Diagnosis of Fibroepithelial and Mesenchymal Lesions on Core Needle Biopsy

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Disclosure

• There are no conflicts of interest.
Objectives

• Describe the pathologic characteristics of the most common fibroepithelial lesions diagnosed on core needle biopsy (CNB).
• Describe the pathologic characteristics of the most common mesenchymal lesions diagnosed on CNB.
• Discuss possible diagnostic challenges.
Agenda

- Fibroadenoma
- Phyllodes Tumors
- Pseudoangiomatous stromal hyperplasia
- Hamartomas
- Myofibroblastoma
- Fibromatosis
- Vascular Lesions
Fibroadenoma

• Benign tumors arising from the terminal duct lobular unit (TDLU)
• Most common breast tumors in adolescent and young women
  – Childhood -> 70 years
• Painless, firm or rubbery
• Well-circumscribed
Fibroadenoma

• Several terms have been used to subclassify FAs
  – >90% of FAs are of the adult/usual type

• Immunohistochemistry (IHC):
  – ER-α + epithelium
  – ER-B – stroma
  – PR + stroma
  – Actin & CD34 +/-
  – B-catenin positivity has been reported
Fibroadenoma

- Rarely poses a challenge on CNB diagnosis.
Phyllodes Tumor

- 6-86 (41.7) years
- Solitary, unilateral masses
- Coexistent FAs are found histologically in ~40% of cases
- Isolated examples described in men
- Diagnosis of PT favored if:
  - > 4 cm
  - Rapid growth
Phyllodes Tumor

- Heterogeneous histology
- Elongated epithelial-lined clefts is a defining feature
  - Geographic peninsula
- Expansion and increased stromal cellularity
Phyllodes Tumor

• Stromal overgrowth
  – Absence of an epithelial component in at least one microscopic field at 40× total magnification

• Stromal expansion
  – Absence of epithelium in at least one microscopic field at final 100× magnification

• Use of these parameters has intrinsic limitations
  – Provides a useful and practical tool for evaluation
<table>
<thead>
<tr>
<th>Histological Feature</th>
<th>Fibroadenoma</th>
<th>Benign PT</th>
<th>Borderline PT</th>
<th>Malignant PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor border</td>
<td>Well defined</td>
<td>Well defined</td>
<td>Well defined, may be focally permeative</td>
<td>Permeative</td>
</tr>
<tr>
<td>Stromal cellularity</td>
<td>Variable, scanty to variably cellular, usually uniform</td>
<td>Cellular, usually mild, may be non-uniform or diffuse</td>
<td>Cellular, usually moderate, may be non-uniform or diffuse</td>
<td>Cellular, usually marked and diffuse</td>
</tr>
<tr>
<td>Stromal atypia</td>
<td>None</td>
<td>Mild or none</td>
<td>Mild or moderate</td>
<td>Marked</td>
</tr>
<tr>
<td>Mitotic activity</td>
<td>Usually none, rarely low</td>
<td>Usually few(&lt;5/10HPF)</td>
<td>Usually frequent (5-9/10HPF)</td>
<td>Usually few(≥10/10HPF)</td>
</tr>
<tr>
<td>Stromal overgrowth</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent or very focal</td>
<td>Often present</td>
</tr>
<tr>
<td>Malignant heterologous elements</td>
<td>Absent</td>
<td>Absent</td>
<td>Absent</td>
<td>May be present</td>
</tr>
<tr>
<td>Distribution relative to all breast tumors</td>
<td>Common</td>
<td>Uncommon</td>
<td>Rare</td>
<td>Rare</td>
</tr>
<tr>
<td>Relative proportion of all PTs</td>
<td>-</td>
<td>60-75%</td>
<td>15-20%</td>
<td>10-20%</td>
</tr>
</tbody>
</table>
Phyllodes Tumor

- Epithelial nuclear atypia is marked in 9% PTs
- ADH ~ 1.5%
- ALH, DCIS & LCIS ~ 0.03%
- Invasive carcinoma in PTs is infrequent
Phyllodes Tumor

- Actin & desmin +/-
- CD34+
- CKs focally +
- p53 +
- P63 & p40
- ER/PR
- HER2 –
- AR < 5%
- CD117 ~6%

<table>
<thead>
<tr>
<th></th>
<th>Benign (%)</th>
<th>Borderline (%)</th>
<th>Malignant (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD34</td>
<td>78.6</td>
<td>66.7</td>
<td>44.4</td>
</tr>
<tr>
<td>ER epithelial</td>
<td>67</td>
<td>43</td>
<td>47</td>
</tr>
<tr>
<td>p53</td>
<td>29</td>
<td>57</td>
<td>50</td>
</tr>
</tbody>
</table>
CNB diagnosis?
Fibroepithelial Lesions on CNB

- Excision should be recommended when features are suggestive of PT:
  - $> 2$ mitosis/ 10 HPF
  - $\uparrow$ stromal cellularity
  - Stromal overgrowth
  - Infiltrative borders
  - Tissue fragmentation
Pseudoangiomatous Stromal Hyperplasia

- Myofibroblastic proliferation
- Driven by hormonal imbalances
  - Contraceptives use
- Well circumscribed, non-encapsulated nodules
Pseudoangiomatous Stromal Hyperplasia

- No necrosis or fat infiltration
- PR, actin, desmin and calponin +/-
- 13-26% recurrence rate
Hamartoma

- 4.8% breast tumors
- Well demarcated, encapsulated
- Difficult to distinguish on CNB
Myofibroblastoma

- Women and men
  - 25-87 years
- Wide morphological spectrum
- Metaplasias can be observed
- Desmin & CD34 +
- SMA, BCL2, CD99, CD10, ER, PR and AR +/-
Fibromatosis

- Locally infiltrative lesion
- Fibroblasts/myofibroblasts
- Pectoral fascia & breast parenchyma
- Previous trauma and surgery (implants)
- Poorly circumscribed
Fibromatosis
Fibromatosis
B-Catenin +
CK –
CD34 -

Myofibroblastoma
CD34 +

Phyllodes Tumor
B-Catenin +/-
CK +/-
CD34 +/-
p63 +/-

Metaplastic Carcinoma
B-Catenin +/-
CK +/-
P63 +/-
# Vascular Lesions

<table>
<thead>
<tr>
<th>Entity</th>
<th>Size (cm)</th>
<th>Borders</th>
<th>Intralobular Distribution</th>
<th>Papillary Endothelial Proliferation</th>
<th>Anastomosis</th>
<th>Hyperchromatic Nuclei</th>
<th>Mitosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perilobular Hemangioma</td>
<td>0.2-0.4</td>
<td>Circumscribed</td>
<td>Possible</td>
<td>Absent</td>
<td>Absent</td>
<td>Rare</td>
<td>No</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>0.4-2</td>
<td>Circumscribed</td>
<td>Absent</td>
<td>Present</td>
<td>Rare</td>
<td>Rare</td>
<td>No</td>
</tr>
<tr>
<td>Angiomatosis</td>
<td>9-11</td>
<td>Irregular</td>
<td>Absent</td>
<td>Absent</td>
<td>Rare</td>
<td>Absent</td>
<td>No</td>
</tr>
<tr>
<td>Angiosarcoma</td>
<td>0.7-25</td>
<td>Irregular</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
<td>Present</td>
</tr>
</tbody>
</table>

Angiosarcoma

Sporadic
- 2nd most common mesenchymal neoplasm in breast
- 0.05% breast malignancies
- 15-75 (median: 40) years

Secondary
- Latent interval 30-156 (mean 84) months
- 0.1% incidence
- 46-87 (median: 70) years
- MYC Amplification
# Angiosarcoma

<table>
<thead>
<tr>
<th><strong>Histologic Features</strong></th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Low</strong></td>
</tr>
<tr>
<td>Breast Parenchyma Involvement</td>
<td>Present</td>
</tr>
<tr>
<td>Anastomosing Channels</td>
<td>Present</td>
</tr>
<tr>
<td>Hyperchromatic Nuclei</td>
<td>Present</td>
</tr>
<tr>
<td>Endothelial Tufting</td>
<td>Minimal</td>
</tr>
<tr>
<td>Papillary Hyperplasia</td>
<td>Focally Present</td>
</tr>
<tr>
<td>Solid/Spindle cell foci</td>
<td>Absent</td>
</tr>
<tr>
<td>Mitosis</td>
<td>Absent/rare</td>
</tr>
<tr>
<td>Blood Lakes</td>
<td>Absent</td>
</tr>
<tr>
<td>Necrosis</td>
<td>Absent</td>
</tr>
</tbody>
</table>

References