Learning objectives

- Pathophysiology ,presentation and management of mastitis
- Diagnosis of Breast Cancer
- Breast Cancer Staging and Biomarkers
- Overview of Breast Cancer Therapy
- Breast Surveillance
- Familial breast cancer
- Communication skills in breast cancer
- Gynecomastia

Acute and subacute inflammations of the breast

Bacterial mastitis

Bacterial mastitis is the commonest variety of mastitis and associated with lactation in the majority of cases.

Some of these will be associated with an infected haematoma or with periductal mastitis .

Aetiology :
Most cases are caused by Staphylococcus aureus. The intermediary is usually the infant.

Ascending infection from a sore and cracked nipple may initiate the mastitis.

Blockage of the lactiferous ducts by epithelial debris leading to stasis — this theory is supported by the relatively high incidence of mastitis in women with a retracted nipple.

Clinical features
The affected breast presented with the classical signs of acute inflammation.

Early on this is a generalised cellulitis, but later an abscess will form.

Treatment
In the cellulitic stage the patient should be treated with an appropriate antibiotic, e.g. flucloxacillin or co amoxiclav.
Feeding from the affected side may continue if the patient can manage.
Support of the breast, local heat and analgesia will help to relieve pain.

Figure 53.14 Large breast abscess.

The breast should be incised and drained if the infection did not resolve within 48 hours or if after being emptied of milk there was an area of tense induration or other evidence of an underlying abscess.

This advice has been replaced with the recommendation that repeated aspirations under antibiotic cover (if necessary using ultrasound) be performed.
This often allows resolution without the need for an incision scar and will also allow the patient to carry on breast-feeding.

Operative drainage of a breast abscess

Incision of a lactational abscess is necessary if there is marked skin thinning and can usually be performed under local anaesthesia.

The usual incision is sited in a radial direction over the affected segment, although if a circumareolar incision will allow adequate access to the affected area this should be preferred because of a better cosmetic result.

The wound may then be lightly packed with ribbon gauze or a drain inserted to allow dependent drainage.

Tuberculosis of the breast

Tuberculosis of the breast is usually associated with active pulmonary tuberculosis or tuberculous cervical adenitis.
Tuberculosis of the breast occurs more often in parous women and usually presents with multiple chronic abscesses and sinuses and a typical bluish attenuated appearance of the surrounding skin.

The diagnosis rests on bacteriological and histological examination.
Treatment is with antituberculous chemotherapy. Healing is usual although often delayed, and mastectomy should be restricted to patients with persistent residual infection.

Figure 53.15 Tuberculosis of the breast with secondary suppurating axillary lymph nodes (courtesy of Professor AK Toufeeq, Lahore, Pakistan).

Actinomycosis

Actinomycosis of the breast is rarer still.
The lesions present the essential characteristics of faciocervical actinomycosis.

Mondor's disease is thrombophlebitis of the superficial veins of the breast and anterior chest wall.

The differential diagnosis is lymphatic permeation from an occult carcinoma of the breast. The only treatment required is restricted arm movements, and in any case the condition subsides within a few months without recurrence, complications or deformity.

Figure 53.16 Mondor's disease of the right breast.

Breast cancer is the commonest cause of death in middle-aged women and accounting 3—5 per cent of deaths

Aetiological factors

I. Geographical. It occurs commonly in the Western world accounting for 3—5 per cent of deaths, yet is a rare tumour in Japan. In developing countries it accounts for 1—3 per cent of deaths.

2. Age. Carcinoma of the breast is extremely rare below the age of 20, but thereafter the incidence steadily rises so that by the age of 90 nearly 20 per cent of women are affected.

3. Gender. Less than 0.5% of patients with breast cancer are male.

4. Genetic. It occurs more commonly in women with a family history of breast cancer than in the general population. Breast cancer related to a specific mutation accounts for about 5 per cent of breast cancers.

5. Diet. There is some evidence that there is a link between diets low in phyto-oestrogens. A high intake of alcohol is associated with an increased risk of developing breast cancer.

6. Endocrine. Breast cancer is commoner in nulliparous women and breastfeeding in particular appears to be protective. Also protective is having a first child at an early age, especially if associated with late menarche and early menopause.

It is known that in postmenopausal women, breast cancer is more common in the obese. This is thought to be because of an increased conversion of steroid hormones to oestradiol in the body fat.

Recent studies have clarified the role of exogenous hormones, in particular the oral contraceptive pill and HRT, in the development of breast cancer.

For most women the benefits of these treatments will far outweigh the small putative risk; however, long-term exposure to the combined preparation of HRT does significantly increase the risk of developing breast cancer.

Previous radiation The risk appears about a decade after treatment and is higher if radiotherapy occurred during breast development

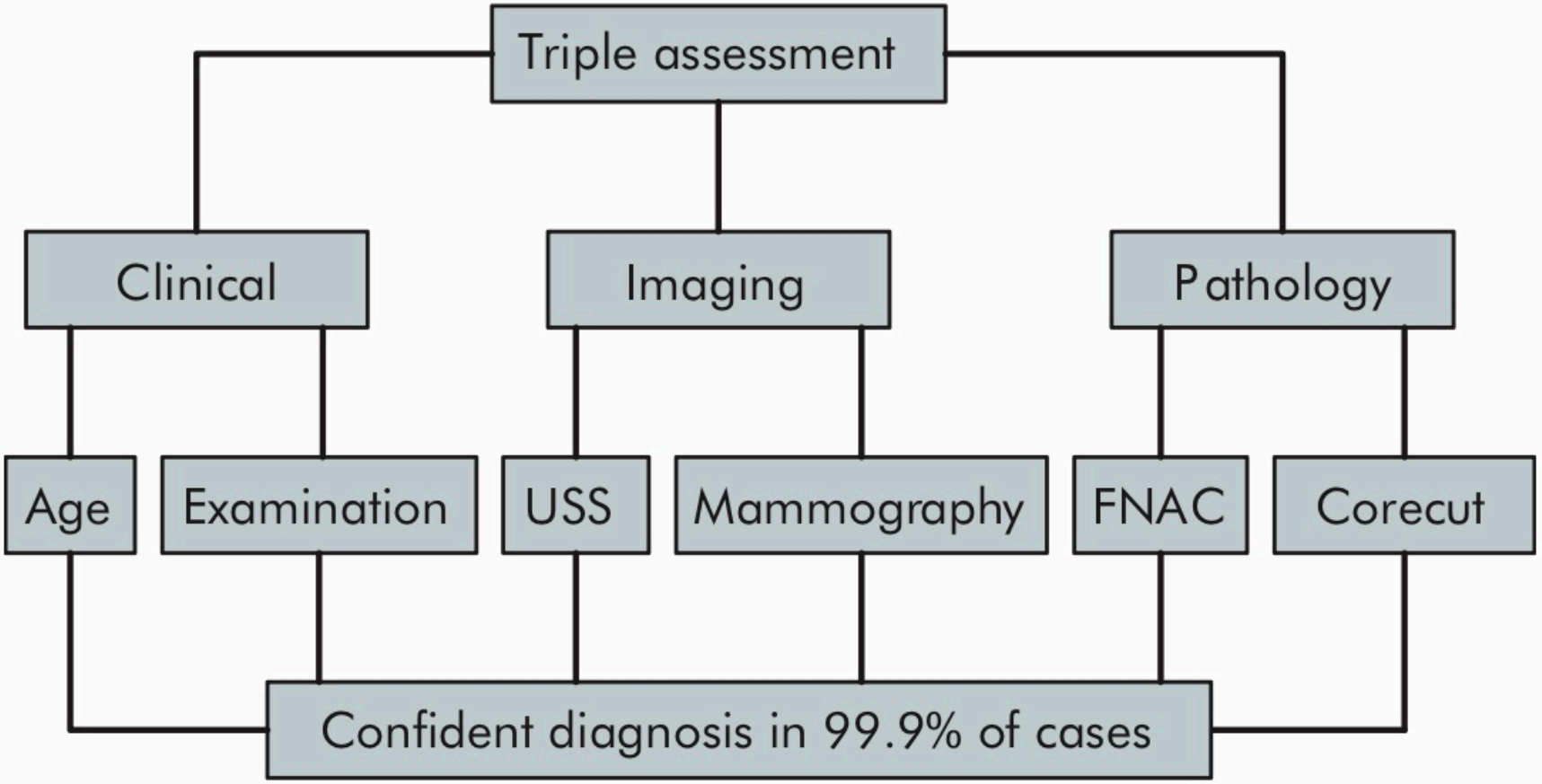


Figure 53.8 Triple assessment of breast symptoms. FNAC, fine-needle aspiration cytology; USS, ultrasound scan.

Cancer risk associated with benign breast disorders and in situ carcinoma of the breast

Abnormality	Relative risk
Nonproliferative lesions of the breast	No increase risk
Sclerosing adenosis	No increase risk
Intraductal papilloma	No increase risk
Florid hyperplasia	1.5 to 2-fold
Atypical lobular hyperplasia	4-fold
Atypical ductal hyperplasia	4-fold
Lobular carcinoma in situ	10-fold
Atypical ductal hyperplasia	10-fold

Pathology

Breast cancer may arise from the epithelium of the duct system anywhere from the nipple end of major lactiferous ducts to the terminal duct unit which is in the breast lobule.

1.Ductal carcinoma is the most common variant

2.lobular carcinoma occurs in up to 15 per cent of cases. Invasive lobular carcinoma is commonly multifocal and/or bilateral.

Rarer histological variants, usually carrying a better prognosis, include :

3.colloid carcinoma whose cells produce abundant mucin,

4.medullary carcinoma with solid sheets of large cells often associated with a marked lymphocytic reaction and

5.tubular carcinoma.

6.Inflammatory carcinoma is a fortunately rare, highly aggressive cancer which presents as a painful, swollen breast, which is warm with cutaneous oedema.

This is due to blockage of the subdermal lymphatics with carcinoma cells.

A biopsy will confirm the diagnosis and show undifferentiated carcinoma cells.

In situ carcinoma is preinvasive cancer which has not breached the epithelial basement membrane.

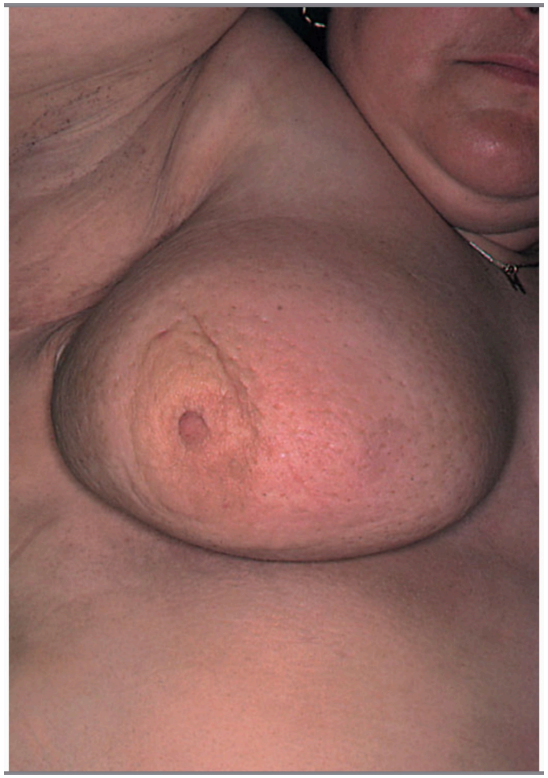
In situ carcinoma may be ductal (DCIS) or lobular (LCIS), the latter often multifocal and bilateral.

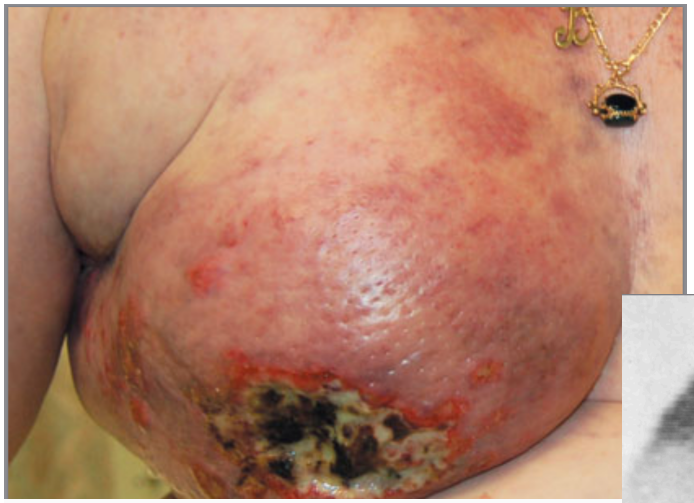
Both are markers for the later development of invasive cancer which will go on to develop in at least 20 percent of cases.

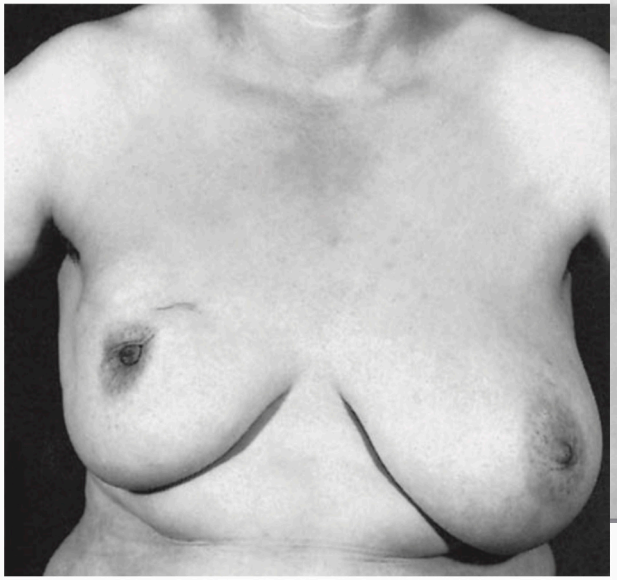
Although mastectomy is curative, this is overtreatment in many cases and the best treatment for in situ carcinoma is the subject of a number of clinical trials.

Staining for oestrogen and progesterone receptors is now considered routine, as their presence will indicate the use of adjuvant hormonal therapy with tamoxifen or the newer aromatase inhibitors .

Tumours are also stained HER2/neu (a growth factor receptor) as patients who are positive can be treated with the monoclonal antibody trastuzumab (Herceptin), either in the adjuvant or relapse setting.







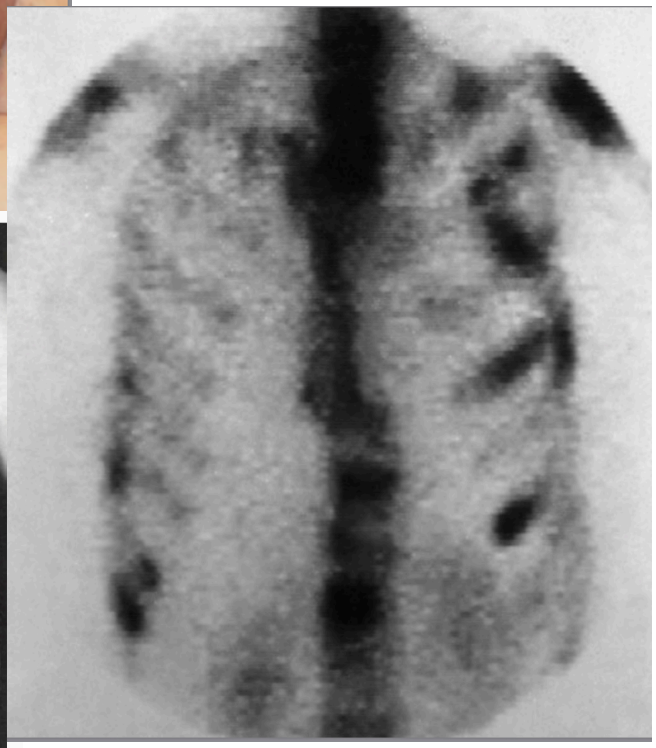


Figure 53.22 Invasive carcinoma of the right breast. Note the shrinking and elevation of the breast with nipple retraction.

The spread of mammary carcinoma

1.Local spread: The tumour increases in size and invades other portions of the breast. It tends to involve the skin and to penetrate the pectoral muscles, and even the chest wall.

2.Lymphatic metastasis: occurs primarily to the axillary lymph nodes and to the internal mammary chain of lymph nodes.

In advanced disease there may be involvement of supraclavicular nodes and of any contralateral lymph nodes.

3. Spread by the bloodstream: It is by this route that skeletal metastases occur (in order of frequency) in the lumbar vertebrae, femur, thoracic vertebrae, rib and skull; they are generally osteolytic.

Metastases may also occur in the liver, lung and brain, and occasionally the adrenal glands and ovaries.

The multidisciplinary team approach

Good doctor-patient communication plays a vital role in helping to alleviate patient anxiety.

Participation of the patient in treatment decisions is of particular importance in breast cancer when there may be uncertainty as to the best therapeutic option and the desire to treat the patient within the protocol of a controlled clinical trial.

Advice should be available on breast prostheses, psycho- logical support and physiotherapy, when appropriate.

The care of breast cancer patients is undertaken as a joint venture between the surgeon, medical oncologist, radiotherapist and allied health professionals such as the clinical nurse specialist.

The basic principles of treatment of breast cancer are to reduce the chance of local recurrence and the risk of metastatic spread.

Algorithm for management of operable breast cancer

Achieve local control

Appropriate surgery

- Wide local excision (clear margins) and radiotherapy, or
- Mastectomy ± radiotherapy (offer reconstruction – immediate or delayed)
- Combined with axillary procedure
- Await pathology and receptor measurements
- Use risk assessment tool; stage if appropriate

Treat risk of systemic disease

- Offer chemotherapy if prognostic factors poor; include Herceptin if Her-2 positive
- Radiotherapy as decided above
- Hormone therapy if oestrogen receptor or progesterone receptor positive

Procedure	
Axillary node sample	picks out a minimum of four individual lymph nodes from the axillary fat
Axillary node clearance (axillary lymph node dissection)	block dissection of the axillary contents level 1 - up to the lateral border of pectoralis minor level 2 - up to the medial border of pectoralis
Sentinel node biopsy	selective removal of the first tumour-draining node(s)

The sentinal node is that lymph node designated as the first axillary node draining the breast.

The internal mammary nodes are fewer in number and lie along the internal mammary vessels deep to the plane of the costal cartilages.

Systemic therapy such as chemotherapy or hormone therapy is added if there are adverse prognostic factors such as lymph node involvement, indicating a high likelihood of metastatic relapse.

In locally advanced or metastatic disease is usually treated by systemic therapy to palliate symptoms, with surgery playing a much smaller role.

Prognosis

Nottingham prognostic index = (0.2* tumor size in cm) + tumor grade (1–3) + lymph node stage (1–3)

- Value < or = 2.4 – excellent prognosis
- Value < or = 3.4 – good prognosis
- Value < or = 5.4 – moderate prognosis
- Value > 5.4 – poor prognosis.

Table 53.4 A pragmatic classification of breast cancer.

Group	Approximate 5-year survival rate (%)	Example	Treatment
'Very low-risk' primary breast cancer	>90	Screen-detected DCIS, tubular or special types	Local
'Low-risk' primary breast cancer	70–90	Node negative with favourable histology	Locoregional with/without systemic
'High-risk' primary breast cancer	<70	Node positive or unfavourable histology	Locoregional with systemic
Locally advanced	<30	Large primary or inflammatory	Primary systemic
Metastatic	–	–	Primary systemic

DCIS, duct carcinoma *in situ*.

Follow-up

- **Monthy self examination**
- **6 monthly clinical examination and systemic examination for 1st 2 years and yearly thereafter.**
- **Yearly mammogram.**
- **Metastatic follow-up as per the symptoms.**

Breast reconstruction

These women can now be offered immediate or delayed reconstruction of the breast.

The easiest type of reconstruction is using a silicone gel implant under the pectoralis major muscle. This may be combined with prior tissue expansion using an expandable saline prosthesis first which creates some ptosis of the new breast.

If the skin at the mastectomy site is poor (e.g. following radiotherapy) or if a larger volume of tissue is required, a musculocutaneous flap can be constructed either from

- Latissimus dorsi muscle (an LD flap) or
- Transversus abdominis muscle TRAM flap

Figure 53.29 Reconstruction with latissimus dorsi flap.

Figure 53.30 Transversus abdominus muscle flap.

Screening for breast cancer

- Because the prognosis of breast cancer is closely related to stage at diagnosis so breast screening by mammography in women over the age of 50 years will reduce cause-specific mortality by up to 30 per cent.

- Three-yearly mammographic screening for women between the ages of 50 and 64 years (now increased to 70 years).

Breast Surveillance

Early detection of breast cancer by surveillance

Familial breast cancer

- Breast cancer is due to an inherited genetic change actually account for less than 5 per cent of all cases of breast cancer.
- Those who prove to be ‘gene positive’ have a 50–80 per cent risk of developing breast cancer, predominantly while premenopausal.
- Many will opt for prophylactic mastectomy.

Table 53.5 Likelihood of genetic mutation with family history.

No. of family cases <50 years old	*BRCA1* (%)[a]	*BRCA1* (%)[b]
2	4	3
3	17	13
4	41	33
5	55	44

[a]*BRCA1* is also associated with ovarian and, to a lesser extent, colorectal and prostate cancer.
[b]*BRCA2* is associated with familial male breast cancer.

For the great majority of women with a positive family history, who are unlikely to be carriers of a breast cancer gene should be assessed and followed-up.

Tamoxifen given for five years appears to reduce the risk of breast cancer by 30–50 per cent.

Familial breast cancer

Gynecomastia

Causes of gynecomastia are as follows:

Physiological

- **Neonatal gynecomastia due to placental estrogens.**
- **Adolescent gynecomastia due to relative estrogen excess.**
- **Senescent gynecomastia due to relative testosterone deficiency.**

Pathological

- **Idiopathic—mc**
- **Estrogen excess**

Increased testicular production

– Testicular tumors (Leydig cell, sertolicell, granulose/ theca cell tumor)
– Bronchogenic carcinoma and transitional cell tumor of urinary tract

Increased aromatization

– Adrenal hyperplasia or carcinoma
– Cirrhoses, thyrotoxicoses, exogenous androgen administration

Primary testicular failure

– Anorchia, Klinefelter syndrome, testicular feminization syndrome

Secondary testicular failure

– Orchitis, trauma, castration, leprosy, – Renal failure
– Myotonic dystrophy or spinal cord injury

- Common Drugs (DOC4KS) Digitalis, oral contraceptive pills, cimetidine, clomiphene, captopril, calcium channel blockers, ketoconazole, spironolactone.
- Other drugs: Isoniazid, tricyclic antidepressants, methyldopa, flutamide.

Simon grading

Grade 1	Mild enlargement, no skin redundancy
Grade 2A	Moderate enlargement, no skin redundancy
Grade 2B	Moderate enlargement, skin redundancy
Grade 3	Marked enlargement with skin redundancy and ptosis

Investigations

History and physical examination.

Evaluate testis: Testicular ultrasound, serum testosterone, LH, DHEAS, endocrine profile—estrogen, prolactin, adrenal CT.

Thyroid function tests.

Breast mammogram, ultrasound, biopsy.

Liver function test, abdominal CT.

Treatment

1. Stop offending drug.
2. Treat the systemic disease, if present.
3. Karyotyping for klinfelter if positive, consider bilateral mastectomy.
4. Most cases resolve spontaneously and 1 year observation period is suggested.
5. Pharmacology during observation: Tamoxifen, danazol, aromatase inhibitors all have been used in the treatment of gynecomastia.
6. Surgery is done for gynecomastia of long duration, cosmetic or psychological reason, symptomatic or suspected malignancy.
7. Simple mastectomy, subcutaneous mastectomy, liposuction, reduction mammoplasty are all suggested procedures.

Risk Factors and Screening for Early-Onset Breast and Ovarian Cancer

What risk factors for breast or ovarian cancer should primary care providers (PCPs) be looking for in their patients who are women younger than age 45?

Do you counsel your patients to perform a monthly breast self-examination (BSE)?

How do you tell a patient she is at increased risk for breast cancer?

A young woman who has a family history associated with an increased risk for the BRCA1 or BRCA2 or other gene mutations

What do you tell them?

What preventive measures can be taken by young women with an inherited gene mutation associated with high risk for breast cancer?

Prophylactic bilateral mastectomy with or without reconstructive surgery

Some women who do not want surgery may be candidates for chemoprevention with agents such as tamoxifen.

She needs high-risk surveillance: an exam by a breast surgeon every 6 to 12 months and probably yearly MRI and mammograms starting at age 25 and 30, respectively.

Are there limitations to cancer genetic testing?

SIGN 84 Management of breast cancer in women. A national clinical guideline. Available online at: www.sign.ac.uk

A 32-year-old woman presents for evaluation of a lump that she noticed in her right breast on self-examination. She says that while she does not perform breast self-examination often, she thinks that this lump is new. She denies nipple dis charge or breast pain, although the lump is mildly tender on palpation. She has never noticed any breast masses previously and has never had a mammogram. She has no personal or family history of breast disease. She takes oral contraceptive pills (OCPs) regularly, but no other medications. She does not smoke cigarettes or drink alcohol. She has never been pregnant. On examination, she is a well-appearing, somewhat anxious, and thin woman. Her vital signs are within normal limits. On breast examination, in the lower outer quadrant of the right breast, there is a 2-cm, firm, well-circumscribed, freely mobile mass without over lying erythema that is mildly tender to palpation. There is no skin dimpling, retraction, or nipple discharge. While no other discrete breast masses are palpable, the bilateral breast tissue is noted to be firm and glandular throughout. There is no evidence of axillary, supraclavicular, or cervical lymphadenopathy. The remainder of her physical examination is unremarkable.

What is the most likely diagnosis of this breast lesion?
What is the first step in evaluation?
What is the recommended follow-up for this patient?

Key Points

Routine use of screening mammography in women ≥50 years of age reduces mortality from breast cancer by 25%. MRI screening is recommended in women with BRCA mutations and may be considered in women with a greater than 20% to 25% lifetime risk of developing breast cancer.
Core-needle biopsy is the preferred method for diagnosis of palpable or nonpalpable breast abnormalities.

Sentinel node dissection is the preferred method for staging of the regional lymph nodes in women with clinically node-negative invasive breast cancer. Axillary dissection may be avoided in women with 1 to 2 positive sentinel nodes who are treated with breast conserving surgery, whole breast radiation and systemic therapy.

Local-regional and systemic therapy decisions for an individual patient with breast cancer are best made using a multidisciplinary treatment approach. The sequencing of therapies is dependent on patient and tumor related factors including breast cancer subtype.