

Clinical Presentations of Breast Disease

Clinical patterns • Anatomical basis • Differential diagnosis

A clinicopathologic teaching lecture

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Learning objectives

- Relate common breast symptoms to normal anatomy and benign changes.
- Differentiate diffuse nodularity, pain, discrete masses, discharge and inflammation.
- Explain why clinical assessment, imaging and tissue sampling are complementary.
- Identify presentations requiring evaluation for malignancy.

The breast contains distinct epithelial and stromal compartments

- Ducts and lobules form the epithelial glandular system.
- Luminal and myoepithelial cells constitute two epithelial layers.
- Interlobular and intralobular stromal cells can also produce lesions.

Ducts and lobules

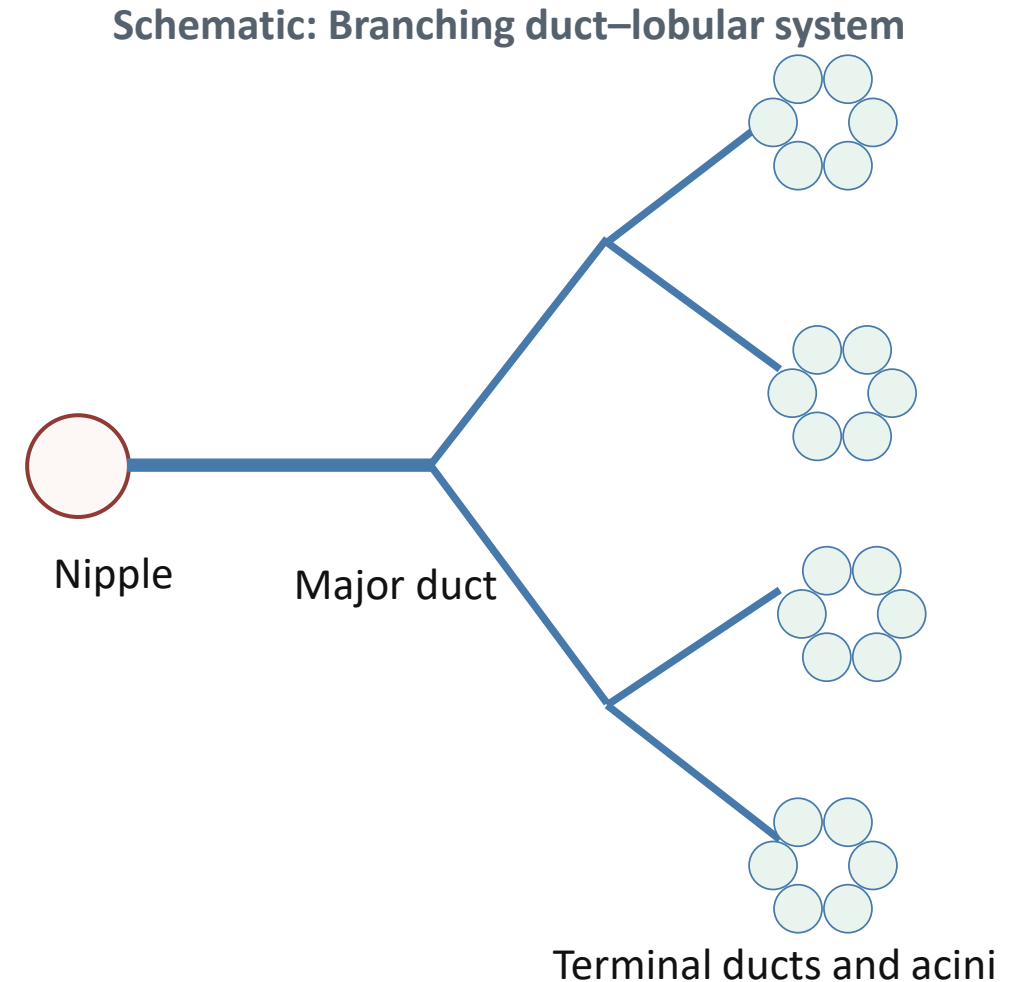
Luminal epithelium

Myoepithelium

Stroma

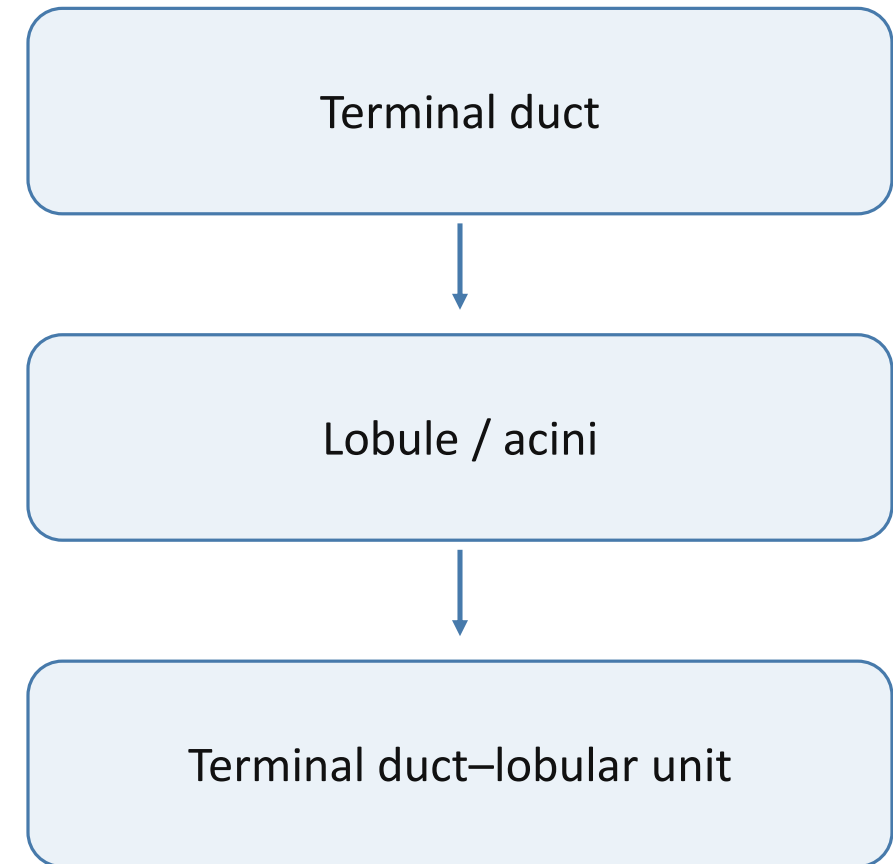
Major ducts branch into terminal duct–lobular units

- The ductal–lobular system comprises approximately 5–15 segments or lobes.
- Each major duct branches toward small terminal ducts.
- Terminal ducts connect to lobules containing clusters of acini.



The terminal duct–lobular unit is a functional unit

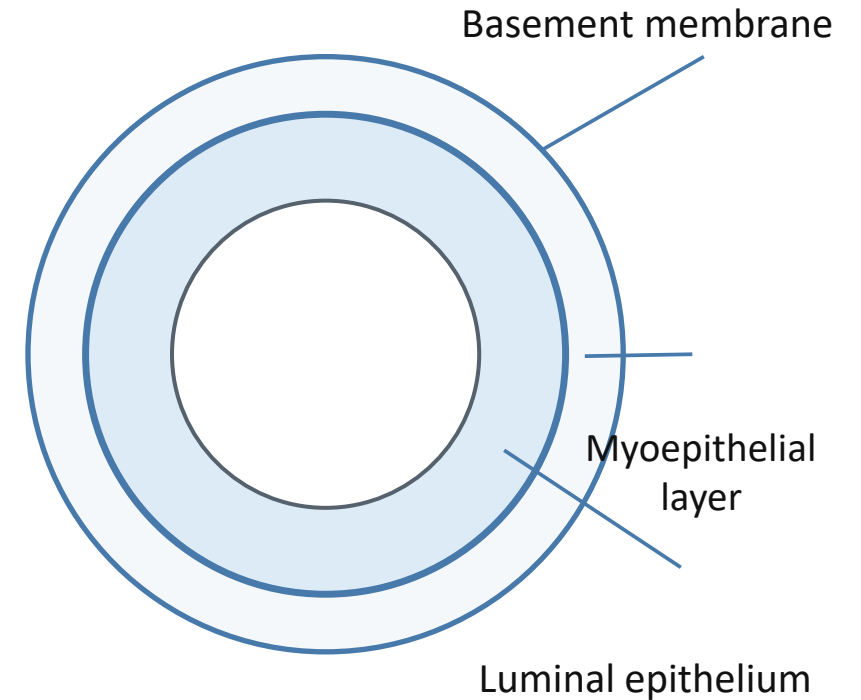
- A terminal duct and its lobule together form the TDLU.
- Lobular architecture changes with reproductive hormonal signals.
- Normal structural variation helps explain diffuse clinical nodularity.



An intact duct has layered epithelial boundaries

- Luminal epithelial cells face the ductal lumen.
- Myoepithelial cells form the outer epithelial layer.
- Basement membrane separates the ductal system from the stroma.

Cross-section of a duct (schematic)



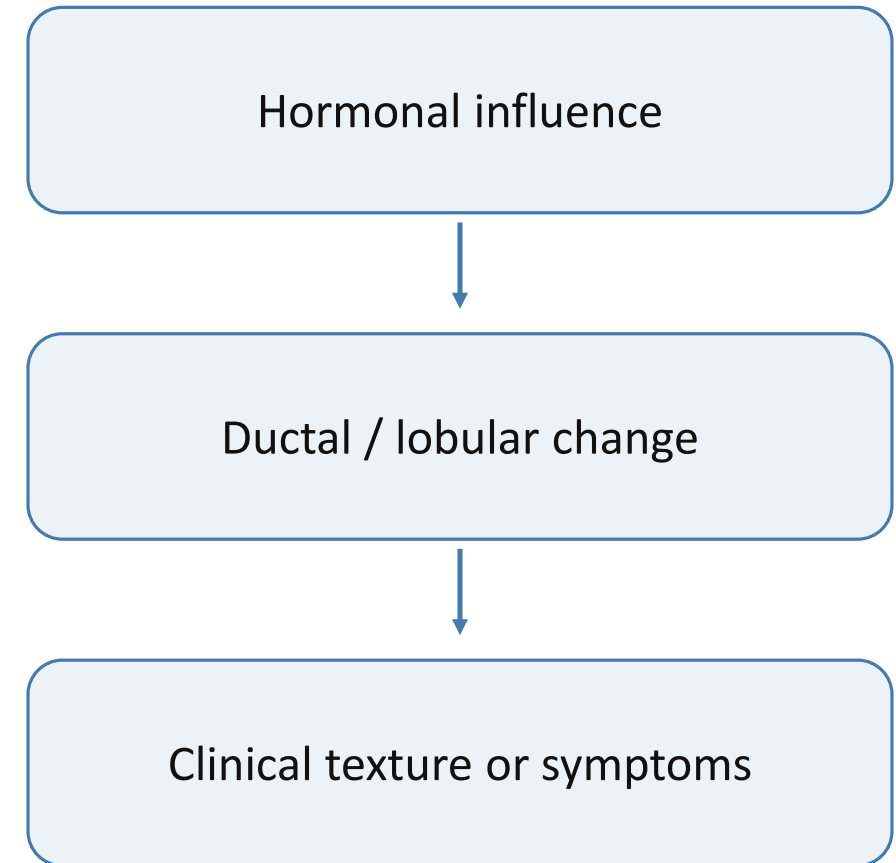
Stromal origin differs from epithelial origin

- Both epithelial proliferation and stromal proliferation can yield masses.
- A palpable mass does not reveal the originating cell type.
- Fibroadenoma is one common benign mass highlighted in this chapter.

Epithelial compartment	Stromal compartment
Ductal and lobular epithelium Can give rise to proliferative lesions	Interlobular and intralobular stroma Can give rise to masses

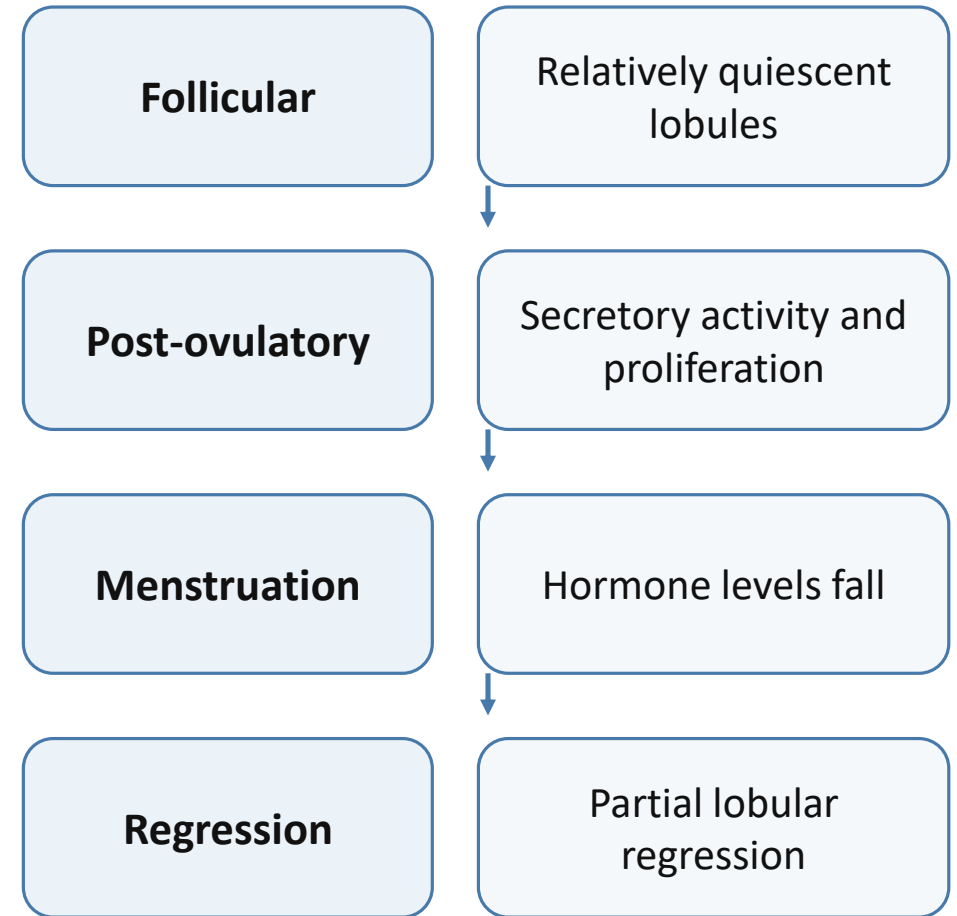
Breast tissue responds dynamically to reproductive hormones

- Estrogen, progesterone and prolactin influence branching and lobular maturation.
- Changes occur during puberty, menstrual cycles, pregnancy and lactation.
- Symptoms should be interpreted in their physiologic context.



Menstrual cycling alters lobular structure

- Lobules are relatively quiescent early in the cycle.
- After ovulation, epithelial proliferation and secretory activity increase.
- Falling hormone levels at menstruation produce partial regression.



Pregnancy produces marked lobular expansion

- Lobules increase in number and size during pregnancy.
- Near term, lobules occupy most of the breast with relatively scant stroma.
- Postpartum secretion changes from colostrum to milk.

Pregnancy

Lobular maturation

Near term

Marked lobular expansion

Postpartum

Colostrum → milk

Involution changes tissue composition and imaging appearance

- Lobules begin involuting after the third decade.
- Radiodense fibrous interlobular stroma is progressively replaced by fat.
- Endogenous and exogenous hormone exposure can modify these changes.

Earlier pattern

Involuted pattern

Relatively more
fibrous stroma

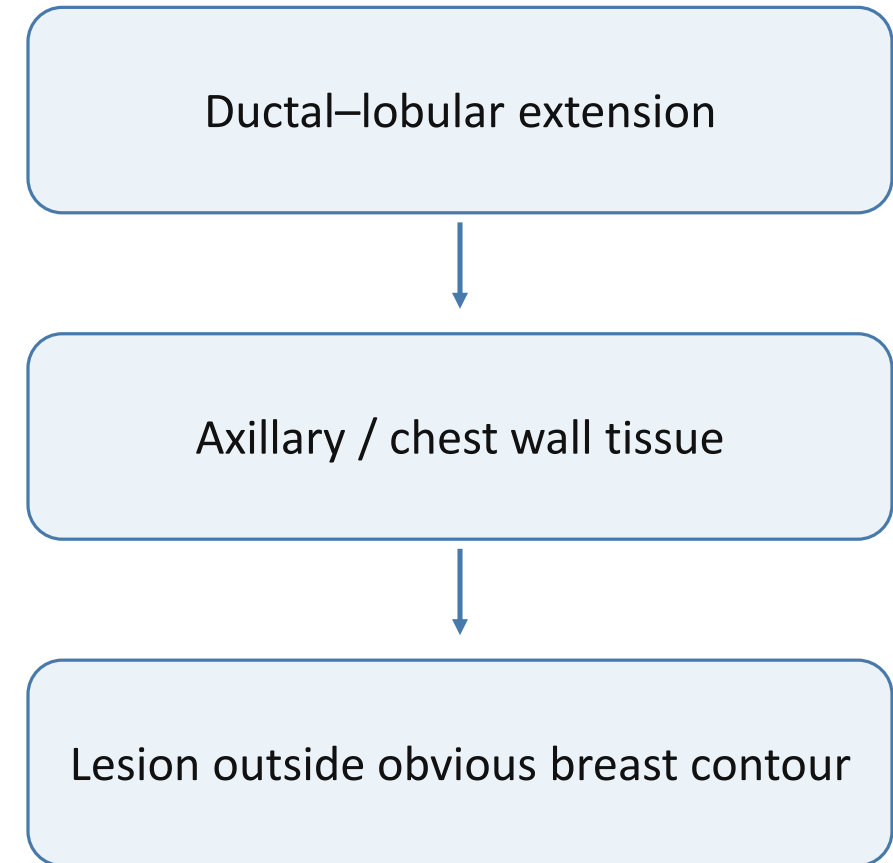
Relatively more
adipose stroma

Greater radiodensity

Greater radiolucency

Breast tissue may extend beyond the obvious breast contour

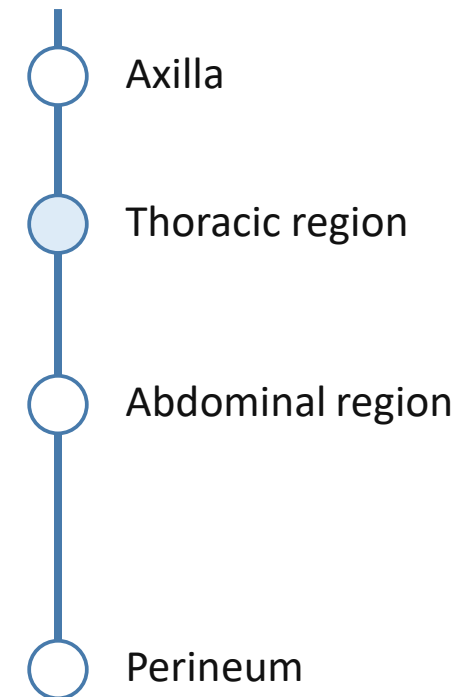
- Ductal and lobular tissue may extend into the chest wall subcutis.
- The axillary tail can reach into the axillary fossa.
- Breast lesions may therefore arise outside grossly evident breast tissue.



Milk-line remnants represent persistent developmental tissue

- Supernumerary nipples or breast tissue arise from persistent embryonic epidermal thickenings.
- The milk line extends from axilla toward perineum.
- Such sites may present with premenstrual painful swelling.

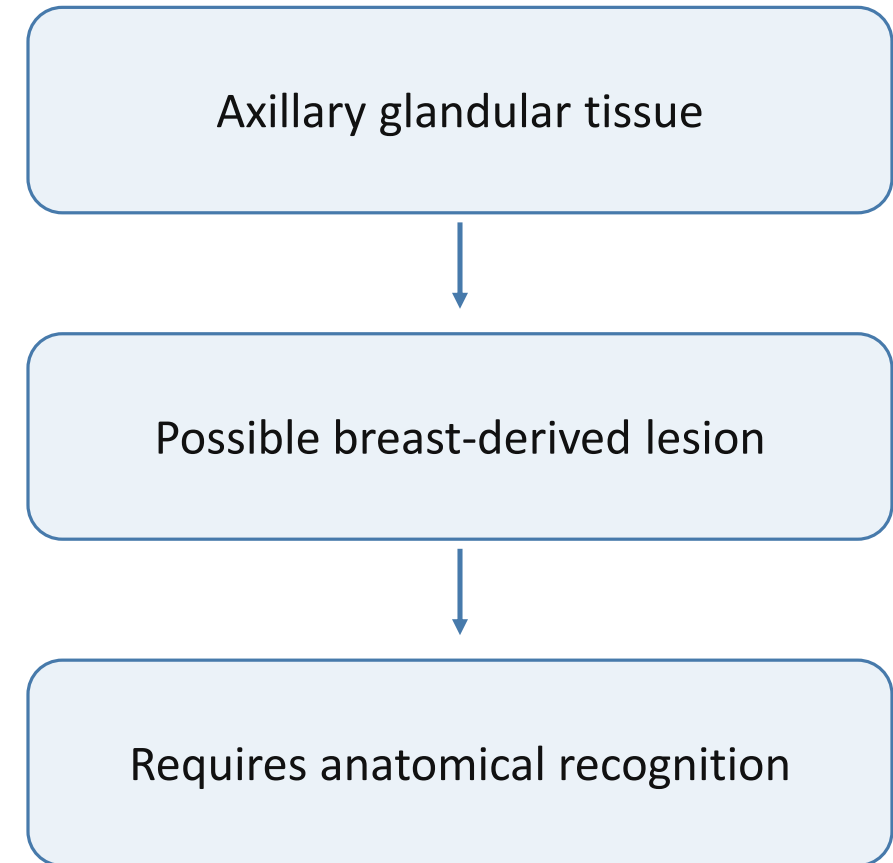
Persistence along the embryonic milk line



Illustrative sites, not a patient examination

Accessory axillary breast tissue has clinical implications

- Axillary glandular tissue may represent a normal anatomic extension.
- A palpable axillary abnormality need not arise from a lymph node.
- Residual accessory breast tissue helps explain why prophylactic mastectomy does not completely eliminate cancer risk.



Congenital and acquired nipple inversion differ

- Congenital inversion reflects failure of nipple eversion in development.
- Congenital inversion may be unilateral and is usually of little clinical significance.
- New nipple retraction is more concerning for invasive cancer or inflammatory nipple disease.

Congenital

Longstanding
Frequently benign

May evert in pregnancy or on traction

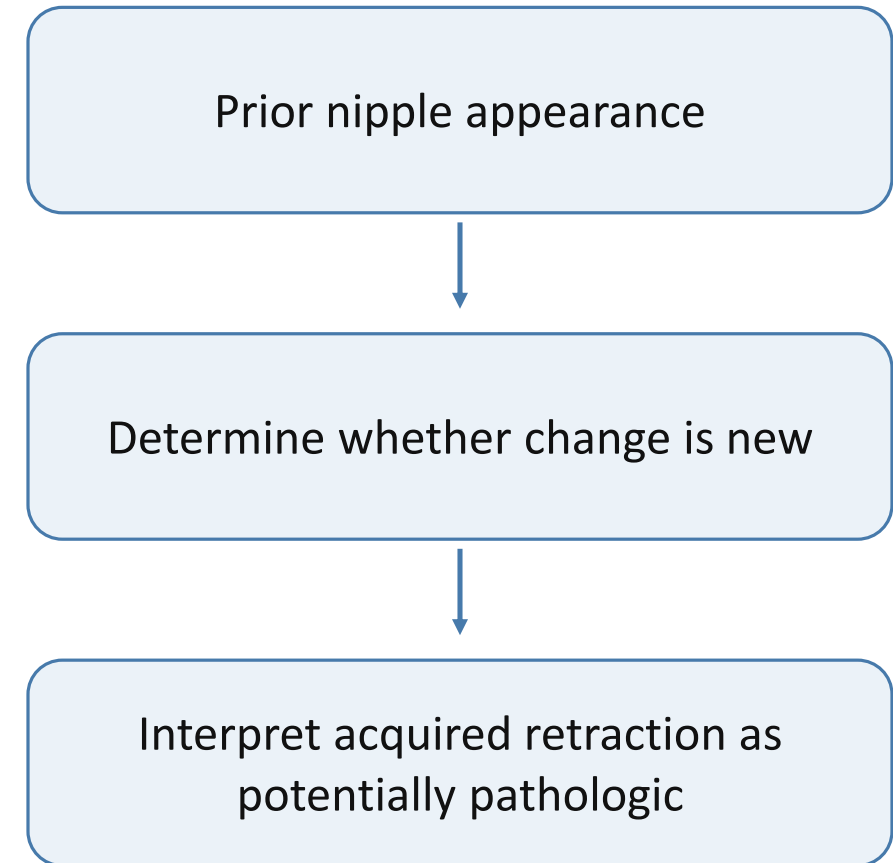
Acquired

New retraction

Consider invasive carcinoma or nipple inflammation

Timing is central to interpreting nipple inversion

- A longstanding inverted nipple may be developmental.
- Change from a previously everted nipple is a different clinical finding.
- Acquired retraction deserves assessment for an underlying disease process.



Five symptom groups bring breast disease to attention

- Diffuse lumpiness and mastalgia are common complaints.
- A discrete mass and nipple discharge require symptom characterization.
- Erythema and edema signal an inflammatory presentation.

Diffuse lumpiness

Pain

Palpable mass

Nipple discharge

Erythema / edema

Most symptomatic breast lesions are benign

- The chapter reports more than 90% of symptomatic breast lesions are benign.
- The diagnostic purpose of assessment is often to exclude malignancy.
- Symptom prevalence does not make any individual suspicious presentation safe to ignore.

Population pattern

Most symptomatic lesions are benign

Individual decision

Concerning findings still require evaluation

Breast cancers present clinically or through screening

- Some carcinomas produce symptoms or a palpable lesion.
- Others come to attention through mammographic screening.
- Clinical symptoms and screening identify partly different groups of lesions.

Symptomatic route

Clinical sign or
symptom triggers
assessment

Screening route

Mammographic
finding precedes
symptoms

Mammography emphasizes densities and calcifications

- Densities are one principal mammographic sign of carcinoma.
- Calcifications are another principal mammographic sign.
- Imaging contributes information not available from palpation alone.

Density

Structural
radiographic finding

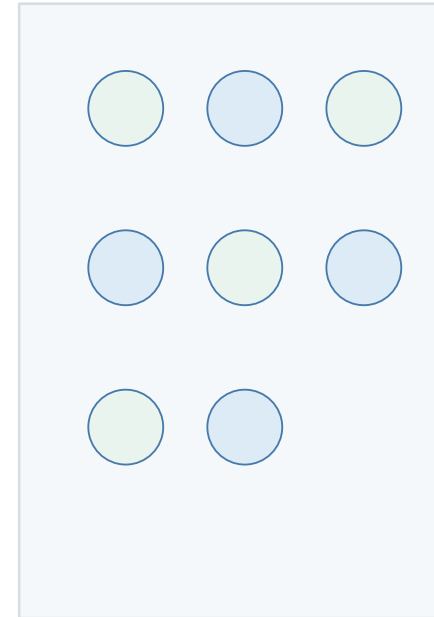
Calcifications

Mineral-density
radiographic finding

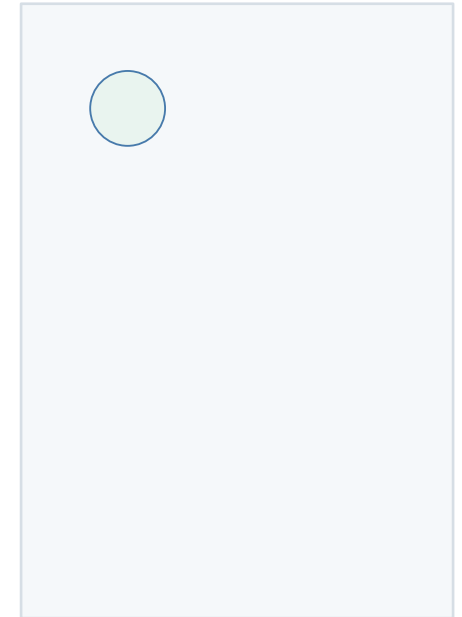
Diffuse lumpiness often reflects nonmalignant tissue

- Lumpiness means generalized nodularity rather than a single clearly defined mass.
- It commonly reflects normal glandular tissue or fibrocystic changes.
- The key diagnostic question is whether a discrete lesion is hidden within the nodularity.

Conceptual distribution, not imaging



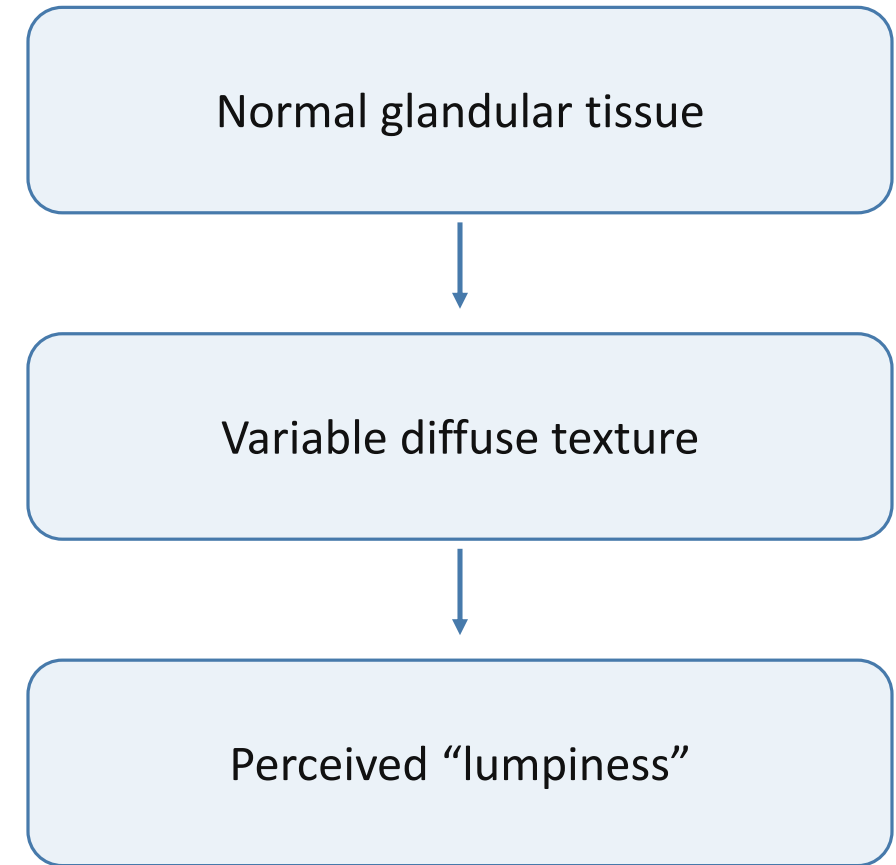
Diffuse nodularity



Discrete focal mass

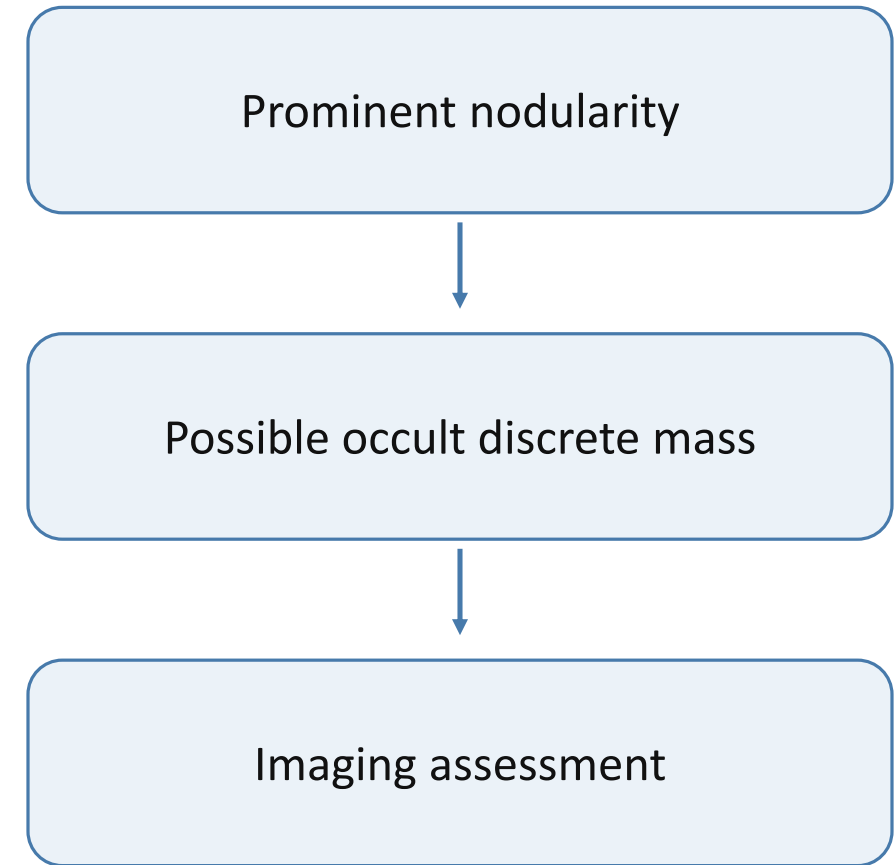
Normal glandular architecture contributes to nodularity

- The lobular system and stroma vary with life stage and hormones.
- Normal glandular tissue may be palpated as an irregular background texture.
- Background nodularity should not automatically be labelled a tumor.



Imaging can clarify prominent diffuse nodularity

- Pronounced nodularity may obscure a discrete mass clinically.
- Imaging is used to investigate whether a focal lesion is present.
- The symptom description and imaging question should remain distinct.



A diffuse nodular breast differs from a discrete mass

- Diffuse nodularity describes widespread texture.
- A discrete mass has a definable focal boundary on examination.
- Different clinical patterns generate different diagnostic questions.

Diffuse nodularity

Widespread texture

Often normal tissue
or fibrocystic change

Discrete mass

Localized lesion

Benign or malignant
causes

Mastalgia may be cyclic or noncyclic

- Mastalgia and mastodynia refer to breast pain.
- Cyclic pain tracks menstrual timing.
- Noncyclic pain is more often localized to a particular region.

Cyclic

Relationship with
menses

Often diffuse

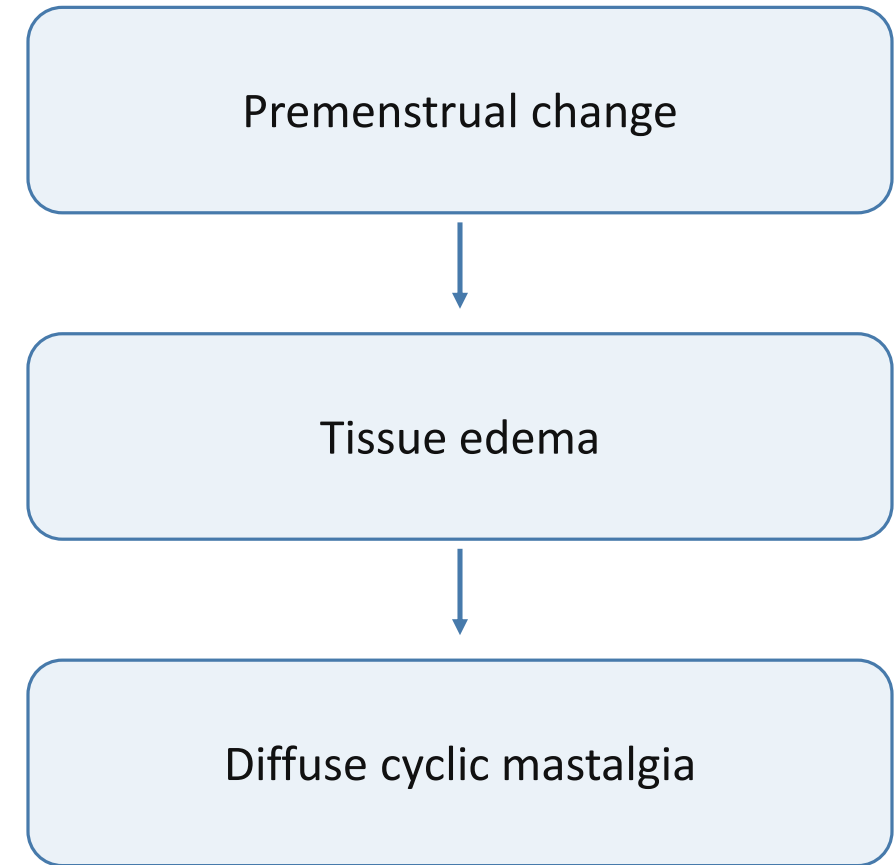
Noncyclic

Not tied to the cycle

Often focal

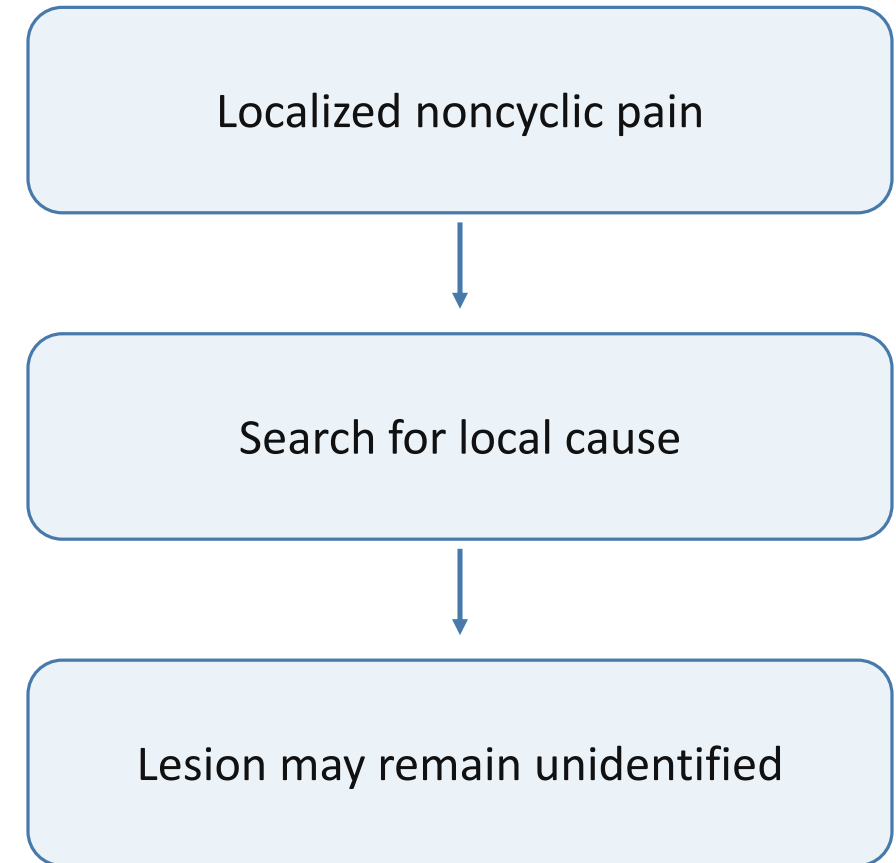
Diffuse cyclic pain can arise from premenstrual edema

- Premenstrual tissue changes may increase breast discomfort.
- The timing and diffuse character support a cyclic mechanism.
- Cyclic pain does not, by itself, imply a discrete lesion.



Noncyclic mastalgia is often localized

- Noncyclic pain frequently affects one breast region.
- It may reflect a particular local process.
- A specific lesion is nevertheless often not identified.



Recognized causes of noncyclic pain vary

- A ruptured cyst may produce localized pain.
- Physical injury can produce focal symptoms.
- Infection is another possible inflammatory cause.

Ruptured cyst

Physical injury

Infection

No lesion identified

Pain is usually benign but does not exclude cancer

- Most painful masses are benign.
- Approximately 5% of painful masses to breast cancer.
- Interpret pain with any accompanying focal mass, discharge or skin change.

Pain alone is not a reliable discriminator

Benign disease is common

Cancer remains possible

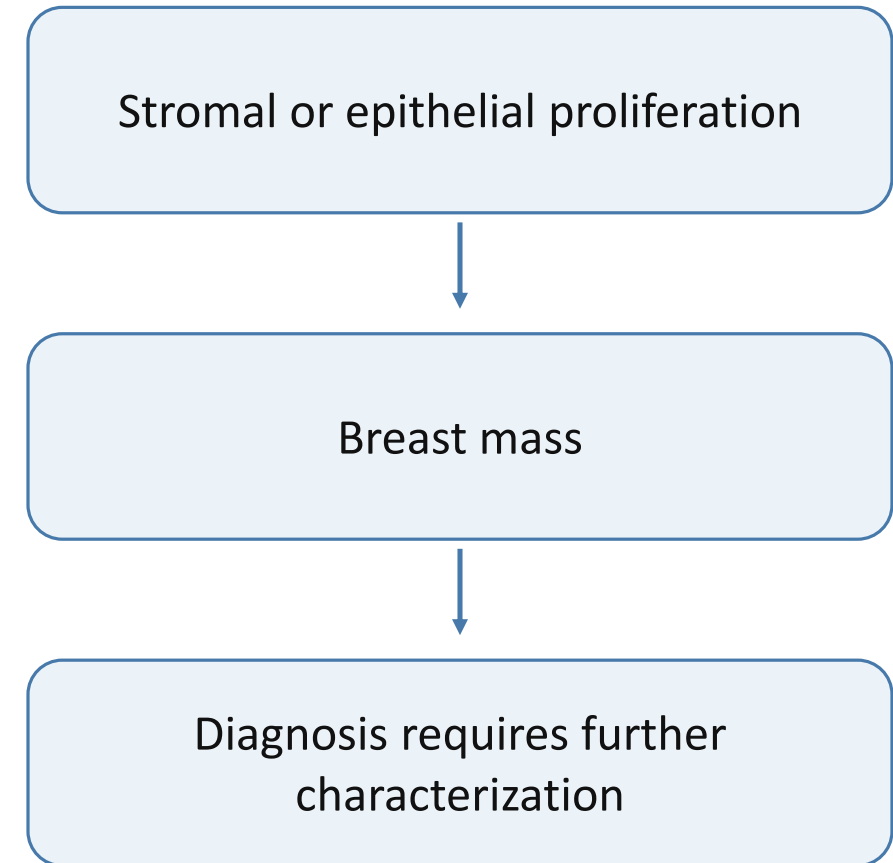
Assess accompanying findings

Pain pattern helps structure the differential

Feature	Cyclic mastalgia	Noncyclic mastalgia
Timing	Menstrual relationship	No necessary cycle relationship
Distribution	Often diffuse	Usually localized
Possible explanation	Premenstrual edema	Cyst rupture, injury, infection
Lesion found?	Not necessarily	Often no specific lesion

A palpable mass may originate from epithelium or stroma

- Stromal-cell proliferation may create a palpable mass.
- Epithelial-cell proliferation may also create a mass.
- Palpation alone cannot establish histologic lineage.



Palpability generally implies a lesion of measurable size

- Usual detection of palpable masses around 2–3 cm.
- Size at palpation is not equivalent to biological onset.
- Small radiologic abnormalities may be nonpalpable.

Palpable

Often approximately
2–3 cm

Clinical recognition

Nonpalpable

May be found by
mammography

Screening
recognition

Benign masses often have circumscribed clinical features

- Common benign masses are often round or oval.
- They may be rubbery and mobile.
- These clinical features suggest benignity but cannot prove it.

Round / oval

Rubbery

Mobile

Often benign

Invasive carcinomas may feel hard, irregular and fixed

- Malignant tumors invade across tissue planes.
- Invasion can produce an irregular contour and restricted mobility.
- Desmoplastic hardening may produce a scirrhus character.

Infiltrative growth across tissue planes



Irregular lesion + altered stromal response



Hard / relatively immobile mass

Tissue-plane invasion explains reduced mass mobility

- A circumscribed lesion can move relative to surrounding tissue.
- Invasive growth connects a lesion with adjacent tissue planes.
- Fixity is therefore a mechanistic clinical clue rather than a diagnosis.

More mobile

Relatively fixed

Well-demarcated
lesion

Less tethering of
tissues

Tissue-plane
invasion

Greater tethering

Fibroadenomas and cysts are frequent benign masses

- The chapter identifies fibroadenomas among the common benign palpable masses.
- Cysts are another common benign cause.
- Neither should be diagnosed definitively from palpation alone.

Fibroadenoma	Cyst
Frequent benign solid mass	Frequent benign cystic mass

Cancer probability among palpable masses rises with age

- Age modifies the prior probability of malignancy in a palpable mass.
- Approximately 10% under age 40 and 60% over age 50 in its cited context.
- These chapter estimates must not be treated as universal contemporary risk calculators.

Younger than 40

Chapter estimate:
10%

Lower malignant
proportion

Older than 50

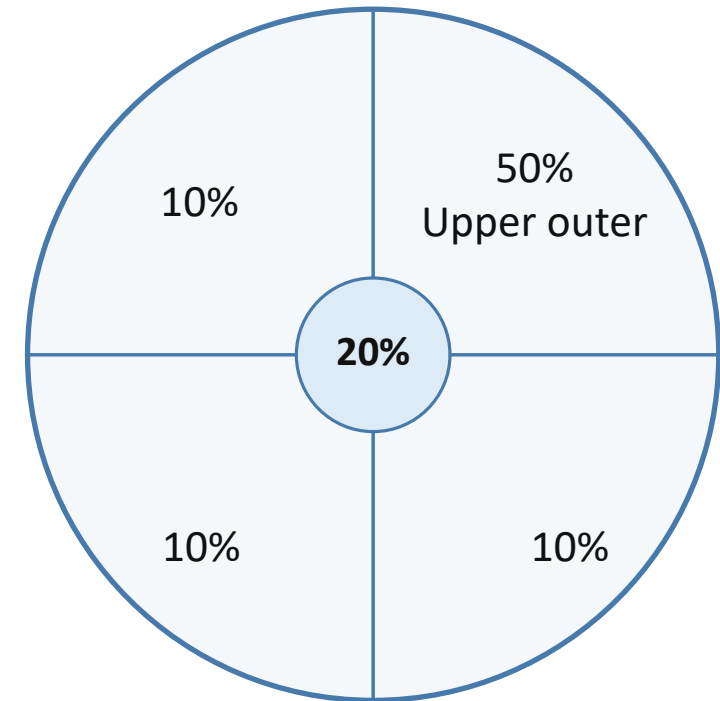
Chapter estimate:
60%

Higher malignant
proportion

Breast carcinomas are not uniformly distributed by site

- Approximately half are described in the upper outer quadrant.
- The chapter places about one fifth centrally or subareolarly.
- The remaining three quadrants account for about one tenth each.

Approximate site distribution reported



Central / subareolar: 20%

Screening by palpation has important limitations

- Only a subset of cancers are first recognized as palpable masses.
- Cancers capable of metastasis may disseminate before becoming palpable.
- Robbins therefore notes limited mortality benefit from screening by palpation.

Tumor becomes biologically aggressive



Metastatic potential may precede palpability



Palpation screening has limited mortality effect

Palpable mass features are suggestive, not definitive

Clinical attribute	Often benign	Concerning for invasion
Contour	Round / oval	Irregular
Consistency	Rubbery	Hard / scirrhus
Mobility	Mobile	Relatively fixed
Biologic interpretation	May be circumscribed	May invade tissue planes

Nipple discharge is characterized by pattern

- Volume and laterality help distinguish physiologic from pathologic patterns.
- Spontaneous versus expressed discharge is clinically relevant.
- Milky, serous and bloody appearances have different common associations.

Four clinical descriptors

Quantity	Small vs substantial
Laterality	Bilateral vs unilateral
Provocation	Expressed vs spontaneous
Appearance	Milky, serous, bloody

Small-volume bilateral discharge may be physiologic

- Robbins recognizes a small quantity of bilateral discharge as potentially normal.
- Unilateral, spontaneous or bloody discharge is a distinct clinical pattern.
- Description should precede etiologic interpretation.

**Potentially
physiologic**

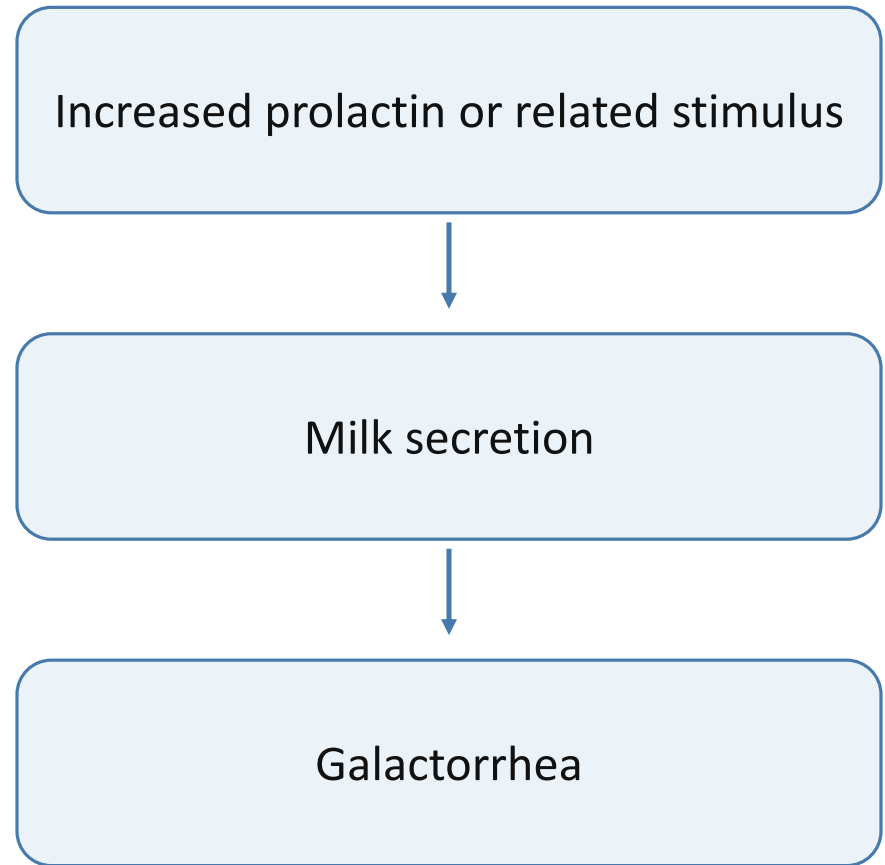
Small volume
Bilateral

Concerning pattern

Spontaneous
Unilateral
Bloody

Galactorrhea refers to inappropriate milk secretion

- Milky nipple discharge is termed galactorrhea.
- Elevated prolactin can be associated with this symptom.
- Galactorrhea is not described as a feature of breast malignancy.



Endocrine disorders can be associated with galactorrhea

- Pituitary adenoma may produce elevated prolactin.
- Hypothyroidism may be associated with galactorrhea.
- Endocrine anovulatory syndromes are another association.

Pituitary adenoma

Hypothyroidism

Anovulatory
syndromes

Elevated prolactin

Several medications may be linked to galactorrhea

- The chapter lists oral contraceptives and tricyclic antidepressants.
- Methyldopa and phenothiazines are also listed.
- Drug history is therefore part of interpreting milky discharge.

Oral contraceptives

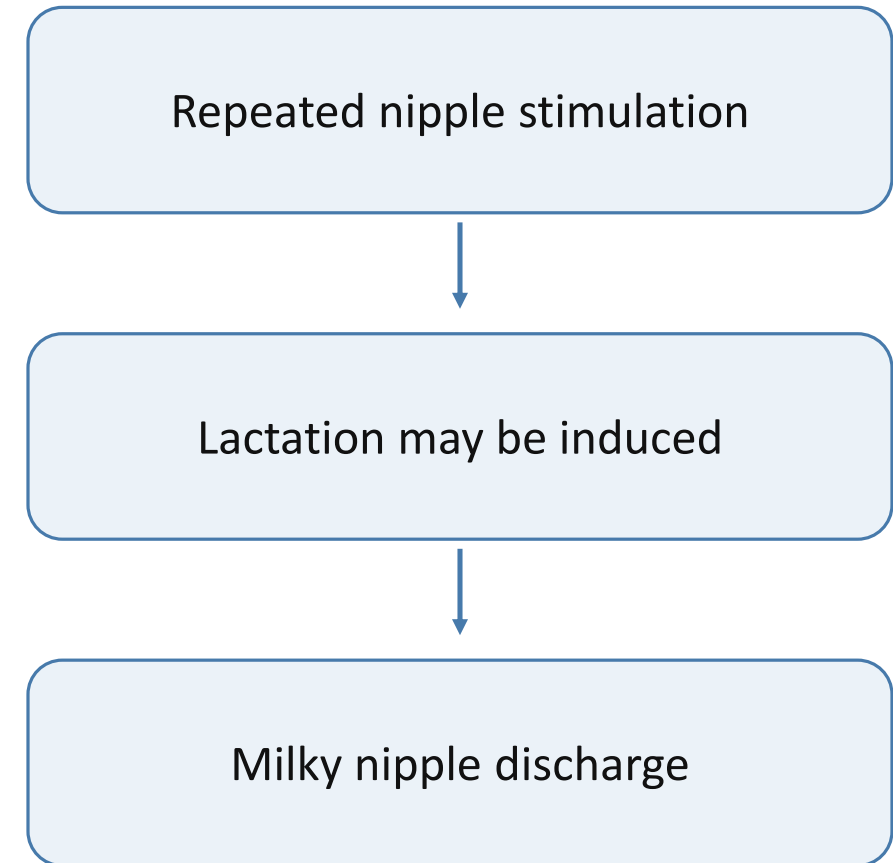
Tricyclic
antidepressants

Methyldopa

Phenothiazines

Repeated stimulation may induce milk secretion

- Repeated nipple stimulation can induce lactation.
- A milky appearance alone does not establish a pituitary lesion.
- Physiologic and exposure context matters when interpreting galactorrhea.



Serous or bloody discharge frequently has benign causes

- Large duct papillomas commonly produce bloody or serous discharge.
- Cysts are another common association.
- Discharge appearance still requires contextual interpretation.

Large duct papilloma

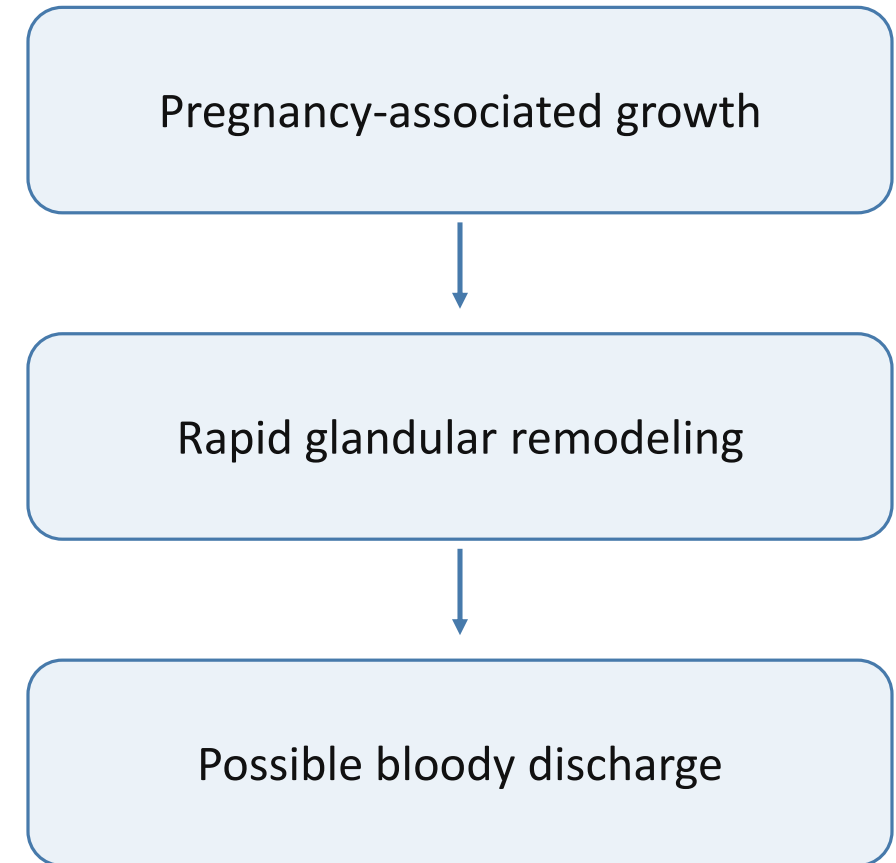
Common cause of
serous / bloody
discharge

Cyst

Another common
benign association

Pregnancy can produce a bloody nipple discharge

- Pregnancy causes rapid growth and remodeling of breast structures.
- This remodeling may produce bloody discharge.
- The clinical context modifies the differential diagnosis.



Spontaneous unilateral bloody discharge is concerning

- The combination is particularly important in older patients.
- It may be associated with an underlying malignancy.
- Clinical assessment should not rely on color alone without laterality and spontaneity.

Concerning discharge pattern

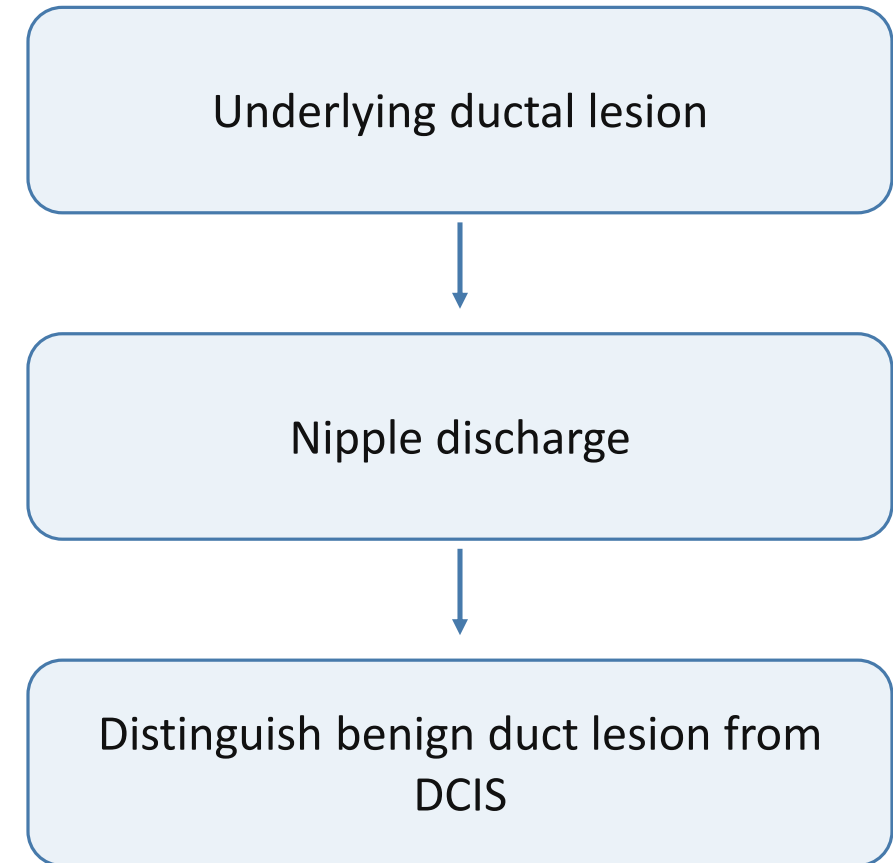
Spontaneous

Unilateral

Bloody (especially with older age)

Ductal carcinoma in situ can present with discharge

- When discharge is associated with malignancy, DCIS is highlighted as a common cause.
- Clinical discharge does not distinguish DCIS from all benign duct lesions.
- Pathologic evaluation may be needed to establish the underlying ductal lesion.



Age changes the significance of nipple discharge

- Carcinoma in 7% of females with discharge under 60 years.
- The corresponding figure is 30% at age 60 or older.
- These are source-specific estimates, not an individual diagnostic probability.

Younger than 60

7% carcinoma-associated discharge
(textbook report)

Age 60 or older

30% carcinoma-associated discharge
(textbook report)

Discharge pattern narrows the clinical differential

Pattern	Common associations in Robbins	Interpretive significance
Small, bilateral	May be normal	Potentially physiologic
Milky	Prolactin, endocrine or drug causes	Galactorrhea
Serous / bloody	Papilloma, cyst	Benign causes common
Spontaneous unilateral bloody	May reflect DCIS / carcinoma	Greater concern with age

Inflammation produces erythema and edema

- Inflammatory change may involve all or part of a breast.
- Erythema and edema are the principal visible clinical effects described.
- Infection is the most common context highlighted by Robbins.

Erythema

Visible redness

Inflammatory
change

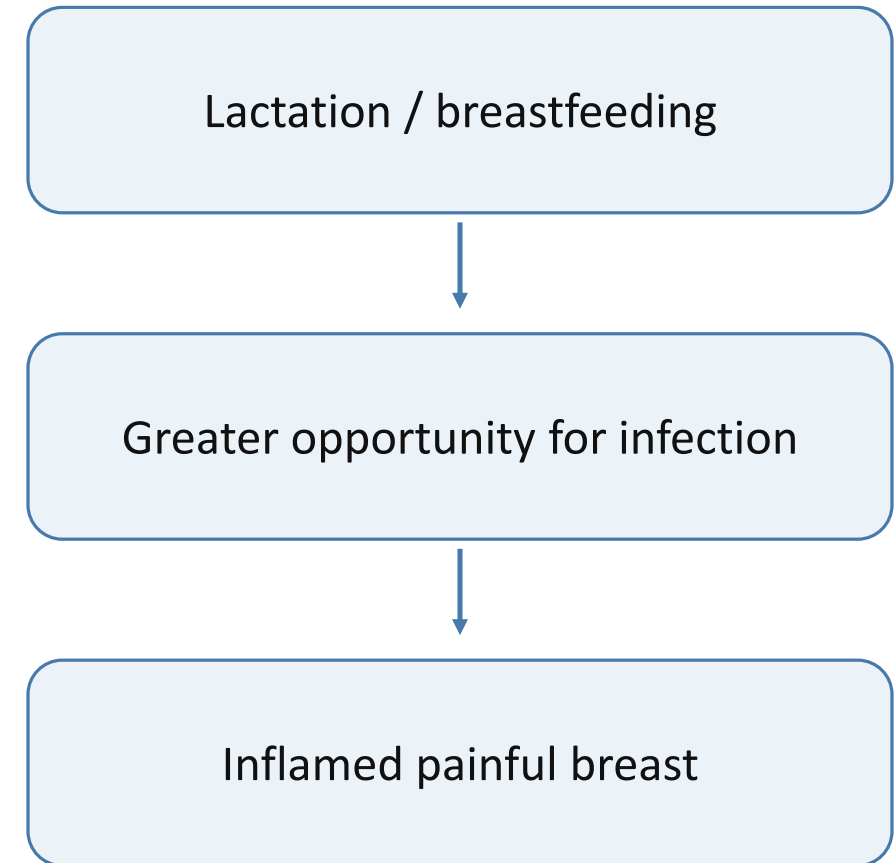
Edema

Tissue swelling

Inflammatory
change

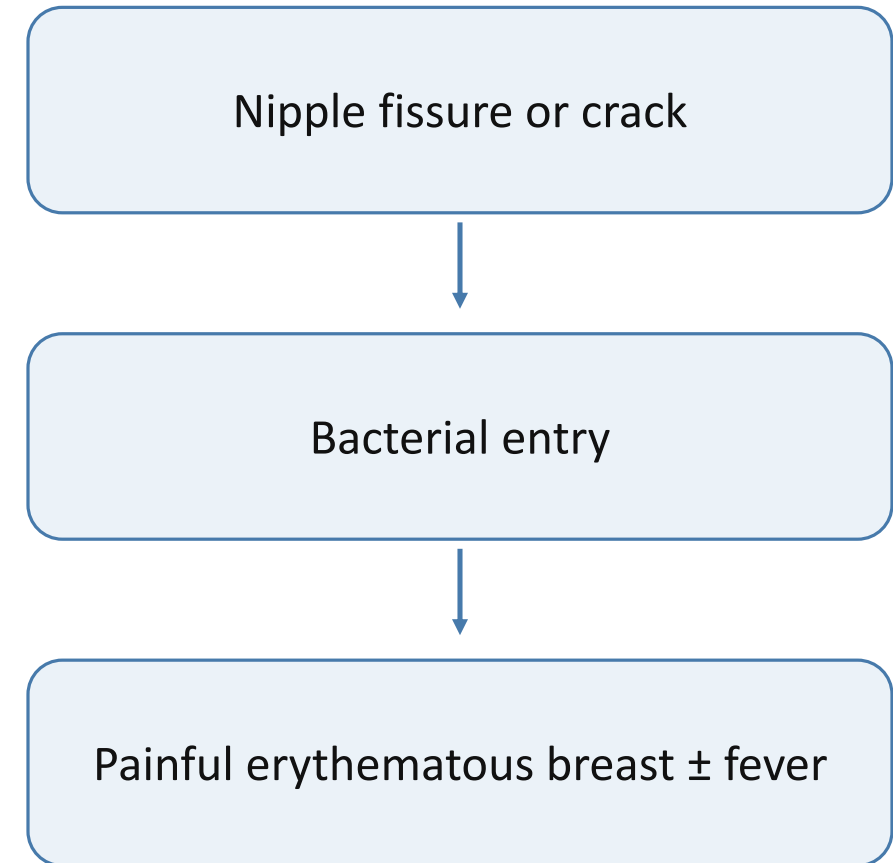
Breast infections occur most often around lactation

- Breast infection is uncommon outside lactation and breastfeeding.
- The immediate breastfeeding period is a vulnerable interval.
- A lactation history provides etiologic context for a red and painful breast.



Lactational mastitis follows breaches in the nipple surface

- Cracks and fissures of the nipple may permit organism entry.
- Bacteria then invade breast tissue and cause local infection.
- Clinical features include erythema, pain and often fever.



Staphylococcal and streptococcal infections differ

- Staphylococcus aureus is a common organism in acute mastitis.
- Staphylococcal infection often causes single or multiple abscesses.
- Streptococci are associated with spreading cellulitis.

S. Aureus

Abscess formation

Streptococci

Spreading cellulitis

Inflammatory breast signs have noninfectious mimics

- Autoimmune and foreign-body–type reactions can inflame breast tissue.
- Extravasated keratin or secretions may elicit inflammation.
- Clinical erythema does not prove bacterial infection.

Infection

Autoimmune process

Extravasated keratin

Extravasated
secretion

Inflammatory breast cancer can mimic mastitis

- Inflammatory carcinoma may present with a red, swollen breast.
- The clinical appearance can resemble an infectious process.
- Keeping inflammatory carcinoma in the differential.

Infectious inflammation

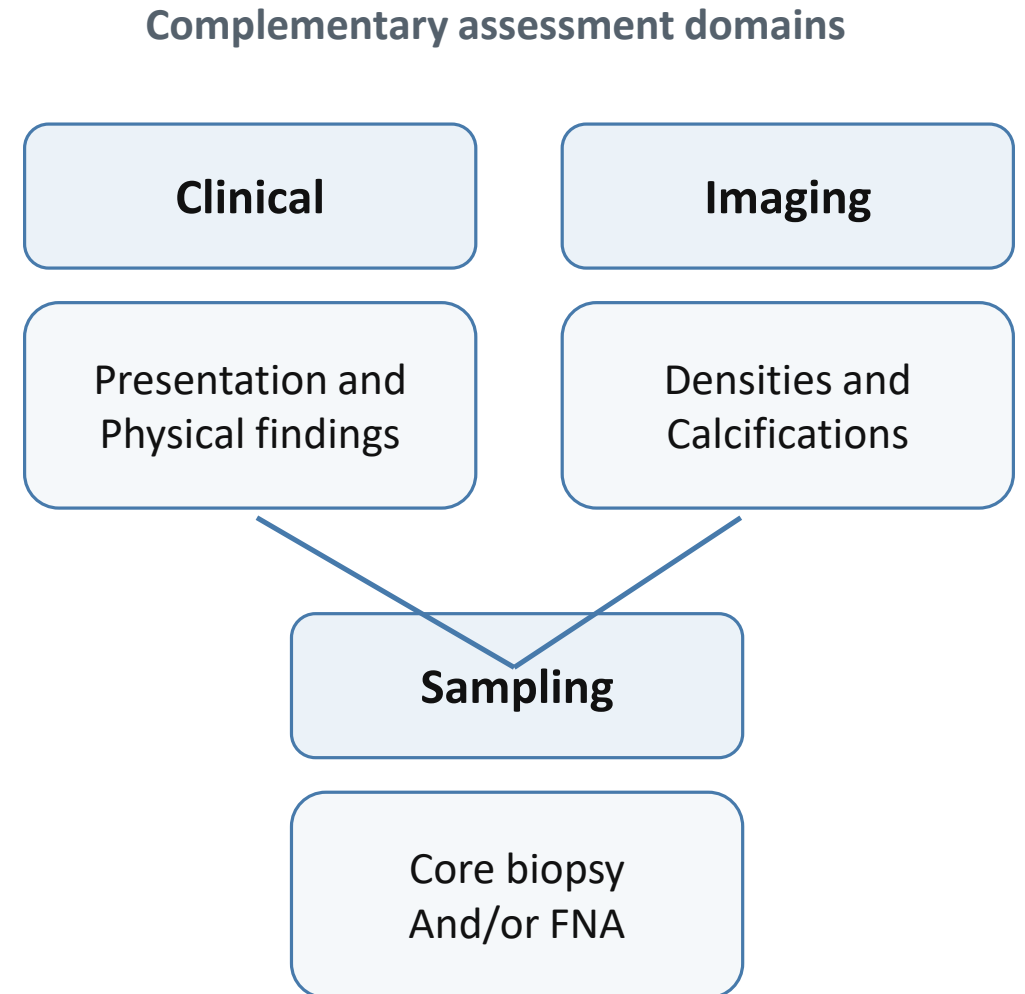
Pain / erythema
Often associated with lactation

Inflammatory carcinoma

Can mimic erythema and swelling
Requires exclusion

Clinical assessment, imaging and biopsy are complementary

- Clinical evaluation defines the presenting problem.
- Imaging identifies structural findings and targets.
- Sampling provides cellular or tissue evidence when indicated.



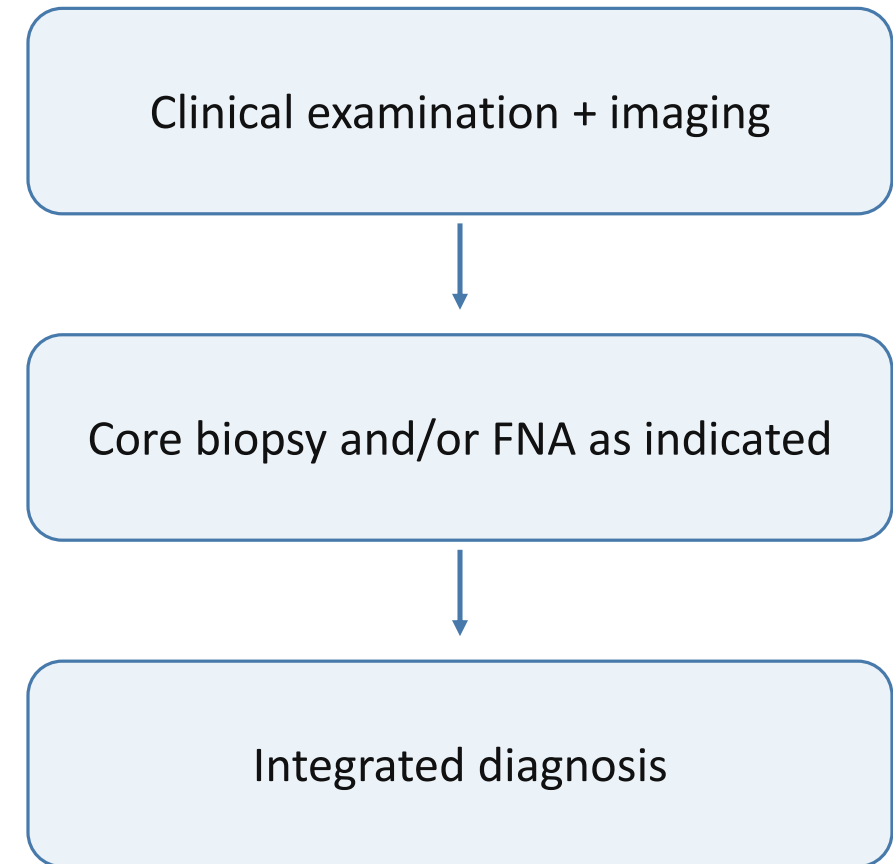
Tissue sampling may be cytologic or histologic

- Robbins mentions core needle biopsy as a tissue-sampling option.
- Fine-needle aspiration cytology provides a cytologic approach.
- The chosen diagnostic method must be interpreted with clinical and imaging findings.

Core biopsy	FNA cytology
Tissue fragments Histologic architecture	Aspirated cells Cytologic assessment

Combined assessment supports accurate case resolution

- The chapter reports detection of more than 99.5% of malignancies in symptomatic patients by combined assessment.
- That figure applies to the combined approach, not one standalone test.
- Discordant clinical, radiologic and pathologic findings require reconciliation.



Different symptoms suggest different diagnostic questions

Presentation	First mechanistic question	Important exclusion
Diffuse nodularity	Normal / fibrocystic tissue?	Concealed discrete mass
Pain	Cyclic, injury, cyst or infection?	Painful carcinoma
Discrete mass	Benign versus invasive features?	Malignancy
Nipple discharge	Pattern, endocrine or duct lesion?	DCIS / carcinoma
Red, edematous breast	Lactational infection or mimic?	Inflammatory carcinoma

Case: Generalized nodularity before menses

A patient reports bilateral diffuse breast lumpiness that becomes more noticeable in the premenstrual period. No distinct focal lump is identified on the initial assessment.

Interpretation and diagnostic reasoning

- Physiologic glandular change and fibrocystic change are possible explanations.
- Pronounced nodularity can justify imaging to exclude a discrete lesion.
- Diffuse texture and a circumscribed mass are different observations.

Case: A new firm, poorly mobile mass

An older patient presents with a new irregular hard breast mass that appears less mobile than the surrounding tissue.

Interpretation and diagnostic reasoning

- Irregular hardness and reduced mobility fit the invasive pattern described.
- Age modifies the probability that a palpable mass is malignant.
- Clinical impression needs imaging and appropriate sampling.

Case: Spontaneous unilateral bloody discharge

A patient aged over 60 reports spontaneous bloody discharge from one nipple, without reported endocrine symptoms.

Interpretation and diagnostic reasoning

- The combination of age, spontaneity, laterality and blood is concerning.
- Benign duct papilloma remains a possible cause.
- DCIS and other carcinoma must be considered and evaluated.

Case: Erythematous painful breast during lactation

A breastfeeding patient develops breast pain, redness and fever after nipple fissuring.

Interpretation and diagnostic reasoning

- This presentation fits the mechanism of acute lactational mastitis.
- *S. Aureus* may lead to abscess; Streptococci may cause cellulitis.
- An atypical or unresolved inflammatory presentation requires broader differential consideration.

Clinical interpretation depends on symptom combinations

- Diffuse nodularity, cyclic pain and a mobile oval mass often have benign explanations.
- A new hard fixed mass, acquired retraction or suspicious discharge changes concern.
- An erythematous breast can be infectious or malignant in appearance.

Common benign contexts

Diffuse nodularity

Cyclic pain

Small bilateral discharge

Concerning contexts

Hard fixed mass

New nipple retraction

Unilateral bloody discharge

Clinical presentations of breast disease: Synthesis

- Anatomy and hormones explain many benign breast symptoms.
- Symptom pattern determines whether diffuse, focal, ductal or inflammatory disease is suspected.
- Malignancy is excluded through integrated assessment, not symptom labels alone.
- Clinical and imaging findings are complemented by core biopsy or cytology when indicated.

Selected reference

Robbins, Cotran & Kumar: Pathologic Basis of Disease

11th edition (2026) • Chapter 23: The Breast

Primary teaching scope: breast anatomy, developmental variants and clinical presentations (printed pp. 944–946).

Clinical anatomy, developmental variants, symptom patterns,
and integrated diagnostic assessment.