Hiding in Plain Sight / Site: Architectural Distortions and Breast Asymmetries

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• Book Publication
  – Available through Amazon

• Otherwise, nothing relevant
Architectural Distortion
Asymmetry

• Challenges
  – Architectural Distortion-
    • The perception – What to look for
    • Summation tissues vs ill-defined mass
  – Asymmetry
    “Which” asymmetry ?:
    – “Asymmetry” < previously “density”
    – “Global asymmetry” < previously “asymmetric breast tissue”
    – ”Focal asymmetry” < previously “focal asymmetric density”
    – “Developing asymmetry” < Neodensity
  • Summation tissues vs. ill-defined mass

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Architectural Distortion

Definition BIRADS® (4th ed.)

- “The normal architecture (of the breast) is distorted with no definite mass visible. This includes spiculations radiating from a point and focal retraction or distortion at the edge of parenchyma.”

- Can be difficult to visualize finding based on written description
Architectural Distortion

• Perception:
  – Most commonly missed mammographic finding
    • Burrell HD et al. Rad 1996; 199: 811-817

• Know what to look for
  – To be able to answer “Is it real?”
Architectural Distortion

• Look for
  – Straight lines
  – Radiating/ Spoke wheel appearance
  – Fine, “hair-like” lines in Fat away from the center

• Optimize image
  – Fatty tissue- gray color medium to light
“Calls” of Architectural Distortion: Real and Summation Shadows
Calls of Architectural Distortion
Architectural Distortion

- Straight lines
  - Sort out vessels and ducts
  - Can be a fine, ‘brush-hair’ appearance
- In fat
- Spoke wheel
- Angular fat-glandular interfaces
Arch Distortion vs Spiculated Mass

• Perceptual features are the same:
  – Straightened lines, radiation pattern

• Architectural distortion
  – No central density; hence the center is radiolucent/ fat density

• Spiculated Mass
  – Features of a mass
  – Spiculations describe the margins of the mass
Arch Distortion vs Spiculated Mass

• Perceptual features are the same:
  – Straightened lines, radiation pattern

• Like the peacock, these features may vary with projections
Architectural Distortion vs Summation tissues

• Question at Diagnostic Work-up?

• IS IT REAL??
First question- Is it real?

If not present on the additional view, is it because the technologist spotted the wrong area, off the page, or is it just a summation shadow?
For Location Correlation between spots and full views, Verify with “Continents” of Density- both white and grey, as well as skin, nipple, chest wall.
For Location Correlation between spots and full views, Verify with “Continents” of Density- both white and grey, as well as skin, nipple, chest wall.
Is it Real – Spiculated Mass?
Yes Real!
What do you do
If the 90 degree
Does not help?
ROLLED LAT

ROLLED MED

YES- Real !!
VALUE OF ROLLED VIEWS

- Confirm/ determine 3D location
- Determine 3D location BEFORE Ultrasound
- Can roll the breast in any position
- Place BB on breast to help determine location
- Guard against rolling tissue off the ‘page’.
AD with Tomo

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AD with Tomo

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AD with Tomo

Note Central Lucency- BIOPSY!!

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AD with Tomo

Note Central Lucency- BIOPSY!!

Invasive Ductal Ca

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The Asymmetries

“The Spectrum of Breast Asymmetries: Imaging Features, Work-up, Management” Sickles EA.
Radiological Clinics of No Am. 2007: 765-771

• Asymmetry- one view only
• Global Asymmetry –
  – >,= 1 quadrant
• Focal Asymmetry
  – < 1 quadrant
• Developing asymmetry (neodensity)
Focal Asymmetry

• Is it real? – But in What Way?
Focal Asymmetry

• Is it real? – But in What Way?

  The Differential:
  - Is it an ill defined mass, hence likely to be Ca, OR
  – Is it summation tissues, hence negative for Ca?
    • An “island” of breast tissue
Focal Asymmetry

• Is it a Mass?

• 3 Objective Criteria to Apply
  – **Margins** - Convexed vs Concaved from center
  – **Density** - Homogeneous vs Heterogeneous
  – **Shape** - Rounded (mass) vs Planar / Amorphous
Breast Imaging: Basic Principles

- Solid Ball at Xray - A “Mass”
  - Round Shape
  - Margins convexed outward
  - Homogeneous soft-tissue pattern
  - Centrally more dense because thicker in the center
Breast Imaging: Basic Principles

• Shape Determination of a Mass
  – What is the radiographic density pattern of a fibrocystic *Cyst*?

  – Same “color” (soft-tissue density) as a solid mass, but the pattern is different. Why?
Breast Imaging: Basic Principles

• Shape Determination of a Mass
  – What is the radiographic density pattern of a Cystic mass?

  – Because the SHAPE of a cyst is different than a solid mass in a Mammogram!!
Screening Call-back – Focal Asymmetry
Focal Asymmetry

MLO CC
LM RL

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1 year prior

Developing Asymmetry – Is it a New Mass?
Are margins white LINES?
Rolled Views

• One can roll the breast in ANY projection.
• Very helpful with BB’s for laterality determination
• Use them if you need additional data
• AND – can be used with Tomo !!
Developing Focal Asymmetries

MLO

CC

Two years prior  MLO

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Developing Focal Asymmetries

LM

BIOPSY! – represents focal change
Developing Focal Asymmetries
Developing Focal Asymmetries

2 years later

nipple involved
Developing Focal Asymmetries

2 years later

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Developing Focal Asymmetries

If Real = Ill Defined Mass – BIOPSY!
Developing Focal Asymmetries

If Real = Ill Defined Mass – BIOPSY!

Invasive Ductal Ca

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The A’s: - Summary

• Differentiate findings between “A” and summation shadows
  – Architectural Distortion
    • Look in the fatty tissues for straight lines, spoke wheel
  – Focal Asymmetry
    • Analyze shape, density pattern and margins on all views
    • Use rolled views, in any projection, including Tomo
  – Developing Asymmetry
    • If real = Ill-defined Mass.  BIOPSY!!