

lesion is cancer is only 10%, but this rises to greater than 25% in women older than 50. **The principal mammographic signs of breast carcinoma are densities and calcifications:**

- **Densities.** Breast lesions that replace adipose tissue with radiodense tissue form mammographic densities. Rounded densities are most commonly benign lesions such as fibroadenomas or cysts (see Fig. 23-27), whereas invasive carcinomas generally form irregular masses (see Fig. 23-22). Mammography can identify small, nonpalpable cancers that are, on average, about half the size of invasive carcinomas detected by palpation (i.e., 1 cm rather than 2 to 3 cm).
- **Calcifications.** Calcifications form on secretions, necrotic debris, or hyalinized stroma. Calcifications are often associated with benign lesions such as clusters of apocrine cysts, hyalinized fibroadenomas, and sclerosing adenosis (see Fig. 23-6). Calcifications associated with malignancy are usually small, irregular, numerous, and clustered. Screening has increased the diagnosis of ductal carcinoma in situ (DCIS), since it is most commonly detected as mammographic calcifications (see Figs. 23-14 and 23-17).

Approximately 10% of invasive carcinomas are not detected by mammography. The principal causes are the presence of surrounding radiodense tissue obscuring the tumor (especially in younger women), small size, a diffuse infiltrative pattern with little or no desmoplastic response, or a location close to the chest wall or in the periphery of the breast. The inability to image a palpable mass does not indicate that it is benign, and all palpable masses require further investigation. Other imaging modalities can be useful adjuncts. For example, ultrasonography distinguishes between solid and cystic lesions and defines more precisely the borders of solid lesions, while magnetic resonance imaging (MRI) detects cancers by the rapid uptake of contrast agents due to increased tumor vascularity and blood flow.

Although the recent downward trend in deaths from breast cancer is partially attributed to earlier diagnosis due to mammography, the beneficial effect of screening has been smaller than originally anticipated for several reasons. Seventy percent to 80% of cancers detected by mammography are already invasive, and many of these have already metastasized. In addition, the cancers most likely to cause death are those least likely to be detected by mammography. These lethal cancers arise in young women of pre-screening age, or are rapidly growing cancers that present during the interval between mammograms. In turn, some cancers detected by mammography are clinically unimportant, as they have such indolent biologies that they would never have caused the patient any harm (a situation reminiscent of many prostate cancers in men, Chapter 21). Although the magnitude is debated, it is estimated that between 10% and 30% of invasive cancers detected by mammography fall into this category.

Inflammatory Disorders

Inflammatory diseases of the breast are rare (accounting for less than 1% of breast symptoms) and are caused

by infections, autoimmune disease, or by foreign body type reactions to extravasated keratin or secretions. “Inflammatory breast cancer” mimics inflammation by obstructing dermal vasculature with tumor emboli, and should always be considered in women with an erythematous swollen breast.

Acute Mastitis

Acute bacterial mastitis typically occurs during the first month of breastfeeding and is caused by a local bacterial infection when the breast is most vulnerable due to cracks and fissures in the nipples. From this portal of entry, *Staphylococcus aureus* or, less commonly, streptococci invade the breast tissue. The breast is erythematous and painful, and fever is often present. At the outset only one duct system or sector of the breast is involved. If not treated the infection may spread to the entire breast. Staphylococcal abscesses may be single or multiple whereas Streptococci cause spreading infection in the form of cellulitis.

Most cases of lactational mastitis are easily treated with appropriate antibiotics and continued expression of milk from the breast. Rarely, surgical drainage is required.

Squamous Metaplasia of Lactiferous Ducts

Squamous metaplasia of lactiferous ducts is known by a variety of names, including recurrent subareolar abscess, periductal mastitis, and Zuska disease. Women, and sometimes men, present with a painful erythematous subareolar mass that clinically appears to be a bacterial abscess. In recurrent cases, a characteristic fistula tract often tunnels under the smooth muscle of the nipple and opens onto the skin at the edge of the areola. Many women have an inverted nipple, most likely as a secondary effect of the underlying inflammation. More than 90% of the afflicted are smokers. It has been suggested that a relative deficiency of vitamin A associated with smoking or toxic substances in tobacco smoke alter the differentiation of the ductal epithelium.

MORPHOLOGY

The key feature is **keratinizing squamous metaplasia** of the nipple ducts (Fig. 23-4). Keratin shed from these cells plugs the ductal system, causing dilation and eventually rupture of the duct. An intense chronic granulomatous inflammatory response develops once keratin spills into the surrounding periductal tissue. With recurrences, a secondary anaerobic bacterial infection may supervene and cause acute inflammation.

Simple incision drains the abscess cavity, but the offending keratinizing epithelium remains and recurrences are common. In most cases, en bloc surgical removal of the involved duct and contiguous fistula tract is curative. If secondary bacterial infection is present, antibiotics also have a therapeutic role.

Duct Ectasia

Duct ectasia presents as a palpable periareolar mass that is often associated with thick, white nipple secretions and occasionally with skin retraction. Pain and erythema are