctum on the skin surface with an underlying superficial palpable mass. There may be redness, pain and warmth if inflamed/infected. Treatment is often warm compresses placed on the skin that may open the pores and promote drainage.

**What are characteristic imaging features of granulomatous mastitis?**

This is a trick question as there really are no typical features and this can present similar to a mass or similar to breast infection. Remember that granulomatous mastitis is a non-infectious process and is not an imaging diagnosis but is a clinical and pathologic diagnosis. Granulomatous mastitis can be bilateral and can have draining skin fistulous with drainage of puss despite being non-infectious.

**What is the classic diagnosis for a cord-like palpable mass in the superficial breast that may be red and painful?**

This describes classic features of Mondor disease which is a superficial thrombophlebitis that may be idiopathic or post-traumatic in etiology.

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**How can one distinguish a Phyllodes tumor from a fibroadenoma on imaging?**

One can't tell the difference between a fibroadenoma or Phyllodes tumor on imaging. In general, Phyllodes tumors tend to be larger and demonstrate rapid growth compared to a fibroadenoma but definitive diagnosis is not possible on imaging, is challenging on a core needle biopsy and may ultimately require excisional biopsy for definitive diagnosis. Treatment for board exam purposes is wide surgical excision, even if benign.

**What breast lesion is classic for a "breast within a breast" appearance?**

Hamartoma aka fibroadenolipoma.

**A radial scar presents most classically with what imaging appearance and is classically at risk for harboring what type(s) of malignancy?**

A radial scar classically presents as an area of spiculation with architectural distortion and larger radial scars may be termed a complex sclerosing lesion but these are otherwise the same pathologically. Radial scars often have a lucent center with appearance termed a "dark star" although a radial scar cannot be differentiated from malignancy on mammography alone. Radial scars may harbor coexisting malignancy in a minority of cases, most classically a tubular carcinoma which has a better prognosis compared to most breast malignancies. DCIS can also be associated with a radial scar.