

Clinicopathological Spectrum and Diagnostic Evaluation of Breast Lumps: A Narrative Review

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Abstract

Breast lumps are among the most common clinical presentations encountered in surgical and gynecological practices. Although most breast lumps are benign, distinguishing benign lesions from malignant conditions remains a critical aspect of patient management. Advances in clinical examination, imaging modalities, and histopathological evaluation have significantly improved diagnostic accuracy. This review aims to summarize the clinicopathological spectrum of breast lumps, discuss common benign and malignant lesions, and highlight contemporary diagnostic approaches.

Keywords: Breast lump, Fibroadenoma, Breast carcinoma, Histopathology, Triple assessment, Breast disease

Introduction

Breast disorders constitute a major healthcare concern worldwide, affecting women across all age groups. A breast lump is often the first symptom that prompts medical consultation. While most breast lumps are benign, the possibility of breast cancer generates considerable anxiety among patients and clinicians alike. The clinicopathological evaluation of breast lumps involves a combination of history taking, physical examination, imaging studies, and pathological assessment. Histopathological examination remains the gold standard for establishing a definitive diagnosis.

Epidemiology

Breast lumps are common in both developed and developing countries. Benign breast diseases account for a significant proportion of cases, particularly among younger women. The incidence of malignant lesions increases with advancing age.

Table 1. Common Breast Lesions by Age Group

AGE GROUP	COMMON LESIONS
<20 years	Fibroadenoma

20-40 years	Fibroadenoma, fibrocystic changes
40-60 years	Fibrocystic disease, Carcinoma
>60 years	Breast Carcinoma

Clinical Presentation

Patients with breast lumps may present with various symptoms:

- Painless breast lump
- Breast pain (mastalgia)
- Nipple discharge
- Skin changes
- Nipple retraction
- Axillary swelling
- Breast asymmetry

A painless, progressively enlarging lump warrants thorough investigation to exclude malignancy.

Diagnostic Evaluation

Table 1. Recommended Investigation of Breast Lumps by Age Group

Age Group	Common Lesions	First-Line Investigation	Additional Investigation
<20 years	Fibroadenoma, cysts	Ultrasonography (USG)	FNAC/Core needle biopsy if suspicious
20-29 years	Fibroadenoma, fibrocystic changes	Ultrasonography	Core needle biopsy if BI-RADS ≥ 4
30-39 years	Fibroadenoma, fibrocystic disease, phyllodes tumor	Ultrasonography $\pm$ Mammography	Core needle biopsy
40-49 years	Fibrocystic disease, carcinoma	Diagnostic Mammography + Ultrasonography	Core needle biopsy
50-69 years	Breast carcinoma, fibrocystic disease	Mammography + Ultrasonography	Core needle biopsy; MRI in selected cases
≥ 70 years	Breast carcinoma	Mammography + Ultrasonography	Core needle biopsy; staging investigations if malignant

Table 2. Triple Assessment of Breast Lump

Component	Purpose	Examples
Clinical Assessment	Identify suspicious features	Lump size, mobility, skin changes, nipple retraction, axillary nodes
Imaging Assessment	Characterize lesion	Ultrasound, Mammography, MRI
Pathological Assessment	Confirm diagnosis	FNAC, Core Needle Biopsy, Excision Biopsy

Table 3. Imaging Modality Selection

Clinical Scenario	Preferred Investigation
Woman <30 years with palpable lump	Ultrasonography
Woman >40 years with palpable lump	Mammography + Ultrasonography
Dense breast tissue	Ultrasonography ± MRI
High-risk patient (BRCA mutation)	MRI + Mammography
Suspicious lesion on imaging	Core needle biopsy
Simple breast cyst	Ultrasonography-guided aspiration if symptomatic

Triple Assessment

The modern evaluation of breast lumps is based on the principle of triple assessment:

1. Clinical examination
2. Radiological imaging
3. Pathological assessment

When all three components are concordant, diagnostic accuracy exceeds 95%.

Imaging Modalities:

Ultrasonography

Ultrasound is preferred in younger women due to denser breast tissue. It effectively differentiates solid from cystic lesions.

Mammography

Mammography remains the primary screening and diagnostic tool in women above 40 years of age.

Magnetic Resonance Imaging (MRI)

MRI is reserved for selected high-risk patients and complex diagnostic scenarios.

Histopathological Spectrum:

Benign Lesions

Fibroadenoma

Fibroadenoma is the most common benign breast tumor among young women. It presents a mobile, well-circumscribed, painless lump.

Fibrocystic Changes

Fibrocystic disease is characterized by cyst formation, fibrosis, and epithelial proliferation. Patients commonly present with cyclical breast pain.

Breast Abscess

Breast abscesses are commonly encountered in lactating women and may require drainage in addition to antibiotic therapy.

Malignant Lesions

Invasive Ductal Carcinoma

Invasive ductal carcinoma is the most common type of breast cancer, accounting for approximately 70–80% of cases.

Invasive Lobular Carcinoma

This subtype demonstrates diffuse infiltration and may be difficult to detect clinically.

Table 2. Common Histopathological Diagnoses

<i>Lesion</i>	<i>Nature</i>
Fibroadenoma	Benign
Fibrocystic disease	Benign
Breast Abscess	Benign inflammatory
Phyllodes tumor	Benign/Malignant potentia
Invasive ductal carcinoma	Malignant
Invasive lobular carcinoma	Malignant

Risk Factors for Malignancy

Several factors increase the likelihood of breast cancer:

- Increasing age
- Family history of breast cancer
- BRCA1 and BRCA2 mutations
- Early menarche
- Late menopause
- Nulliparity
- Obesity
- Hormonal therapy

Recognition of these risk factors assists in identifying high-risk individuals who may benefit from enhanced surveillance.

Management Strategies

Treatment depends upon the underlying pathology.

Benign Lesions

- Observation and follow-up
- Surgical excision when indicated
- Antibiotic therapy for infectious conditions

Malignant Lesions

Management typically involves a multidisciplinary approach including:

- Surgery
- Chemotherapy
- Radiotherapy
- Hormonal therapy
- Targeted therapy

Early-stage breast cancer is associated with significantly improved survival rates when diagnosed and treated promptly.

Recent Advances

Recent developments in breast pathology include molecular classification, genomic profiling, and targeted

therapeutic approaches. These advances have enabled personalized treatment strategies and improved clinical outcomes.

Artificial intelligence-assisted imaging interpretation and digital pathology are emerging technologies with the potential to enhance diagnostic precision and reduce observer variability.

Conclusion

Breast lumps encompass a broad spectrum of benign and malignant conditions. Comprehensive clinicopathological evaluation remains essential for accurate diagnosis and appropriate management. Triple assessment continues to be the cornerstone of evaluation, while advances in imaging and molecular pathology are shaping the future of breast disease diagnosis and treatment. Early detection, patient awareness, and timely intervention remain critical factors in improving outcomes and reducing breast cancer-related morbidity and mortality.

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