AI-03162 DDx Breast Cancer

Owner	Ⓡ Rigel Arcayan
Tags	MD
Created time	@November 13, 2025 7:23 PM

DDx breast cancer. What are sequential steps in diagnosis? Is mammogram done first then ultrasound? Which test is relevant?

Excellent question — let's break this down clearly and in sequence as it would be approached clinically.

1. Differential Diagnosis (DDx) of a Breast Mass

A breast lump or abnormality may not always be cancer. The main differential diagnoses (DDx) include:

Benign Causes

- Fibroadenoma – smooth, mobile, well-defined mass, common in young women
- Fibrocystic change – cyclic tenderness, multiple nodular areas
- Breast cyst – fluid-filled, compressible
- Fat necrosis – post-trauma, firm irregular mass
- Intraductal papilloma – discharge (may be bloody), usually under the nipple
- Mastitis / abscess – erythematous, tender, febrile
- Lipoma / hamartoma – soft, mobile, non-tender

Malignant Causes

- Invasive ductal carcinoma (IDC) – most common
- Invasive lobular carcinoma

- Ductal carcinoma in situ (DCIS)
- Paget’s disease of the nipple
- Inflammatory breast cancer
- Metastatic lesions (rare, e.g. melanoma, lung, ovary)

2. Sequential Steps in Diagnosis

The diagnostic pathway depends on age, clinical findings, and risk factors, but follows this structured sequence:

Step 1: Clinical Evaluation

- History: Duration, pain, discharge, skin changes, family history
- Physical exam: Size, consistency, fixation, nipple retraction, axillary nodes

→ If suspicion persists → proceed to imaging.

Step 2: Imaging Studies (the “Triple Assessment” starts)

A. Mammography

- First-line test in women ≥40 years old
- Detects microcalcifications and architectural distortions
- Used for screening and diagnosis
- Sensitivity: ~85%, lower in dense breasts

B. Breast Ultrasound (US)

- First-line for women <30–35 years (due to dense breast tissue)
- Second-line after mammogram in older women to characterize lesions (solid vs cystic)
- Also useful for guiding biopsy

C. MRI Breast (if indicated)

- Used in high-risk women, dense breasts, or inconclusive mammogram/US
- Also for extent of disease mapping and post-lumpectomy follow-up

👉 Sequence:

Women <30: Ultrasound → Mammogram if suspicious

Women ≥30–40: Mammogram → Ultrasound if abnormality found or breasts are dense

High-risk or complex: MRI for clarification

Step 3: Tissue Diagnosis (Confirmatory)

If imaging is BI-RADS 4 or 5 (suspicious or highly suggestive of malignancy) → proceed to biopsy:

- Core needle biopsy (preferred) – gives histology
- Fine needle aspiration (FNA) – cytology, less reliable
- Excisional biopsy – if core biopsy inconclusive or discordant with imaging

Step 4: Pathologic and Receptor Analysis

If cancer is confirmed → analyze:

- ER / PR (estrogen, progesterone receptors)
- HER2 status
- Ki-67 proliferation index

This determines subtype and guides therapy.

3. Relevance of Each Test

Test	Purpose	Key Relevance
Clinical exam	First detection	Identifies need for imaging
Mammogram	Screening & diagnosis (>40 yrs)	Detects calcifications, spiculated masses
Ultrasound	Characterization (<40 yrs)	Distinguishes cystic vs solid
MRI	Problem-solving, staging	Detects multifocal/multicentric lesions
Biopsy	Confirmation	Only method that confirms cancer
Receptor testing	Treatment planning	Determines hormonal/targeted therapy

4. Simplified Diagnostic Algorithm

1️⃣ Palpable lump or screening abnormality

2️⃣ Clinical breast exam

3️⃣ Imaging (age-based):

- <30 → Ultrasound
- ≥30 → Mammogram ± Ultrasound
  4️⃣ If suspicious (BI-RADS 4–5): Core needle biopsy
  5️⃣ If confirmed malignant: Receptor studies → staging → treatment plan

Would you like me to create a diagrammatic algorithm (flowchart) of this diagnostic sequence? It's useful for memorization and quick recall in clinical settings.