Fine Linear or Fine-Linear Branching

• Thin and Irregular
  Less than 0.5 mm Wide

• Discontinuous

• Suggest Filling of Duct by Breast Cancer

• More Suspicious than Fine Pleomorphic Calcifications

• 70% of Biopsied Lesions are Malignant (BI-RADS 4C)
Fine Linear

Core Biopsy: DCIS
Core Biopsy: DCIS
Biopsy Results for “Suspicious” Calcifications According to Pre-Biopsy Morphology Descriptors*

<table>
<thead>
<tr>
<th>BI-RADS Description</th>
<th>Positive Predictive Value (PPV-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse</td>
<td>13%</td>
</tr>
<tr>
<td>Heterogeneous</td>
<td>21%</td>
</tr>
<tr>
<td>Amorphous</td>
<td>29%</td>
</tr>
<tr>
<td>Fine Pleomorphic</td>
<td>29%</td>
</tr>
<tr>
<td>Fine Linear or</td>
<td>70%</td>
</tr>
<tr>
<td>Fine Linear Branching</td>
<td></td>
</tr>
</tbody>
</table>

### Appropriate Pre-Biopsy BI-RADS Coding According to Morphology Descriptors

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Expected PPV</th>
<th>BI-RADS Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse</td>
<td>13%</td>
<td>4B &gt; 10% to ≤ 50%</td>
</tr>
<tr>
<td>Heterogeneous</td>
<td>21%</td>
<td>4B &gt; 10% to ≤ 50%</td>
</tr>
<tr>
<td>Amorphous</td>
<td>21%</td>
<td>4B &gt; 10% to ≤ 50%</td>
</tr>
<tr>
<td>Fine Pleomorphic</td>
<td>29%</td>
<td>4B &gt; 10% to ≤ 50%</td>
</tr>
<tr>
<td>Fine Linear or Branching</td>
<td>70%</td>
<td>4C &gt; 50% to ≤ 95%</td>
</tr>
</tbody>
</table>
Distribution Modifiers for Calcifications

- Diffuse
- Regional
- Grouped
- Linear
- Segmental
Grouped Distribution

• Historically, “Clustered” implied “Suspicious”

• Now, “Clustered” is compatible with either benign or malignant

• “Grouped” is preferred term, rather than “Clustered”
Grouped Distribution

• At least 5 calcifications within “1 cc volume” (BI-RADS 4th edition)

• Changed to “1 cm distance” in BI-RADS 5th edition

• Upper limit of 2 cm when larger numbers of calcifications are grouped
Management of Grouped Calcifications

• Among grouped calcifications that vary in size and shape, there is a continuum from “dystrophic” to “coarse or popcorn-like” to “coarse heterogenous” and “fine pleomorphic”, based on size of the largest particles in the group.
Management of Grouped Calcifications

• As the particle size decreases, likelihood of malignancy increases

• About 30% of biopsies are malignant
Multiple Groups
Linear Distribution

- Calcifications arrayed in a line
- Suggests deposits in a duct
- Elevates suspicion of malignancy
Linear Distribution

- About 60% of biopsied lesions are malignant
- However, vascular and large rod-like calcifications have linear array, too
BI-RADS 4A, 4B, or 4C?
BI-RADS
4A, 4B, or 4C?
BI-RADS 2, 3, or 4?
Segmental Distribution

• Suggests Deposits in a Duct and its Branches

• Suggests Extensive or Multifocal Disease Lobe or Segment
Segmental Distribution

- Also Seen with Secretory Calcifications

  But, Morphology is Distinctive

- Elevates Suspicion for all Other Calcifications

- About 75% of Biopsies are Malignant
BI-RADS Category?
Regional Distribution

• Scattered in a Large Volume
  More than 2 cm in Greatest Dimension

• Not in a Duct Distribution

• May Involve Most of a Quadrant or
  Even More than a Single Quadrant
Regional Distribution

• May be Benign or Malignant

Calcification Morphology is Key

• About 25% of Biopsied Lesions are Malignant
Diffuse Distribution

- Random Distribution Throughout Breast
- Usually Bilateral
- Almost Always Benign, when Punctate, Amorphous, or Bilateral
- Malignancy is Rare
- “Diffuse” is now preferable term to “Scattered”