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Benign breast conditions

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Introduction

Over 90% of patients presenting to a breast clinic have normal breasts or benign breast disease.¹ Knowledge of and an understanding of the benign conditions that can affect the breast, the symptoms they cause and their management will ensure correct treatment and patient satisfaction. Benign breast disease causes considerable morbidity and anxiety, and with increasing patient awareness and expectations, the number of patients with benign conditions attending clinics is increasing.² Accurate diagnosis and effective treatment followed by an adequate explanation of the condition with provision of relevant information is a rewarding part of a breast surgeon's workload.

Benign breast disease can be divided into congenital abnormalities, aberrations of normal breast development and involution (ANDI), and a range of specific benign conditions.

Congenital abnormalities

Developmental abnormalities of the breast can cause considerable concern and are not uncommon reasons for referral to a breast clinic. They are discussed in [Chapter 1](#).

Aberrations of normal breast development and involution (ANDI)

The breast passes through phases related to breast development, cyclical change and involution.

Defining what represents breast disease and what is normal is not a new problem. The ANDI classification³ was developed to provide a framework to help understanding of the pathogenesis and subsequent management of conditions that develop during the specific phases of breast development, cyclical change and involution. Some conditions are so common that they should not be considered as disease but rather as aberrations ([Table 3.1](#)).

Aberrations of breast development

Fibroadenomas

Fibroadenomas arise from the terminal duct lobular unit and are now considered as aberrations of normal breast development. They are not neoplasms or benign tumours because they do not arise from a single cell, but contain a mixture of connective tissue and epithelium ([Fig 3.1a](#)). They are affected by hormones in a similar way to the normal breast, increasing in size during pregnancy. The stromal element of these tumours defines their classification and behaviour. A 'simple' fibroadenoma contains stroma of low cellularity and regular cytology. Phyllodes (leaf-like) tumours may or may not arise from fibroadenomas but contain stroma with increased cellularity and atypia. Benign phyllodes tumours cannot always be differentiated from fibroadenomas on core biopsy with certainty. Fibroadenomas clinically are usually extremely mobile, discrete, rubbery masses that present symptomatically in young women or are an incidental finding during breast imaging in older women. They account for about 13% of all palpable

Table 3.1 • Aberrations of normal breast development and involution

Age (yr)	Normal process	Aberration
<25	Breast development	
	Stromal	Juvenile hypertrophy
25–40	Lobular	Fibroadenoma
	Cyclical activity	Cyclical mastalgia
		Cyclical nodularity (diffuse or focal)
35–55	Involution	
	Lobular	Macrocysts
	Stromal	Sclerosing lesions
	Ductal	Duct ectasia

**Figure 3.1** • (a) Fibroadenoma and (b) juvenile fibroadenoma right breast.

symptomatic breast masses, but in women aged 20 they account for almost 60% of such masses.⁴ They are usually solitary but some women develop multiple fibroadenomas in one or both breasts.

Ultrasound can usually differentiate fibroadenomas from cancers and guidelines suggest that it is acceptable to omit biopsy in a patient under the age of 25 with unequivocal benign clinical and ultrasound findings, but due to experience from clinical and medicolegal practice our upper limit for omitting biopsy is age 23. If biopsy is omitted, follow-up ultrasound should be performed at 6 months. All lesions considered likely to be fibroadenomas clinically and on imaging in women aged 23 and over should be biopsied using a 14-gauge automated core biopsy – multiple passes with at least three samples from the lesion minimises misdiagnosis

rates.⁵ In women presenting with multiple clinical and radiological fibroadenomas, core biopsy should be undertaken of the largest lesions – either one from both breasts or two from the same breast.

✓ Clinical and medicolegal practice suggests it is acceptable to omit biopsy in a patient under the age of 23 with unequivocal benign clinical and ultrasound findings.

✓✓ Natural history: Fibroadenomas were observed for 2 years in women under 40 years of age. The majority did not change in size (55%), some got smaller or resolved (37%) and only a small number increased in size (8%), the majority of which were in women under the age of 20.⁶

Rapid growth of a fibroadenoma is rare but can occur in adolescence (juvenile fibroadenoma) (Fig. 3.1b). The term ‘giant fibroadenoma’ is used when the size exceeds 5 cm and these ‘giant fibroadenomas’ are seen more commonly in women of African origin.⁷ Macroscopically, fibroadenomas are discrete, bosselated, whitish tumours that appear to bulge when cut through. Only rarely does cancer develop within a fibroadenoma but when it does it tends to be non-invasive and lobular in type.⁸

Management

This depends on the patient’s age and preference as well as the results of triple assessment. In patients with lesions under 5 cm, where histology confirms the diagnosis, the patient can be reassured and if they do not wish their lump excised they can be discharged without any follow-up.

Excision is indicated only if the fibroadenoma is symptomatic, for instance if it is large relative to the breast size, it is superficial or it causes significant distortion of the breast. Excision for pain rarely improves this symptom. Excision should be performed through a cosmetically placed incision. Another option is to remove smaller fibroadenomas with a vacuum-assisted large-volume core biopsy.⁹ A large fibroadenoma where histology has shown no suggestion that it could be a phyllodes tumour can be broken up to allow the lesion to be excised through a small incision.

Juvenile fibroadenomas occur in adolescent girls and sometimes undergo rapid growth, and almost always need excision as they can be very large. An inframammary approach gives good results (although tunnelling to distant areas can leave numbness) and in such women removal of skin is rarely required. In some very large lesions, later revisional surgery is required but it is important to wait for up to a year after the initial excision as skin

retracts and the breast reshapes over this period. Recurrence of a fibroadenoma can occur but is rare and may result from initial incomplete excision.

Tubular and lactating adenomas

When a benign lesion consists of glands with very little intervening stroma, this is termed a tubular adenoma. Lactating adenomas are similar to tubular adenomas, but occur during pregnancy or lactation and are often multiple. Tubular adenomas in non-pregnant women are managed in a similar way to fibroadenomas. Mammographically or on ultrasound, punctuate microcalcification within acini may be visible in lactating adenomas. Lactating adenomas can be managed conservatively once a diagnosis has been established. They tend to regress following cessation of breastfeeding.

Macromastia, so-called virginal or juvenile hypertrophy

This is the excessive development of the breasts and tends to occur during puberty (juvenile hypertrophy) or with onset of lactation (gestational). Prepubertal breast enlargement may occur very rarely in conjunction with a hormone-secreting tumour. It results from excessive proliferation of ducts and stromal tissue but no lobule formation. Significant psychological and physical problems can be caused by macromastia and patients with significant breast enlargement benefit from breast reduction. Most centres have an assessment process for such women to determine who benefits most from surgery. This procedure is not without complications and should be performed by an appropriately trained surgeon. Care should be taken with the timing of surgery as further growth may occur after surgery if the breast is still developing or in subsequent pregnancy.

Aberrations in the early reproductive period

Pain and nodularity

Cyclical pain or mastalgia and nodularity are so common that they can be regarded as physiological and not pathological. Severe or prolonged pain is regarded as an aberration of cyclical change. Nodularity is also a common problem during cyclical change and is the most common cause of an apparent breast lump in a woman referred to a breast clinic. Terms such as fibroadenosis, fibrocystic disease and mastitis should no longer be used by clinicians or pathologists for this change. On imaging and on biopsy it is pathologically normal breast tissue. Focal asymmetric nodularity

that persists after menstruation needs full triple assessment as cancer in young women often presents as localised nodularity rather than a discrete mass.

Mastalgia

The aim for clinicians is to differentiate between true mastalgia (pain originating within the breast) and referred pain, most often chest wall pain. Features suggesting that breast pain is referred rather than originating in the breast include pain that:

- is unilateral, and brought on by activity;
- is very lateral or medial in the breast; and
- can be reproduced by pressure on a specific area of the chest wall.

Due to its hormonal aetiology, true breast pain is often worse before and relieved after menstruation. Exacerbating factors include the perimenopausal state (where hormone levels fluctuate) and the use of exogenous hormones (hormone replacement therapy or the oral contraceptive pill). The precise cause of cyclical mastalgia is unknown.

Assessment

Any patient complaining of breast pain should have a complete breast examination including palpation with the woman lying on each side allowing the breast to fall away from the chest wall. In women over 40 years of age, mammography should be performed to exclude an occult malignancy (approximately 5% of women with breast cancer complain of pain,¹⁰ while 2.7% of women presenting with pain as their main symptom are diagnosed with breast cancer¹¹). If a dominant lump or lumpiness is palpable, then this should be investigated. Most breast pain that reaches the breast clinic arises from the chest wall.

Treatment

The mainstay of treating chest wall pain is reassurance that there is no serious underlying cause for the pain.¹²

- ✓ Wearing a soft supporting bra 24 hours a day improves chest wall pain. Non-steroidal anti-inflammatory drugs (NSAIDs), providing that there are no contraindications, are usually effective at controlling chest wall pain. There is some evidence that topical agents cause fewer gastrointestinal problems and are also effective.¹³ If the pain is localised to one specific spot, then infiltrating the tender area in the chest wall with prednisolone 40mg in depot form combined with long-acting local anaesthetic can produce long-lasting pain relief.

For true breast pain a variety of agents have been tried but few are used now in clinical practice.

- ✔✔ • Evening primrose oil (EPO) is not effective and bromocriptine causes significant side-effects.^{14–16}
- Selective serotonin reuptake inhibitors can improve mastalgia as part of premenstrual syndrome.¹⁷
- Phyto-oestrogens (e.g. soya milk)¹⁸ and Agnus castus (a fruit extract) produce some benefits but are not widely used.¹⁹
- Reducing fat intake to less than 15% of dietary calories improves symptoms of cyclical mastalgia but is difficult to maintain.²⁰
- In severe pain the best option is tamoxifen 10 mg daily.²¹ Tamoxifen can be given in the luteal phase of the menstrual cycle and abolished pain in 85% of women in one study.²² Although tamoxifen does not have a product licence for breast pain it is used widely and appears safe.
- Danazol 200 mg daily has been used but tamoxifen 10 mg daily has fewer side-effects.^{23,24}

Breast pain overview

- Breast pain alone or painful lumpiness is common and accounts for approximately 50% of all referrals of new patients to clinics.
- Breast pain is a rare symptom of breast cancer.
- Pain in the breast can arise from the breast or from the underlying chest wall.
- Careful examination can differentiate chest wall pain from true breast pain.
- Few patients with breast pain need treatment with drugs.

Aberations of involution

Palpable breast cysts

Palpable breast cysts are a common reason for presentation to a breast clinic and affect 7% of all women.¹⁰ They constitute 15% of all discrete breast masses. Cysts are distended and involuted lobules and are most common in perimenopausal women. They are less common after the menopause. Some women have multiple bilateral cysts. Most present as smooth discrete breast masses which can be firm.

Imaging

Mammographically, breast cysts have characteristic haloes. Ultrasound is essential to the management of cystic disease because not only does ultrasound distinguish between solid and cystic lesions; it also provides information on the cyst wall and fluid consistency. It is also an adjunct in ensuring accurate differentiation of simple from complex cysts, as well as allowing complete aspiration. A simple cyst has a smooth outline with no internal echoes and posterior enhancement. Complex (or complicated or atypical)

cysts are characterised by internal echoes or thin septations, thickened and/or irregular wall, and absent posterior enhancement. Complex cysts, although rarely malignant, require aspiration or review. If the cyst wall shows any projections, this may indicate the presence of an intracystic papilloma or carcinoma and guided core biopsy of the relevant area is indicated.

Management

Following imaging, simple, asymptomatic cysts should be left alone. Large, symptomatic or complex cysts should be aspirated to dryness. If the fluid is bloodstained it should be sent for cytology; otherwise it should be discarded. If a palpable mass is still present after aspiration, further imaging and biopsy are indicated. If the cyst recurs, then repeat aspiration is performed. Only rapid and persistent refilling requires further investigation to double-check the diagnosis. Although women with cysts have a slightly increased risk of breast cancer, this risk is insufficient to warrant follow-up.²⁵

Sclerotic/fibrotic lesions

Stromal involution can produce areas of fibrosis within the breast supporting tissues. Three different groups of stromal lesions are described: sclerosing adenosis, radial scars and complex sclerosing lesions (CSLs). Sclerosing adenosis can present with a palpable mass. Mammographically, it can be associated with microcalcification. It differs histologically from radial scars and CSLs in the degree of excessive myoepithelial proliferation seen together with fibrosis. Radial scars and CSLs are part of the same process but are differentiated on size (radial scar, ≤ 1 cm; CSL, > 1 cm). They are usually asymptomatic and discovered as part of mammographic screening but can rarely present as a palpable mass.

Radial scars and CSLs are themselves benign but clinically important because of the diagnostic problems they cause during breast screening and association with ductal carcinoma in situ (DCIS) and cancer.^{26,27} Diagnosis is by core biopsy. Excision of radial scars and CSLs is usually required as up to 20% of these lesions are associated with DCIS or low-grade invasive cancers. Excision biopsy can often be performed by vacuum-assisted large-bore core biopsy and spares open surgery in the majority of patients.

✔ **Learning point:** The mammographic appearance of sclerosing lesions mimics that of cancer, causing diagnostic problems during breast screening.

Duct ectasia

The major subareolar ducts dilate and shorten during involution and, by the age of 70, 40% of women have substantial duct dilatation or duct ectasia. Some women with excessive dilatation or

shortening present with nipple discharge, nipple retraction or a palpable mass that may be hard or doughy. The discharge is usually cheesy and the nipple retraction is classically symmetrical and slit-like in contrast to the nipple indrawing and distortion seen in cancer. Bilateral mult duct green discharge is physiological and not related to duct ectasia. Surgery is indicated only if the discharge is troublesome. Surgery with the aim of evert ing the nipple is often unsuccessful in the long term and is not encouraged. Duct ectasia should not be confused with periductal mastitis, which develops in young women, mainly cigarette smokers, and is associated with recurrent subareolar infection.²⁸

Benign neoplasms and proliferations

Epithelial hyperplasia

Epithelial hyperplasia is an increase in the number of cells lining the terminal duct lobular unit. The degree of hyperplasia is graded as mild, moderate or florid (severe). If the hyperplastic cells also show cellular atypia, the condition is called atypical hyperplasia.

✔✔ The absolute risk of breast cancer in a woman with atypical ductal hyperplasia (ADH) who does not have a first-degree relative with breast cancer is of the order of 8% at 10 years; for a woman with a first-degree relative with breast cancer, the risk is 20–25% at 15 years. Studies of chemoprevention with tamoxifen have shown that 5 years of tamoxifen 20 mg per day can decrease the subsequent breast cancer risk of women with atypical ductal hyperplasia by over 80%.²⁹

✔ **Learning point:** Atypical hyperplasia is the only benign breast condition associated with a significantly increased risk of subsequent breast cancer.

Atypical hyperplasia on core needle biopsy

ADH can produce indeterminate intraluminal calcifications that are visible on mammography and these calcifications can be the stimulus to perform a core biopsy to determine their nature.

✔ Approximately 10–20% of ADH cases diagnosed on core needle biopsy of indeterminate calcifications are 'upgraded' to DCIS or invasive carcinoma on subsequent excision.³⁰

For this reason, when ADH is diagnosed, consideration should be given to obtaining more tissue either by large-volume vacuum-assisted core biopsy or by excisional biopsy.

Ductal papillomas

These can be single or multiple. They are common and should be considered as aberrations rather than true benign neoplasms, as they show minimal malignant potential. They are characterised by epithelial fronds that have both the luminal epithelial and myoepithelial layers, supported by a fibrovascular stroma. The epithelial component can range from being completely benign to showing hyperplasia, metaplasia, atypical hyperplasia and in situ carcinoma.

A solitary intraductal papilloma is seen usually in a subareolar duct (within 5 cm of the nipple), and is the most common pathological cause of a bloody nipple discharge. Most common in women aged 30–50 years, they are palpable in one-third of patients. Half of women with papillomas have bloody discharge while the others have a serous discharge.⁷ Microdochectomy or total duct excision in older women establishes the diagnosis and stops the discharge.³¹

Papillomas are common abnormalities detected through breast screening. They are also sometimes visible on ultrasound performed in women with nipple discharge. As core biopsy cannot always differentiate reliably between benign and malignant papillomas, excision is indicated either by a large-volume vacuum-assisted core device (increasingly preferred) or surgery.

Multiple intraductal papilloma syndrome

This consists of five or more clearly separate papillomas within a localised segment of breast tissue, usually in a peripheral location. These tend not to present with nipple discharge but as a palpable lump or are detected at screening. They are only associated with an increased risk of malignancy if they contain areas of atypical hyperplasia. Repeated excision of papillomas in patients with multiple intraductal papillomas can result in significant breast asymmetry. One option in such patients is to excise such lesions with a vacuum-assisted core biopsy device. This provides sufficient material for the pathologist to assess that all excised lesions are benign. If surgery is required, excision of the affected duct system with an oncoplastic procedure to reshape the breast is preferable to mastectomy. Mastectomy should be considered as a last resort for multiple papilloma syndrome.

Juvenile papillomatosis is a rare condition seen in young women <30 years old and usually

presents as a painless, mobile mass (similar to a fibroadenoma).³² Ultrasound findings are characteristic but somewhat non-specific, usually consisting of an ill-defined heterogeneous mass with multiple small cysts most prominent at the periphery of the lesion. Pathologically there is a spectrum of benign proliferative changes that vary in proportion from case to case. Treatment is by complete excision.

- ✓ • In juvenile papillomatosis long-term clinical follow-up is required if there is:
 - a strong family history of breast cancer;
 - atypical change;
 - bilateral lesions;
 - multifocal lesions; or
 - recurrence.

Phyllodes tumours

The aetiology of phyllodes tumours is unknown. They are much less common than fibroadenomas (ratio of presentation 1:40³³). The age of onset is 15–20 years later than fibroadenomas. They can grow rapidly, sometimes producing marked distortion and cutaneous venous engorgement, which occasionally can lead to ulceration. The majority are benign in nature and feel like large fibroadenomas, and are diagnosed following core biopsy or excision. They are rarely fixed to skin or muscle. When cut during removal they are more brownish in colour than fibroadenomas and can have areas of necrosis. Most diagnoses of phyllodes tumour are made before operation, on core biopsy, and the aim of surgery should be to remove benign phyllodes tumours with a clear but not wide microscopic margin. For benign phyllodes tumours re-excision is not recommended if the lesion has been removed intact.

Current classification recognises benign, borderline and malignant phyllodes tumours. Differentiating these can be difficult and involves assessment of the size, ratio of stroma to epithelium, the border of the lesion, stromal cellularity, the number of stromal mitoses, and the presence or absence of necrosis.³⁴

Overall, benign phyllodes tumours recur locally in less than 20% of patients. Most locally recurrent tumours are histologically similar to the original lesions but occasionally benign phyllodes recur as borderline lesions. Malignant phyllodes tumours on average recur earlier than benign lesions. For borderline and malignant lesions a microscopic margin of 1–2 cm is recommended. This may necessitate mastectomy in large lesions (Fig. 3.2). Regional lymph node metastases are seen rarely in malignant phyllodes tumours, with



Figure 3.2 • Ulcerated large borderline phyllodes tumour.

nodes being affected in approximately 5%. Fewer than 5% of all phyllodes tumours metastasise and approximately 25% of those classified as malignant metastasise, depending on the exact criteria used for classification.^{33,35} Metastatic spread, when it occurs, is similar in pattern to that of sarcomas. Treatment of metastatic disease is discouraging, with no sustained remissions reported from radiation, hormonal treatment or chemotherapy.

Lipomas

These soft, lobulated radiolucent lesions are common in the breast. Interest in these lesions lies in their confusion with pseudolipoma, a soft mass that can be felt around a breast cancer and that is caused by indrawing of the surrounding fat by a spiculated carcinoma.

Ultrasound is helpful in establishing whether a lesion is a lipoma. Biopsy or excision is indicated only if there has been rapid growth or if the lipoma is symptomatic.

Granular cell tumours

This is an uncommon, usually benign neoplasm that originates from Schwann cells of peripheral nerve sheath in the breast. About 6% of all granular cell tumours occur in the breast. The mean age at diagnosis is 40 years. Clinically and on imaging they are difficult to differentiate from a breast carcinoma due to their fibrous consistency, fixation to the pectoral fascia and skin retraction. Granular cell tumours are usually benign but malignant lesions have been described.³⁶ Core biopsy can usually establish the diagnosis. Treatment is by local

excision, ensuring a narrow clear margin to prevent recurrence.

Breast infections

Breast infection is less common than it used to be. It is seen occasionally in neonates, but it most commonly affects women aged between 18 and 50; in this age group it can be divided into lactational and non-lactational infection. Infection can affect the skin overlying the breast, when it can be a primary event, or as a result of an infected skin lesion, such as an epidermoid cyst, or to an underlying skin condition, such as hidradenitis suppurativa.

There are four guiding principles in treating breast infection:

- Appropriate antibiotics should be given early to reduce the likelihood of abscess development.
- Hospital referral is indicated if the infection does not settle rapidly within 48 hours of appropriate antibiotic treatment.
- If an abscess is suspected then ultrasonography should be performed to confirm the presence of pus before any attempt to drain the abscess.
- Breast cancer should be excluded in patients with an inflammatory lesion that is solid on ultrasonography or does not settle despite apparently adequate antibiotic treatment.

All abscesses in the breast can be managed by repeated aspiration or by limited incision and drainage if overlying skin is threatened.

✔ Due to the difficulty of predicting the presence of pus within an inflamed breast, ultrasound should be performed in all patients suspected as having a collection.³⁷ For most breast abscesses, open drainage has been superseded by aspiration and irrigation under local anaesthesia.^{38–40}

Few if any breast abscesses require incision and drainage under general anaesthesia.⁴¹

Following ultrasound, if pus is present and the skin overlying the abscess is normal then the surgeon or radiologist can aspirate this, under ultrasound guidance with local anaesthetic (Fig. 3.3). Patients are reviewed every 2–3 days and any further collections are aspirated until no further pus is evident on ultrasound or on aspiration.⁴² If the skin overlying the abscess is thinned or necrotic then following infiltration of local anaesthesia a small stab incision is made directly over the abscess or the dead skin is excised and pus drained. The stab incision should be just large enough to allow the pus to drain (less than 1 cm) to minimise later scarring. The abscess cavity should be lavaged with further local anaesthetic or saline to ensure all the pus in the abscess cavity is drained. Large incisions and packing the abscess cavity should not be performed as there is clear evidence that packing delays wound healing.

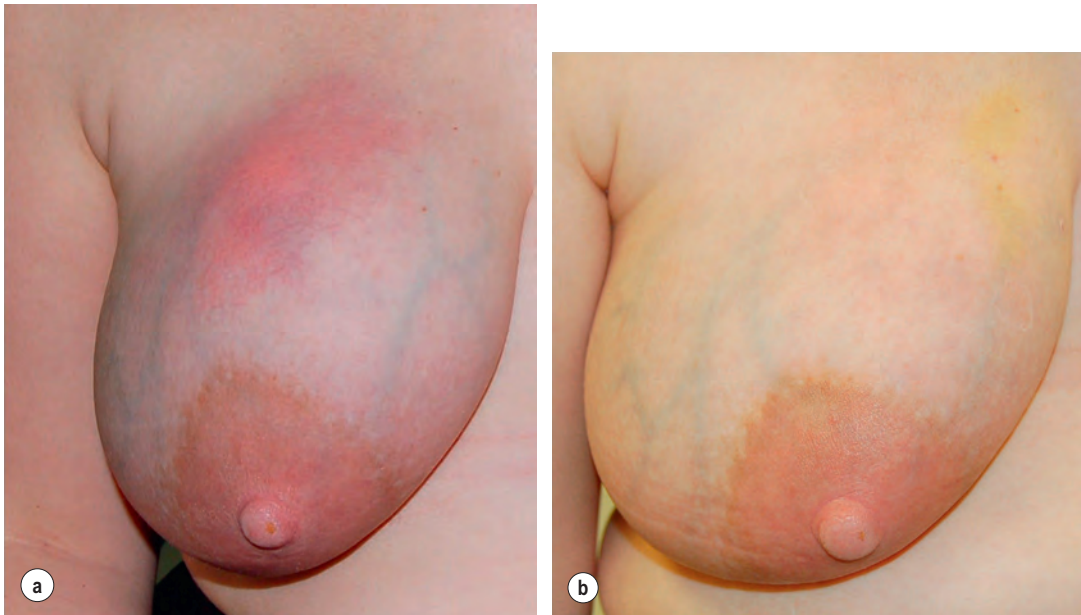


Figure 3.3 • (a) Lactating abscess: skin red but normal at presentation. (b) Lactating abscess following aspiration.

Neonatal infection

Neonatal breast infection is rare but can develop in the first few weeks of life when the breast bud is enlarged. Although *Staphylococcus aureus* is the usual organism, occasionally infection is due to *Escherichia coli*. Abscesses can be drained by a small incision placed as peripherally as possible to avoid damaging the breast bud.

Lactational infection

Lactational mastitis has been estimated to occur in 2–10% of breastfeeding women and is most common during the first 6 weeks after delivery or during weaning as the baby's teeth develop.⁴³ *Staphylococcus aureus* is the most common causative organism and it enters the duct system through the nipple.⁴⁴ There is usually a history of a cracked nipple, which causes local oedema and problems with milk flow. Patients initially present with pain, localised erythema and swelling. If this progresses, the inflammation can affect large areas of the breast and the patient can become septic.

✔✔ Promoting milk flow by continuing to breast feed and the early use of appropriate antibiotics markedly reduces the rate of subsequent abscess formation.⁴⁵

Infections developing within the first few weeks may result from organisms transmitted in hospital and may be resistant to commonly used antibiotics.⁴⁴ Over half of organisms that cause breast infection produce penicillinase.⁴⁶ Flucloxacillin, co-amoxiclav and erythromycin are the antibiotics of preference. Tetracycline, ciprofloxacin and chloramphenicol should not be used to treat infection in breastfeeding women because these drugs enter breast milk and may harm the child. The pain of lactation mastitis is helped by the application of gel packs or cold cabbage leaves to the breast; both are equally efficacious.⁴⁷

✔ *Candida albicans* does not seem to play an important role in infection during breastfeeding and evidence is insufficient to support prescription of antifungals in this setting.⁴⁸

If infection does not settle within 48 hours of starting appropriate antibiotics then hospital referral for breast ultrasound is indicated. If no pus is detected on ultrasonography, and if clinical and imaging assessments indicate that the lesion is infective or inflammatory, then the antibiotic should be changed to cover other possible pathogens, including MRSA.⁴⁴

Women who want to continue breastfeeding should be encouraged to do so. Breastfeeding is often less painful than using a breast pump and is more effective at encouraging milk flow.⁴⁵ There are some women who present with multiple areas of breast infection who are exhausted by breastfeeding in whom consideration should be given to stopping breastfeeding and halting milk flow.⁴⁹

Non-lactational infections

Non-lactational infections are grouped into peripheral or periareolar.

Periareolar infection

Infections in the periareolar region are seen in young women and are often secondary to periductal mastitis (associated with cigarette smoking).⁵⁰ Substances in cigarette smoke may directly or indirectly damage the wall of subareolar ducts.⁵¹ It is likely that the combination of damage due to toxins, microvascular damage by lipid peroxidases, and altered bacterial flora produce the clinical manifestations of periductal mastitis.

Patients with periareolar infection present with periareolar inflammation often associated with a mass or abscess. The organisms causing this infection are usually mixed and include anaerobes.

Treatment

A periareolar inflammatory mass should be treated with a course of appropriate antibiotics that includes anaerobic cover and should be investigated by ultrasonography; any abscess should be managed by aspiration or incision and drainage. If the skin overlying the abscess is necrotic then the dead skin should be excised. If the mass is solid on ultrasonography, or inflammation does not resolve after appropriate treatment, care should be taken to exclude an underlying neoplasm. Abscesses associated with periductal mastitis recur commonly because treatment by aspiration or incision does not remove the underlying diseased duct. Recurrent episodes of periareolar sepsis may be treated by excision of diseased ducts under antibiotic cover by an experienced breast surgeon.⁵² Complications of total duct excision including further episodes of infection and nipple necrosis are common, particularly in those who continue to smoke. Patients should be warned clearly of this and conservative management is increasingly being used.

Mammary duct fistula

A mammary duct fistula is a communication between the skin, usually in the periareolar region, and a major subareolar breast duct. A fistula can develop after incision and drainage of a non-lactating abscess,



Figure 3.4 • Multiple periareolar fistulas.

it can follow spontaneous discharge of a periareolar inflammatory mass, or it can result from biopsy of a periductal inflammatory mass (**Fig. 3.4**).

Treatment

Options include opening the fistula (fistulotomy) or excising of the fistula (fistulectomy) and diseased duct or ducts under antibiotic cover. The best cosmetic result is from fistula excision rather than fistulotomy. Recurrence is common after surgery, with lowest rates of recurrence and best cosmetic results achieved by specialist breast surgeons.^{53,54}

Peripheral breast infection

Peripheral non-lactational breast abscesses are uncommon but three times more frequent in premenopausal women than in menopausal or postmenopausal women. The aetiology of these infections is unclear.⁵⁵ The usual organism responsible is *S. aureus*. Very rarely, an infection is related to underlying comedo necrosis in DCIS. For this reason a mammogram should be performed in women over 35 years of age after resolution of the inflammation.⁵⁶

Granulomatous lobular mastitis

This is a rare condition, characterised by non-caseating granulomas and microabscesses confined to a breast lobule.⁵⁷ Patients present with a firm irregular mass sometimes with breast distortion (which can be indistinguishable from a carcinoma) or multiple or recurrent abscesses⁵⁸ (**Fig. 3.5**). The mass can be extremely tender. Young parous women are most frequently affected and there is no association with smoking. The role of organisms in the aetiology of this condition is unclear but one study did isolate corynebacteria from nine of 12 women with granulomatous lobular mastitis.^{59,60} These organisms are, however, sensitive to penicillin and tetracycline, and treatment with these antibiotics does not produce resolution of granulomatous

lobular mastitis so it is unlikely that these organisms have a major role. In patients diagnosed as having granulomatous lobular mastitis on core biopsy, excision of the mass should be avoided, as it is often followed by persistent wound discharge and failure of the wound to heal.⁶¹ Steroids and other immunosuppressive agents have been used but with varying reports of their efficacy.^{62–64}

✔ There is no convincing evidence that steroids alter the course of this condition. They do improve symptoms but the condition worsens when the dose is reduced and steroids are not without morbidity.

Reports of the benefit of injecting depot steroid are emerging. As this condition resolves spontaneously over a period of 6–18 months the authors no longer use or support the use of steroids in this condition. Treatment is supportive and is aimed at treating associated infection and abscesses.

✔ Large incisions to drain pus and packing of any abscesses should be avoided.

Skin-associated infection

Primary infection of the skin of the breast can present as cellulitis or an abscess and most commonly affects the skin of the lower half of the breast. Skin infection is often recurrent in women who are overweight and have large breasts. As radiotherapy interferes with both the blood and lymphatic flow of the breast it increases the likelihood of skin-associated infection and cellulitis in the breast or chest wall.^{65–67} When inflammation occurs after radiation, care should be taken to distinguish infection from lymphoedema. Cellulitis is also more common in people with skin conditions such as eczema. Cellulitis in the male breast is uncommon, but is seen in the neonatal and pubertal periods. Women with recurrent infections and areas of intertrigo should be advised about weight reduction and keeping the area as clean and dry as possible (this includes careful washing of the area up to twice a day, using a hair dryer to dry the skin, avoiding skin creams and talcum powder, and wearing either a cotton bra or a cotton T shirt or vest worn inside the bra) (**Fig. 3.6**).

✔✔ Antifungal agents should *not* be prescribed for intertrigo as there is no evidence that they are effective or that fungi play an important role in this condition.^{68,69}

✔ **Learning point:** The evidence that fungi play any role in breast infection is poor. *S. aureus* is the usual causative organism of skin infection of the breast.



Figure 3.5 • (a) Granulomatous lobular mastitis which presented with a mass, distortion and central abscess visible on ultrasound. (b) Granulomatous lobular mastitis at presentation with overlying skin ulceration characteristic of this condition. (c) Patient in Fig. 3.5(b) with granulomatous lobular mastitis after resolution.

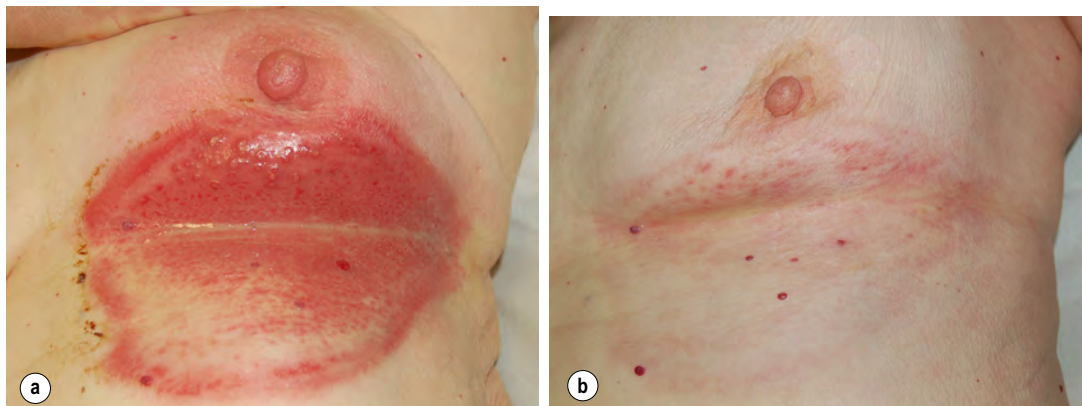


Figure 3.6 • Intertrigo before (a) and after (b) conservative management.

Epidermoid cysts, commonly but erroneously called sebaceous cysts, are common in the skin of the breast and may become infected.

Some recurrent infections in the inframammary fold are due to hidradenitis suppurativa, another smoking-related condition.^{70,71} Infection should be controlled with appropriate antibiotics and drainage of any pus (the same organisms are found in hidradenitis as in non-lactating infection). Patients should be encouraged to stop smoking. Excision of the affected skin is only effective at stopping further infection in about half of patients; the remainder go on to have further episodes of infection despite surgery.

Post-surgical infection

✔✔ Infections can present in the acute post-surgical period or after the wound has healed. Studies have now shown a small but consistent benefit from a single perioperative dose of a broad-spectrum antibiotic such as co-amoxiclav.⁷²

The most common organisms causing early infection include normal skin flora and *S. aureus*.⁷³ Most surgeons give antibiotics routinely to patients having implants inserted. Patients having surgery for periductal mastitis are at increased risk of postoperative infection and all these patients should have perioperative antibiotics that cover the range of organisms isolated from this condition. ‘Seromas’ can become infected following aspiration or as a result of reduced resistance to infection during chemotherapy.

Redness and oedema of the breast following breast-conserving surgery are not uncommon (especially after radiotherapy). This usually occurs between 3 and 12 months following surgery. This is unresponsive to antibiotics and has an incidence of 3–5% in patients following radiotherapy for breast-conserving surgery.⁶⁷ It appears to be related to obstructed lymphatic flow and responds to manual lymphatic drainage.

Infection associated with breast implants

If an implant becomes infected, intensive antibiotic therapy ± implant removal washout and implant replacement is occasionally effective⁷⁴ but usually the prosthesis has to be removed. Implants can become infected after a minor surgical intervention (such as dental work) or during chemotherapy given as adjuvant therapy or as treatment for metastatic disease. Prophylactic antibiotics should be considered for patients with implants undergoing major dental work.

Other infections and inflammatory conditions

Tuberculosis of the breast is now rare. It can be primary or, more commonly, secondary. Clues to its diagnosis include the presence of a breast or axillary sinus in up to half of patients. Tuberculous cavities can become infected by an acute pyogenic organism such as *S. aureus*. Some patients present with enlarged axillary nodes. A history of tuberculosis (TB) exposure and foreign travel is usually evident. A tissue biopsy sent for histology and TB culture helps establish the diagnosis. Treatment is by a combination of surgery and antituberculous chemotherapy.

Syphilis, actinomycosis and mycotic, helminthic and viral infections of the breast and nipple do occur.

Nipple rings can cause problems with recurrent infection, particularly in smokers.⁷⁵ Rarely, excision of the nipple–areolar complex is required to control the infection.

Pilonidal abscesses affecting the nipple have been reported in hairdressers and sheep shearers.^{76–78} Spontaneous infarction of part of the breast, also known as primary gangrene of the breast, does occur. This can become infected and is most commonly seen in diabetics and patients with other medical problems, such as renal failure.⁴¹ Excision of dead and infected tissue back to bleeding healthy breast can allow primary wound closure.

Other benign conditions seen in the breast

Hamartoma

Hamartomas are common benign breast lesions composed of variable amounts of adipose, glandular and fibrous tissues.⁷⁹ They are usually asymptomatic but may be palpable and feel like soft fibroadenomas. Most occur in women over 35. Mammographically, they usually have a classical appearance (circumscribed area consisting of both soft tissue and fatty elements, surrounded by a thin radiolucent zone). They differ subtly on ultrasound from fibroadenomas. It is important when performing a core biopsy of a possible hamartoma to inform the pathologist of this as otherwise they are often reported as normal breast tissue on core biopsy. They require no treatment once a diagnosis is established and rarely need excision.

Nipple adenoma

Nipple adenomas present as a non-discrete, palpable growth of the papilla of the nipple (see [Fig. 3.7](#)) and are seen most commonly in women of between 40



Figure 3.7 • Nipple adenomas.

and 50 years of age. Alternative names for nipple adenomas include erosive adenomatosis, papillary adenoma, florid papillomatosis of nipple and subareolar duct papillomatosis. Clinically, nipple adenomas can present as a mass within the nipple, nipple discolouration, contour change, nipple erosion or a papillomatous-type lesion evident clinically coming out of the nipple.⁸⁰ A characteristic symptom is bloody discharge from the surface of the nipple; this needs to be distinguished from true nipple discharge from ducts underneath the nipple. It is often misdiagnosed clinically as Paget's disease. Core biopsy through the lesion or punch biopsy will establish the diagnosis. They are benign in nature and definitive treatment is complete excision. It is usually possible to excise the lesion but leave a large part of the nipple intact. If excision is incomplete then observation to see if the lesion recurs is a reasonable option.

Bloody nipple discharge in pregnancy

Bilateral bloody nipple is seen not uncommonly during pregnancy or lactation. The likely cause

is hypervascularity of developing breast tissue. It usually resolves spontaneously in which case no further investigation is required.⁸¹

Eczema of the nipple

Eczema affects the areola first in most women in contrast to Paget's disease that always involves the nipple (**Fig. 3.8**). Punch biopsy may be required to differentiate the two. Treatment involves removing an allergen by using simple soap and washing underwear in hypoallergenic washing agents. Short courses of more potent steroid creams are more effective than longer courses of dilute steroid cream.

Raynaud's disease of the nipple

Nipple vasospasm can cause the nipple to turn white followed later by a noticeable triphasic colour change – from white to blue to red – as blood flow returns. Vasospasm due to Raynaud's is more likely to be bilateral, can last for relatively long periods of time (rather than for a few seconds or a few

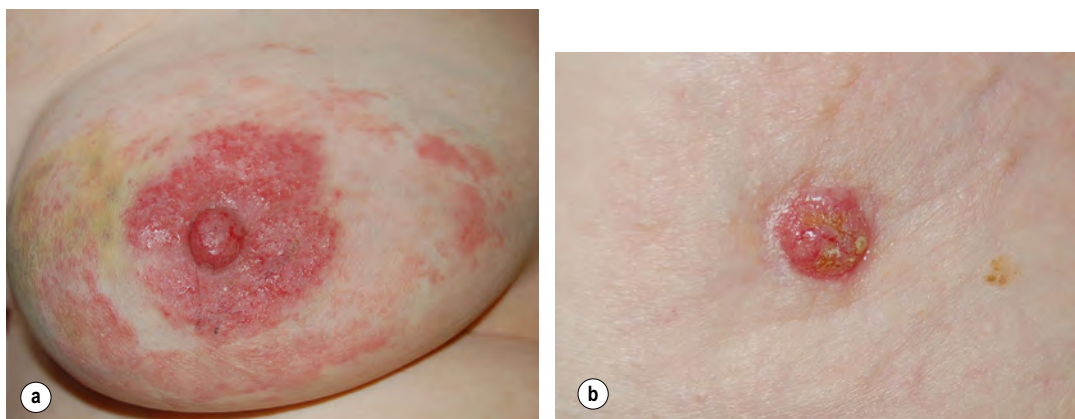


Figure 3.8 • Eczema (**a**) compared with Paget's disease of the nipple (**b**).

minutes), and can occur during pregnancy and breastfeeding.⁸² Patients usually have Raynaud's elsewhere. It can cause localised pain particularly when breastfeeding. Treatment involves avoiding cold and keeping the nipple warm. Low-dose nifedipine can be effective in symptomatic women.

Jogger's nipple

This results from recurrent trauma during regular exercise and is prevented by the application of white petroleum jelly prior to exercise. Jogger's nipple can be very sore and bleeding can be profuse, but it resolves after rest.

Pseudoangiomatous stromal hyperplasia of the breast (PASH)

PASH is a benign myofibroblastic proliferation of non-specialised mammary stroma.⁸³ It is frequently an incidental microscopic finding in breast biopsies performed for benign or malignant disease. It has been reported to form breast masses but whether PASH is the true cause of such masses or it is an epiphenomenon associated with other pathological processes is a matter of debate. For instance, extensive PASH is seen commonly within a juvenile fibroadenoma. The pathogenesis is unknown and assuming that a diagnosis of PASH on a core biopsy explains the cause of any localised mass is unwise.

Fibromatosis

Fibromatosis or *desmoid tumour* of the breast is an infiltrative fibroblastic and myofibroblastic proliferation with significant risk for local recurrence, but no metastatic potential.⁸⁴ Fibromatosis is uncommon in the breast and accounts for less than 0.2% of all primary breast lesions. It may be indistinguishable from malignancy on clinical examination, ultrasound and mammography. The diagnosis is established by core biopsy. Fibromatosis is a spectrum of conditions from extremely indolent areas principally of fibrosis to more proliferative infiltrative lesions. Once a diagnosis is established (this may involve sending the biopsy for an expert opinion), then the initial treatment is observation only. If the lesion increases in size and becomes symptomatic, particularly if it infiltrates the chest wall and encases the intercostal nerves, when it can cause marked discomfort and pain, then surgical excision should be considered. If the lesion recurs after excision and becomes symptomatic then surgery should aim to remove all the disease with a clear margin. In the more proliferative, infiltrative or recurrent lesions there is little evidence of a benefit of chemotherapy or radiotherapy. Tamoxifen has been reported to

be of benefit; although these lesions are oestrogen receptor (ER)-alpha-negative, reports suggest they are ER-beta-rich. There is an association between fibromatosis and mutations in the APC gene. Patients with fibromatosis should have a careful family history taken and consideration given to genetics referral and possibly also colonoscopy screening.

Montgomery's gland problems

Throughout the areola are blind-ending glands that produce fluid to lubricate the areola during breastfeeding. These glands can become blocked, forming hard nodules within the areola. Occasionally these can become infected. Unless symptomatic, the management of prominent Montgomery's glands is reassurance.

Fat necrosis

Following trauma to the breast or following surgery including reduction mammoplasty or lipofilling, fat necrosis can occur. It is not an uncommon finding following breast reconstructions using lower abdominal flaps. Fat necrosis can produce a mass that can feel similar to a breast carcinoma. Patients usually give a history of direct trauma (or surgery) to the affected breast and examination may reveal bruising. Even with a history of trauma or prior surgery it is important to assess areas of abnormality with imaging and not dismiss any mass, dimpling and bruising as fat necrosis. Severe fat necrosis can follow a seat-belt injury and such patients often have a significant defect in the breast with distortion at the site where the seat-belt has disrupted the breast fat.

On mammography a radiolucent well-defined cyst is a pathognomonic feature of early fat necrosis with benign lucent-centred calcification being a characteristic feature of late-stage fat necrosis. Hyperechogenicity in the subcutaneous tissue is the most common ultrasound feature. An echogenic band within an oil cyst that shifts in orientation with changes in patient position is a specific sonographic feature of fat necrosis.

Core biopsy is usually required. Once a diagnosis is established, no treatment is required unless it is causing symptoms. Significant distortion may be treated by lipomodelling.

Diabetic mastopathy

This is a form of sclerosis occurring in premenopausal women, and occasionally men, with long-standing type I diabetes, often associated with other diabetic

complications, particularly retinopathy. It can result clinically in one or more hard masses within the breast that are indistinguishable clinically from malignancy, but on histology the findings are of sclerosis or 'diabetic mastopathy'. The disease probably represents an immune reaction to the abnormal accumulation of altered extracellular matrix in the breast, which is a manifestation of the effects of hyperglycaemia on connective tissue. It does not seem to predispose to breast carcinoma or lymphoma.⁸⁵

Sclerosing lymphocytic lobulitis

Often confused with diabetic mastopathy, it is a condition of unknown aetiology that is diagnosed only on biopsy of a breast lump said to be associated with a range of autoimmune conditions such as Hashimoto's thyroiditis but none of the patients we have seen with this condition has had such associated conditions. All have settled spontaneously.

Haematomas

These most commonly follow trauma such as a road traffic incident or surgery (**Fig. 3.9**), but can occur after core biopsy or fine-needle aspiration. In extremely unusual circumstances a breast carcinoma may present with a haematoma. Breast haematoma



Figure 3.9 • Haematoma of the breast following trauma.

can also occur spontaneously in patients on anticoagulant therapy. Management is supportive.

Para-areola cysts

These cysts are rare and occur in pubertal and postpubertal teenagers (11–16 years), and manifest as discrete superficial cystic masses at the areola margin; occasionally they become infected. They can be interpreted as solid on ultrasonography because of numerous internal echoes, but contain fluid. Diagnosis and treatment is by aspiration, although if the cysts cause no symptoms and ultrasonography shows a cystic lesion, then no intervention is required as they resolve spontaneously.

Mondor's disease

Thrombosis of superficial veins in the skin of the breast is known as Mondor's disease.⁸⁶ Mondor's disease most commonly involves one or more of three venous channels: the thoracoepigastric vein, the lateral thoracic vein and the superior epigastric vein. Most often seen after surgery or trauma, it can occur spontaneously, particularly in patients with an underlying clotting abnormality such as factor V Leiden. It is a self-limiting condition that normally resolves within a couple of weeks but can be very painful. Non-steroidal anti-inflammatory agents massaged over the area of tenderness help the pain.

Morphoea

This is a localised scleroderma of the breast skin and results in a thickened white distorted area of skin.⁸⁷ When severe, it can result in distortion of the breast contour. It is seen most frequently in women who have had radiotherapy after breast-conserving surgery for breast cancer but can occur spontaneously.⁸⁸ Treatment is symptomatic and local chemotherapeutic creams can be effective in resolution and in reducing the local pain that can be caused by such lesions.

Arteritis and aneurysm

Patients with generalised vascular disease can develop localised vasculitis involving vessels in the breast and this can produce a localised mass. Aneurysmal dilatation of arteries in the breast has been described and can also present clinically as a discrete mass with an audible bruit on auscultation.

Sarcoidosis

Patients with sarcoidosis can present with single or multiple masses within the breast. A breast mass can occur either as the first presentation or in a patient with sarcoidosis elsewhere.⁸⁹

Diagnosis is confirmed by core biopsy or excision.

Keloids of the breast skin

These can be seen on the breast and if troublesome are treated by steroid creams or application of liquid nitrogen or silicone tape dressings.

Factitial disease

Artefactual or factitial diseases are diseases caused by the patient, often through complicated or repetitive actions.⁷ Such patients may undergo many investigations and operations before the nature of the disease is recognised. The diagnosis is difficult to establish, but should be considered when the clinical situation does not conform to common appearances or pathological processes. There is often a history of multiple visits to both general practitioner and hospital with various symptoms. Psychiatric referral may help in establishing the diagnosis.

Nipple discharge

Nipple discharge accounts for 5% of referrals to a breast clinic,⁹⁰ with up to 20% of these caused by in situ or malignant disease.⁹¹ The important features to assess are whether the discharge is from a single or multiple ducts, is coloured or bloodstained, is induced or spontaneous, and is affecting one or both breasts. The frequency, colour and consistency of the discharge should be noted. Blood-coloured

discharge or discharge that contains significant amounts of blood on testing has been reported by some, but not all authors, to be more likely to arise from a cancer than coloured discharge that contains no blood on testing.³¹ The sensitivity and specificity of blood in the discharge is, however, not high. Persistent discharge (≥ 2 per week) is also more likely to be associated with a significant causative lesion (such as a papilloma or cancer). The aim is to differentiate between physiological causes and ductal pathology. Discharge can be elicited by squeezing around the nipple in 20% of women⁹² and is often noted following mammography. If discharge is associated with a lump, then management is directed to the diagnosis of the lump.

Galactorrhoea should be diagnosed only if the discharge is bilateral, copious, pale milky in colour and from multiple ducts. Some women continue to produce milk for many months after they have stopped breastfeeding but galactorrhoea usually develops long after cessation of breastfeeding. Prolactin levels should be checked and, if raised (>1000 mIU/L), the cause can be secondary to medication or a pituitary tumour. If the serum prolactin is normal, then reassurance and a full explanation of the aetiology are often all that is required. If there are persistent symptoms, the ducts underneath the nipple can be ligated.

Coloured opalescent discharge, from multiple ducts, is common (**Fig. 3.10a**). It is usually physiological discharge. In older women, thick yellow discharge can result from duct ectasia. Serosanguineous and/or bloody discharge from a single duct is more likely to be associated with papillomas, epithelial hyperplasia, ductal carcinoma in situ (DCIS) or an invasive carcinoma (**Fig. 3.10b**). Only rarely does an invasive cancer cause nipple discharge in the absence of a clinical mass. In most series, ductal carcinoma in situ (DCIS) is responsible for substantially less than 20% of unilateral single-duct nipple discharge.⁹²

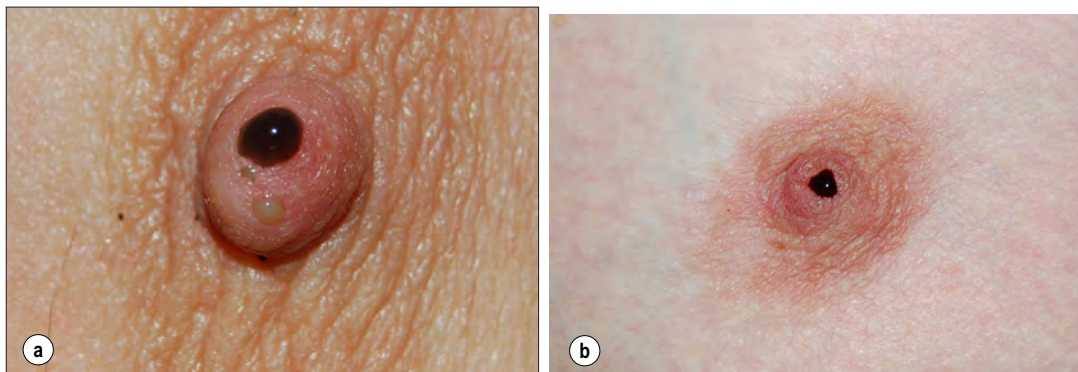


Figure 3.10 • Multiduct discharge (**a**). Note the range of colours characteristic of physiological discharge, compared with (**b**) bloody nipple discharge.

The diagnosis is often made only following surgical excision of the affected duct.

Investigation

Assessment includes a careful breast examination to identify the presence or absence of a breast mass. Firm pressure applied around the areola can help to identify the site of any dilated duct (pressure over a dilated duct will produce the discharge); this is helpful in defining where an incision should be made for any subsequent surgery. The nipple is squeezed with firm digital pressure and if fluid is expressed, the site and character of the discharge are recorded. Testing of the discharge for blood is of limited value, although bloodstained discharge is more likely to be associated with malignancy. Fewer than 20% of patients who have a bloodstained discharge or who have a discharge containing moderate or large amounts of blood have an underlying malignancy. Age is said to be an important predictor of malignancy; in one series, 3% of patients younger than 40, 10% of patients between ages 40 and 60, and 32% of patients older than 60 years who presented with nipple discharge as their only symptom were found to have cancers.⁹³ The absence of blood in nipple discharge is not an absolute indication that the discharge is unrelated to an underlying malignancy, as demonstrated in a series of 108 patients where the sensitivity of haemocult testing was only 50%. Nipple discharge cytology is of little use due to its poor sensitivity.^{94,95}

A number of techniques have evolved to determine the aetiology and avoid unnecessary surgery. Ductoscopy, using a microendoscope passed into the offending duct, allows direct visualisation. There are encouraging reports of its use, especially in directing duct excision at surgery⁹⁶ and detecting deeper lesions that may be missed by blind central excision.⁹⁷ Ductal lavage is a technique in which the duct is cannulated, irrigated with saline and the subsequent discharge examined cytologically. This technique increases cell yield by 100 times that of simple discharge cytology.⁹⁸ Ductography (imaging of the ductal system) can identify intraductal lesions. Although this investigation has only a 60% sensitivity for malignancy, a filling defect or duct cut-off has a high positive predictive value for the presence of either a papilloma or a carcinoma.^{92,99} Ductography, however, is a painful procedure and is not widely practised.

At present, the major role of ductoscopy is as an adjunct to surgery; by using simple transillumination of the skin overlying the lesion during ductoscopy, limited duct excision is possible. The role of ductal lavage has been questioned due to large variations in its sensitivity

and specificity.^{100,101} During ductoscopy, visualised lesions can be biopsied and in one report 38 of 46 women with biopsy-proven papillomas were observed for 2 years with no reported missed cancers.⁹⁷ The role of ductoscopy in the assessment of nipple discharge is set to increase as the quality of equipment improves and it becomes more widely available. A benefit of both ductography and ductoscopy is that they allow identification of the site of any lesion in younger women, allowing localisation and excision of the causative lesion while retaining the ability to lactate. A mammogram should be performed as part of the assessment of patients over 40 years of age with a discharge. The sensitivity in this group of patients is low, at 57%.⁹⁴ Digital mammography has been shown to have a greater sensitivity rate than film mammography in women under 50 or with dense breasts.¹⁰² Ultrasound can sometimes identify papillomas and malignant lesions in the ducts close to the nipple.¹⁰³ Papillomas visualised on ultrasound can then be biopsied or removed using a vacuum-assisted core biopsy device.¹⁰⁴

If no abnormality is found on clinical or mammographic examination, patients are managed according to whether the discharge is from a single duct or multiple ducts. Any patient with spontaneous single-duct discharge should undergo surgery to determine the cause of the discharge if it is:

- bloodstained or contains moderate to large amounts of blood on testing;
- persistent (at least twice per week);
- associated with a mass;
- a new serosanguineous discharge in a postmenopausal woman.

Operations commonly performed in benign breast conditions

Microdochectomy

A single duct in a woman presenting with a single duct discharge can be removed by microdochectomy. This operation is performed through either a radial incision or preferably a circumareolar incision. Expression of the discharge should be performed to identify the offending duct. The discharging duct can be cannulated and either a lacrimal probe placed or methylene blue injected before an incision made. The probe aids identification of the relevant duct and dissection of this from surrounding ducts/breast tissue. A length of at least 2–3 cm should be removed. The excised duct should be opened to ensure a cause for the discharge

is present and the distal remnant inspected to ensure that the entire dilated duct has been excised. If the residual duct is dilated, then it should be split, opened and inspected. Microdochectomy should not damage ducts surrounding normal ducts and allows subsequent breastfeeding. If performing a duct excision directed by ductoscopy, then having identified an abnormality in the duct, the light is used to direct the surgical excision. Once the excision has been performed, the nipple should be squeezed gently to ensure that the discharging duct has been excised.

Total duct excision or division

In women of non-childbearing age, total duct excision is an option for a single-duct discharge. Current evidence suggests that total duct excision is more likely to result in a specific diagnosis and less likely to miss underlying malignancy than microdochectomy.¹⁰⁵ Total duct excision can also be used for multiple-duct discharge if the discharge is copious and affecting quality of life, and may be performed for periductal mastitis. The operation involves dividing all the ducts from the underside of the nipple and removing surrounding breast tissue to a depth of 2 cm behind the nipple–areola complex¹⁰⁶ (Fig. 3.11). A circumareolar incision is used. Patients should be warned that there is a small risk of nipple tip necrosis (<1%), reduced sensation (40%) and

nipple inversion associated with this operation. Patients undergoing surgery for periductal mastitis require total removal of all ducts from behind the nipple; leaving even small remnants of ducts predisposes to recurrence. Because the lesions of periductal mastitis usually contain organisms, patients should receive appropriate perioperative antibiotic treatment. Options include amoxicillin–clavulanate or a combination of erythromycin and metronidazole.

For patients having cosmetic nipple eversion, the procedure can be performed through a small stab incision within the areola and the ducts divided, ensuring that the nipple everts naturally without the need for sutures. Recurrence is frequent.

Common complications of cosmetic breast surgery

Cosmetic surgical procedures to the breast are increasing in popularity. The frequency of patients presenting with symptoms either as a consequence of previous operations or with an unrelated problem in a patient who has undergone cosmetic surgery means that an understanding of such procedures and their complications is necessary. It is recommended that if there are complications from recent surgery the operating surgeon sees these patients.¹⁰⁷ However, it is not uncommon for these patients to be referred to a breast clinic.

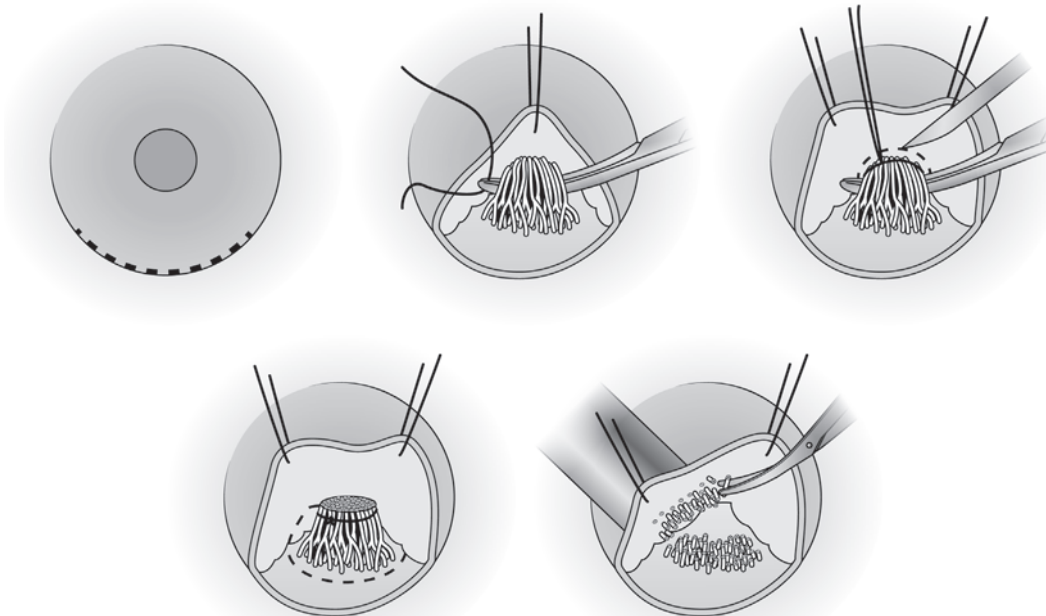


Figure 3.11 • Total duct excision.

Assessment involves a detailed history of the original procedure as well as standard triple assessment. In the augmented patient it is useful to know the type of implant used (particularly with the recent knowledge that some implants have a high rate of leakage and rupture) as well as the size, shape, composition and its position (subpectoral or submammary). The time since surgery and any postoperative surgical complications (e.g. haematoma) should also be recorded. Examination will show if a breast reduction or mastopexy (breast lift) has been performed. In the patient who has undergone a reduction mammoplasty it is useful to know the approximate volume reduction, the technique used and whether there were wound healing problems.

Imaging of breasts post-cosmetic surgery can pose technical challenges.¹⁰⁸ Scarring and calcification from fat necrosis is seen commonly after breast reduction and can make mammographic interpretation difficult, although there are characteristic changes that can be predicted.¹⁰⁹ Assessment of the augmented breast should include mammography (using the Eklund technique¹¹⁰) and ultrasound. Implant integrity and whether there is rupture or leak can be assessed by ultrasound but magnetic resonance imaging (MRI) is the technique of choice if implant rupture is suspected.¹¹¹ Due to the risk of implant damage, any needle biopsy of an augmented breast should be performed under image guidance.

Breast augmentation complications

Capsular contraction

Any foreign tissue placed within a body will produce a reaction or scar. Scarring around an implant produces a capsule, which contracts over time. Due to the relative inertness of silicone and the textured surface of modern implants, capsular contracture causing symptoms or significant distortion is less common than it used to be. It can be exacerbated by postoperative complications such as haematoma or by subclinical infection. Capsular contraction tends to produce pain, change in shape and hardness of the breast. A grading system for capsular contraction is shown in Box 3.1.¹¹² Treatment depends on severity of symptoms and patient wishes. Removal of the implant plus capsulotomy or capsulectomy is the standard treatment with or without re-augmentation. Lipofilling is being used increasingly in capsular contracture either alone or combined with implant exchange.

Rippling/palpable implant edge

Due to the pressure effect of the implant on breast tissue, some degree of glandular atrophy is common in augmented breasts. This can make the

Box 3.1 • Classification of capsular contraction

Grade I (absent)

The breast is soft with no palpable capsule and looks natural.

Grade II (minimal)

The breast is slightly firm, with a palpable capsule but looks normal.

Grade III (moderate)

The breast is firm with an easily palpable capsule and looks abnormal.

Grade IV (severe)

The breast is hard, cold, painful and distorted.

underlying implant more easily palpable, especially in slim women. Round, non-cohesive implants, due to their softness and fluid nature, often have 'rippling'. This is commonly felt superiorly if the implants are placed under the breast in a slim patient or if there is marked ptosis. Rippling and sometimes the implant edge can be felt on the medial or lateral edges of the breast if there is a large implant or a paucity of glandular tissue cover. Treatment is reassurance and an explanation of the cause. Lipofilling over the rippling, changing the implant type or placing the implant in the submuscular plane are options if treatment is required.^{113, 114}

Implant rupture

Rupture is most commonly due to implant failure over time but may be caused by trauma or iatrogenic injury. Modern silicone breast implants contain cohesive gel, which tend to have much lower rates of rupture than seen with liquid silicone implants.¹¹⁵⁻¹¹⁷

Women with rupture can be asymptomatic or present with pain, change in breast shape or a lump. Once identified, treatment is removal of implant plus capsule. Implant capsules can calcify and it is important when removing implants that have been in place for some time that the whole of the capsule is excised as any remaining capsule can form a hard mass or act as a focus for recurrent seromas.

Silicone can leak into the breast and chest wall and cause a reaction producing hard lumps (silicone granulomas). These can be very difficult to excise. Silicone can also migrate to axillary nodes, which can become quite large. These nodes have a typical snowstorm appearance on ultrasound.¹¹⁸ Care should be taken in removing such nodes. They are the sentinel nodes of the breast and aggressive removal of nodes containing silicone can cause both breast and arm oedema. Therefore, these nodes should only be removed if there is definite evidence that they are causing symptoms.

Breast reduction problems

Fat necrosis

Scarring and fat necrosis can result from devascularisation of fatty breast tissue following wound healing problems, particularly in smokers. This may not be noticed until some time has passed after surgery. Triple assessment will rule out any malignancy and allow for reassurance.

Inclusion cyst

An inclusion cyst can occur due to implantation of keratinising squamous epithelium within the dermis if an area of incompletely de-epithelialised skin (usually the pedicle for the nipple) has been buried during a breast reduction operation. A discrete lump may be palpable or an impalpable lesion may be discovered on subsequent mammographic screening.

Key points

- The majority of patients seen in a breast clinic have normal breasts or benign disease.
- Many conditions occur so commonly against the background of breast development, cyclical activity and involution that they are best considered aberrations of this process.
- Following a diagnosis of benign disease, reassurance alone is insufficient. An explanation of the cause, possible risks and treatment options is required.
- Spontaneous, single-duct persistent (>2 per week) or bloodstained nipple discharge requires a definitive diagnosis that may only be obtained by duct excision.
- Breast pain is common and the majority originates in the underlying chest wall, not the breast itself.
- For true cyclical breast pain, tamoxifen is effective.
- Breast cysts diagnosed on ultrasound require aspiration only if symptomatic or complex on scan.
- Breast infection requires early antibiotic therapy and rapid referral to hospital if it does not settle rapidly on antibiotics.
- Breast abscesses should be assessed by ultrasound and treated by repeated aspiration or mini-incision and drainage.
- Gynaecomastia is an increasing problem. The cause should be ascertained and surgery only considered after other options have been exhausted.



Full references available at <http://expertconsult.inkling.com>

Key references

4. Dixon JM, Thomas J. Congenital problems and aberrations of normal development and involution. In: ABC of breast diseases. 4th ed. Oxford: Wiley-Blackwell; 2012. p. 12–24.
11. Iddon J, Dixon JM. Mastalgia. In: ABC of breast diseases. 4th ed. Oxford: Wiley-Blackwell; 2012. p. 25–30.
21. Fentiman IS, Caleffi M, Brame K, et al. Double blind controlled trial of tamoxifen therapy for mastalgia. *Lancet* 1986;ii:287–8. PMID: 2868162.
25. Dixon JM, McDonald C, Elton RA, et al. Risk of breast cancer in women with palpable breast cysts. *Lancet* 1999;353:1742–5. PMID: 10347986.
28. Dixon JM. Periductal mastitis and duct ectasia: an update. *Breast* 1998;7:128.
29. Fisher B, Costantino JP, Wickerham DL, et al. Tamoxifen for the prevention of breast cancer: current status of the National Surgical Adjuvant Breast and Bowel Project P-1 study. *J Natl Cancer Inst* 2005;97:1652–62. PMID: 16288118.
31. Chen L, Zhou WB, Zhao Y, et al. Bloody nipple discharge is a predictor of breast cancer risk: a meta-analysis. *Breast Cancer Res Treat* 2012;132:9–14. PMID: 21947751.
41. Dixon JM. Breast infection. In: Dixon M, editor. ABC of breast diseases. 4th ed. Oxford: Wiley-Blackwell; 2012. p. 31–40.
45. Academy of Breastfeeding Medicine Protocol Committee. ABM clinical protocol #4: mastitis. Revision, May 2008. *Breastfeed Med* 2008;3:177.
53. Bundred NJ, Dixon JM, Chetty U, et al. Mammary fistula. *Br J Surg* 1991;78:1185. PMID: 3607398.
72. Gupta R, Sinnott D, Carpenter R, et al. Antibiotic prophylaxis for post-operative wound infection in elective breast surgery. *Eur J Surg Oncol* 2000; 26:363–6. PMID: 10873356.
74. Nahabedian MY, Tsangaris T, Momen B, et al. Infectious complications following breast reconstruction with expanders and implants. *Plast Reconstr Surg* 2003;112:467–76. PMID: 12900604.
107. General Medical Council. Guidance for doctors who offer cosmetic interventions. GMC ethical guidance 2016; n28687, available at www.gmc-uk.org/guidance/ethical_guidance/28687.asp.