STEREOTACTIC BREAST BIOPSY: CORRELATION WITH HISTOLOGY

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Breast Cancer in Lithuania

- The most common cancer among women
- About 1400 new cases every year
  - 2009 - 83 cases / 100 000 inhabitants
  - 2001 – 62 cases / 100 000 inhabitants

- Screening started in 2005
Breast cancer screening and better diagnostic techniques have resulted in:

– Significant decrease in size of suspicious lesions detected on imaging studies

– Shift from open surgical to percutaneous image guided biopsy
Majority of detected breast cancers are < 15mm

Minimally invasive percutaneous biopsy techniques are now used to diagnose the vast majority of breast cancers

These smaller impalpable cancers are not typically grossly visible to the Surgeon
## BIRADS (breast imaging and detection system)

<table>
<thead>
<tr>
<th>Category</th>
<th>Assessment</th>
<th>Cancer probability</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal</td>
<td>0%</td>
<td>Screening in 2 years</td>
</tr>
<tr>
<td>2</td>
<td>Benign</td>
<td>0%</td>
<td>Screening in 2 years</td>
</tr>
<tr>
<td>3</td>
<td>Probably benign</td>
<td>&lt;2%</td>
<td>Follow-up</td>
</tr>
<tr>
<td>0</td>
<td>Additional investigation needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Probably malignant</td>
<td>2-95%</td>
<td>Biopsy</td>
</tr>
<tr>
<td>5</td>
<td>Malignant</td>
<td>&gt;95%</td>
<td>Biopsy</td>
</tr>
<tr>
<td>6</td>
<td>Known malignancy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ACR (American College of Radiology)
# Indications for Breast Biopsy

<table>
<thead>
<tr>
<th>BIRADS 3</th>
<th>BIRADS 4</th>
<th>BIRADS 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probably Benign Finding</td>
<td>Suspicious Abnormality</td>
<td>Highly Suggestive of Malignancy</td>
</tr>
</tbody>
</table>

- Anxious patient
- Family history of breast cancer
- To confirm diagnosis
- To differentiate benign from malignant lesions
- To plan surgery
- To plan therapy
Biopsies

- Surgical biopsy
- Blind biopsy
- FNA
- CNB
- Vacuum biopsy
- US guided
- Stereo guided
- MR guided
Indicated Targets for SBB

Mammographic Abnormalities BIRADS 4 and 5 including
- Solid, spiculated, nonpalpable Mass
- Suspicious Micro-calcifications
- Architectural distortion
- Asymmetry
“Accuracy” means correlation with surgical biopsy and depends on several issues:

- Sampling localization accuracy
- Sample volume size
- Type of cancer
Accuracy

Desired goal is 25-40% of recommended biopsies be malignant

2005;235:396 -401
Results
Institute of Oncology, Vilnius University

- Since 2009 – SBB Lorad Multicare prone biopsy table
- 14G CNB (Bard)
- 6-10 samples
Prone SBB

- No vasovagal episodes
- More comfort for patient
- Expensive
- Separate room
Results

- 178 SBB
- 65 operations
- 47 cancer cases (26%)
- Sensitivity – 83%

- 133 – microcalcifications
- 30 – architecture distortion
- 12 – mass
- 4 – mass + microc

- 11 non-correlating results
- 8 False Negative
- 3 not found at final histology
# Results

<table>
<thead>
<tr>
<th>Surgical category</th>
<th>BIRADS category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 (11 cases)</td>
<td>4 (158 cases)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CNB benign</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>benign</td>
<td>-</td>
</tr>
<tr>
<td>malignant</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CNB malignant</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>benign</td>
<td>-</td>
</tr>
<tr>
<td>malignant</td>
<td>-</td>
</tr>
<tr>
<td>No operation</td>
<td>1</td>
</tr>
</tbody>
</table>
8 False negative cases

- 2 – architectural distortion
- 6 – mcc

- 4,3 specimens per case (average 5,1)
- 2,2cm – average specimen length (average 1,5cm)

- 1 case of subcutaneous tissue
- 1 case of atypic hyperplasia
- 6 cases – proliferative disorders
CNB: subcutaneous tissue
Postoperative histology: LCIS
CNB: mcc in breast tissue
Postoperative histology: DCIS
CNB: atypic hyperplasia
Sectoral resection
Mastectomy
Multicentric DCIS, LCIS
I CNB: Adenosis
II CNB: Adenosis
Postoperative histology: invasive ductal carcinoma 6 mm G1
Breast Biopsy – DCIS

Final histology – no cancer

- 3 cases
  - Microcalcifications
  - DCIS
CNB: High grade DCIS
Postoperative histology: ductal epithelium hyperplasia
Left breast
Right breast SBB: low grade DCIS

Left breast SBB: low grade DCIS
Postoperative histology: benign fibrocystic changes, ductal epithelium hyperplasia

Subcutaneous mastectomy?

3 months after surgery
CNB: low grade DCIS
Postoperative histology: fibrocystic changes
Factors that may influence False negative biopsy results:

- Histologic heterogeneity of the focus
- Multifocal, multicentral cancer
- Sampling problems
  - The wrong biopsy place
  - The wrong sample size
- Cancer may grow in neighbour regions with benign lesions
Recommendation

- A determination of concordance of pathology results with imaging findings
Conclusions

- Sensitivity of Stereotactic Breast Biopsy was 83%
- 26% Cancer cases from recommended biopsies (target 25-40%)

- All studies in MEDLINE and EMBASE from 1990 to 2009 09 analysed:
  - 33 studies with SCNB
  - 22 studies with vacuum SB
  - 16 studies with US CNB
  - 7 studies with UG vacuum biopsy
  - 5 studies with blind CNB
Summary of Key Accuracy Findings.

<table>
<thead>
<tr>
<th>Biopsy Guidance Method</th>
<th>Biopsy Method</th>
<th>Strength of Evidence</th>
<th>Studies (Biopsies), n (n)</th>
<th>Pooled Sensitivity Estimate (95% CI), %</th>
<th>Pooled Negative Likelihood Ratio Estimate (95% CI), %</th>
<th>Underestimation Rate (95% CI), %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any or none</td>
<td>Open surgical</td>
<td>Not rated</td>
<td>–</td>
<td>98-99</td>
<td>0.00-0.025</td>
<td>0.0, 0.0</td>
</tr>
<tr>
<td>Stereotactic</td>
<td>Automated gun</td>
<td>Low</td>
<td>33 (7153)</td>
<td>97.8 (95.8-98.9)</td>
<td>0.022 (0.012-0.043)</td>
<td>24.4 (18.0-32.1) 43.5 (35.7-51.7)</td>
</tr>
<tr>
<td>Ultrasonography</td>
<td>Automated gun</td>
<td>Low</td>
<td>22 (7512)</td>
<td>99.2 (98.1-99.6)</td>
<td>0.0090 (0.004-0.021)</td>
<td>13.0 (11.1-15.1) 21.7 (17.7-26.4)</td>
</tr>
<tr>
<td>MRI</td>
<td>Automated gun</td>
<td>Insufficient</td>
<td>16 (7124)</td>
<td>97.7 (97.2-98.2)</td>
<td>0.030 (0.022-0.040)</td>
<td>35.5 (27.1-45.0) 29.2 (23.4-35.9)</td>
</tr>
<tr>
<td>Freehand</td>
<td>Automated gun</td>
<td>Low</td>
<td>7 (507)</td>
<td>96.5 (81.2-99.4)</td>
<td>0.036 (0.0060-0.21)</td>
<td>Could not calculate</td>
</tr>
</tbody>
</table>

ADH = atypical ductal hyperplasia; DCIS = ductal carcinoma in situ; MRI = magnetic resonance imaging.
Recommendations

- A determination of **concordance of pathology results with imaging findings**
- 11 G Vacuum biopsy more accurate than CNB
- Lesion clip marking after biopsy
- Preoperative lesion marking
- Specimens radiography
- Surgical biopsy recommended in case of the lesion close to the skin, chest wall, the nipple; small breast