Preoperative diagnosis
An Anglers View

Ian Ellis
Needle Core Biopsy Good Practice

• Principles of Breast Disease Diagnosis
• Needle Core Biopsy Reporting Categories
• Problems and Pitfalls in Interpretation
Needle Core Biopsy
Good Practice

• Principles of Breast Disease Diagnosis
• Needle Core Biopsy Reporting Categories
• Problems and Pitfalls in Interpretation
Breast Diagnosis

Triple Assessment
Careful use of imaging and clinical examination, combined with aggressive use of needle biopsy will result in:

- Reduced patient anxiety
- Minimum number of women undergoing surgery for benign disease

- Pre-operative diagnosis of cancer:
  - Pre-treatment patient counselling
  - Informed surgical planning allowing single surgical procedures
  - No frozen section
• The minimum standard is at least 70 % pre-operative diagnosis of screen detected breast cancer

• We should be aiming for 100% non-surgical definitive diagnosis of all breast abnormalities
The Assessment Process

The core assessment team:

- Radiologist
- Surgeon
- Pathologist
- Nurse specialist
- Radiographer
The Assessment Process

Reasons for recall:

- Mammographic abnormality
- Symptoms
- Signs:
  - Lump
  - Nipple discharge
  - Recent nipple inversion
  - Skin tether / dimpling
  - Nipple eczema
Mammographic abnormality

Symptoms or signs

Technical recall

Short term recall

Recall for Assessment

Triple Assessment Process

Needle biopsy

Routine Screening

Multidisciplinary Review

Short term recall

Treatment
Pre-operative Diagnosis: How

FNAC and Core biopsy

Large Core and Vacuum Mammotomy
Image Guided Biopsy - Choice of Technique

FNAC or Core biopsy?
FNA or Core: Ultrasound
Review of the literature
PD Britton The Breast 1999;8:1-4

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<thead>
<tr>
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FNA or Core : Stereotaxis
Review of the literature
PD Britton The Breast 1999;8:1-4

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<td>1.5</td>
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Automated Large-Core Needle Biopsy of Surgically Removed Breast Lesions: Comparison of Samples Obtained with 14, 16 and 18 gauge Needles


Methods
53 resected lesions were sampled with 16, 14 and 18 gauge needles. Samples were evaluated independently by three pathologists.

Results
the sensitivities for malignancy were:

18g 65%
16g 92%
14g 100%
NHSBSP Performance 1994 -1999
Non-operative Diagnosis

Minimum (>70%)
Expected (>90%)
• FNA is no longer recommended for sampling microcalcifications or stellate lesions

• Core biopsy with specimen radiography to confirm adequate sampling is now the required standard for sampling suspicious microcalcifications
When have mammographic calcifications been adequately sampled at needle core biopsy


- 57 consecutive 14 gauge core biopsies of malignant microcalcifications

- Five or more flecks of calcification gives an absolute sensitivity for malignancy of 100%

- Three or more separate cores containing calcification provided an absolute sensitivity for malignancy of 100%
Predicting Invasion in Mammographically detected microcalcification

Bagnall MJC, Evans AJ, Wilson ARM et al.
Clinical Radiology 2001

- Retrospective analysis of 116 stereo core biopsies of microcalcifications
- Correlation of final histology with original mammographic features
- 35 clusters (30%) were associated with invasive carcinoma and core biopsy detected this in 55%
- Invasion was independent of clinical features, calcification morphology and cluster size
- High grade of DCIS and increasing numbers of calcifications were predictive of invasion (high grade and > 40 48%; high grade < 40 15%; not high grade 0%)
Image Guided Breast Biopsy: How many passes?

Ultrasound:
1 - 3 passes

Stereotaxis:
Minimum of 5 passes
Minimum of 10 for calcifications

For lesions containing calcification
x-ray the specimens
UK Audit of NCB Performance

NHS BSP Audit 1997-2007 - 20001 cases

• Gradual increase in the number of NCBs
• Improvement of performance
  - absolute sensitivity increased from 84.9% to 96.4%
  - complete sensitivity increased from 90.9% to 99.7%.
• Gradual reduction in the number of surgical interventions after benign (B2) and negative (B1) NCB diagnoses.

El-Sayed EJC 2008
FNAC or Core biopsy?

- Use 14 g 20 mm throw automated core devices

- Use core for all biopsies except when:
  - lesion too small
  - lesion too superficial
  - Difficult diagnosis predicted

- Core will provide the answer in 80% or more
• FNA is unreliable for sampling calcifications, stellate lesions, and diffuse mammographic or ultrasound lesions
• Core biopsy is used to confirm benignity
• Core biopsy does not exclude invasive disease in association with DCIS
## Comparison of re-biopsy rates

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<td>Masses</td>
<td>6.1%</td>
<td>1.7%</td>
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<td>Calcifications</td>
<td>23.7%</td>
<td>11.6%</td>
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<tr>
<td>Total</td>
<td>14.9%</td>
<td>9%</td>
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LE Philpotts et al AJR 1999;172:683-687
Core Needle Biopsy of Challenging Benign Breast Conditions: A Comprehensive Literature Review
Reynolds HE, AJR 2000; 174: 1245-1250

Atypical Ductal Hyperplasia (630 of 18,542 biopsies)

<table>
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<tr>
<th>Malignancy</th>
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<td>14 gauge core</td>
<td>155/375</td>
<td>41</td>
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<tr>
<td>Vacuum Mammotomy</td>
<td>15/98</td>
<td>15</td>
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<tr>
<td>All core techniques</td>
<td>214/579</td>
<td>37</td>
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</table>
Stereotactic breast biopsy of nonpalpable lesions: determinants of DCIS underestimation rates

DCIS underestimation rates:

20.4% with core compared to 11.2% with mammotome
24.3% for masses compared to 12.5% for calcifications
17.5% for < 10 cores & 11.5% for > 10 cores

Mammotomy

Disadvantages:
- Time
- Cost

Advantages:
- Single pass
- Vacuum
- Sample flexibility
- Use under ultrasound guidance
- Minimally invasive
When should vacuum assisted mammotomy be used?

**Indications:**
- Very small mass lesions
- Architectural distortions
- Failed “conventional” core biopsy
- Microcalcifications
- Papillary and mucocele like lesions
- Diffuse non-specific abnormality
- Excision of benign lesions
- Sentinel node sampling?
When should ultrasound guided vacuum assisted mammotomy NOT be used?

- For therapeutic treatment of breast cancer
- When core biopsy or FNA are equally effective
Possible indications for diagnostic stereotactic excision

**Diagnosis:**

Benign lesions with a risk of associated malignancy such as:

- Radial scar / CSL
- Papillary lesions
- Mucocoele like lesions
Image Guided Breast Biopsy

Conclusions

• The aim must be to achieve as near as possible 100% non-operative diagnosis of breast problems
• Both palpable and impalpable breast lesions should be biopsied under image guidance
• Automated core biopsy is the technique of first choice
• Ultrasound should be the guidance technique of first choice
• Digital stereotactic core biopsy should only be used for lesions not visible on ultrasound
• FNA is not recommended for calcifications or stellate lesions
Image Guided Breast Biopsy

Conclusions

• 14g core biopsy can provide a definitive diagnosis in 80% of cases and should be the preferred method.
• Mammotomy can provide the diagnosis in the remainder.
• Stereo guided mammotomy is particularly effective for small clusters of indeterminate microcalcifications and calcifications in sites difficult to access with core biopsy.
Needle Core Biopsy Good Practice

- Principles of Breast Disease Diagnosis
- Needle Core Biopsy Reporting Categories
- Problems and Pitfalls in Interpretation
Needle Core Biopsy Reporting

Reporting Categories

B1 Normal tissue
B2 Benign lesion
B3 Lesion of uncertain malignant potential
B4 Suspicious
B5 Malignant
Needle Core Biopsy Reporting Categories

B1 (normal tissue)

- Normal breast ducts and lobules
- Mature adipose tissue or stroma
- Atrophic lobules calcification
- Minor degrees of fibrocytic change
Needle Core Biopsy Reporting Categories

B2 (benign lesion)
A distinct benign lesion present for example:

- fibroadenoma
- cyst
- fibrocystic change
- sclerosing adnosis
- duct ectasia
- fat necrosis
- abscess
Needle Core Biopsy Reporting Categories

B3 (lesion of uncertain malignant potential)

Histological features present benign but lesion type known to be heterogeneous or to be associated with risk of associated malignancy

- Atypical epithelial proliferations (ADH)
- Lobular neoplasia (ALH / LCIS)
- Phyllodes tumour
- Papillary tumours
- Radial scar / complex sclerosing lesion
Needle Core Biopsy Reporting

B3 Atypical Epithelial proliferation

Term “Atypical ductal hyperplasia / ADH” inappropriate
- Derived from surgical specimens
- Dependent on size, histological and architectural features
Needle Core Biopsy Reporting

B3 Atypical Epithelial proliferation

High chance (50%) of coexisting in situ or invasive cancer on surgical biopsy

Liberman Am J Roetgen. 164, IIII, 1995
Needle Core Biopsy Reporting

B3 Atypical Epithelial proliferation

- Uniform population of cells
- Varying degrees of cytonuclear atypia
- Partial duct space involvement or one duct space completely
- Microfocal acinar involvement
- DCIS should have been considered in differential diagnosis
- Range of lesions included
- Often debate between B3 and B4 categorization
Needle Core Biopsy Reporting

B3 Lobular Neoplasia

• Distinction between ALH and LCIS is derived from surgical specimens and relies on extent of lobular involvement

• Distinction not realistic on limited needle biopsy sample

• Management implications of LCIS are different from DCIS and invasive carcinoma
Needle Core Biopsy Reporting

B3 Lobular Neoplasia

• Frequently a chance finding
• May not represent the mammographic lesion
• Risk (10 - 50%) of coexisting insitu or invasive cancer
• Multidisciplinary discussion needed
Needle Core Biopsy Reporting

B3 Papillary Lesion

- Intralesion heterogeneity common
- Associated epithelial proliferation common and may be difficult to classify on a limited sample
Needle Core Biopsy Reporting

B3 Radial scar / CSL

- May show intrallesional heterogeneity
- Associated with ADH / DCIS and low grade invasive cancer
- Coexisting malignancy usually focal and may not be present in a limited sample
Needle Core Biopsy Reporting

B3 Phyllodes Tumour

- Requires combination of architectural and stromal features
- Distinction between cellular fibroadenoma and benign phyllodes tumour can be difficult
- Mild increase in stromal cellularity alone insufficient for definitive diagnosis
- Multidisciplinary discussion may be helpful
Needle Core Biopsy Reporting Categories

B4 (suspicious)

*Malignant features present but insufficient for definite diagnosis*

- Crush artefact or poor fixation
- Abnormalities separate from main specimen (e.g., attached blood clot)
- Microfocal changes
- Incomplete involvement of duct space by high grade atypia
- Multiple partial duct involvement by low grade atypia (also consider B3)
Needle Core Biopsy Reporting

Reporting Categories

B1 Normal tissue
B2 Benign lesion
B3 Lesion of uncertain malignant potential
B4 Suspicious
B5 Malignant
B3 and B4 Audit

2-year period 1998 - 2000

3822 breast needle core biopsies
• 2997 from symptomatic patients
• 825 from screening
B3 and B4 Audit

B4 - 1%  43 reports (40 patients)
B3 - 3%  120 reports (116 lesions, 115 patients).

Frequencies screening versus symptomatic
B4     2.5% versus 0.7%
B3     7.3% versus 2.0%

both higher in screening than in symptomatic patients
B3 and B4 Audit

B4

Most commonly used for small fragments of atypical cells separate from the main core or focal atypical intraductal proliferations.

Excision biopsies were performed in 39 patients with B4 core

Invasive carcinoma or ductal carcinoma in situ was seen in 33 of the patients with B4 (85%)
B3 and B4 Audit

**B3**

The criteria for calling a core B3 were:

- atypical intraductal epithelial proliferations
- lobular neoplasia,
- radial scar,
- papillary lesion,
- fibroepithelial lesion with cellular stroma
- spindle cell proliferations.
B3 and B4 Audit

B3

Excision biopsies were performed in 96 with B3 core.

Invasive carcinoma or ductal carcinoma in situ was seen in 29 of those with B3 cores (25%).

Some categories of B3 core were associated with a higher rate of malignancy (40% for atypical intraductal epithelial proliferations and 46% for lobular neoplasia).
Needle Core Biopsy Reporting

Reporting Categories

B1  Normal tissue
B2  Benign lesion
B3  Lesion of uncertain malignant potential
B4  Suspicious
B5  Malignant
Needle Core Biopsy Reporting

Reporting Categories

B1 Normal tissue
B2 Benign lesion
B3 Lesion of uncertain malignant potential
B4 Suspicious
B5 Malignant
Key Messages

• Pathologists need as much tissue as possible to make a categorical diagnosis of malignancy

• Quality of tissue sample important

• Quality and quantity of tissue sample relates directly to accurate non operative diagnosis
Needle Core Biopsy Reporting Categories

B5 (malignant)

• Ductal carcinoma in situ

• Lobular neoplasia (if indistinguishable from low grade DCIS, otherwise B3)

• Invasive carcinoma
NCB Audit: Method

- June 1997 to May 1998
- 610 malignant (B5) cores
- 300 assessable with invasive carcinoma on excision
- 310 from elderly patients, locally advanced, local recurrences, DCIS, awaiting excision or insufficient tumour for assessment
# NCB Audit: Results

## Histological Grade

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<th>Core Grade</th>
<th>Excision Grade</th>
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<td>11</td>
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<tr>
<td></td>
<td>4</td>
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<tr>
<td>2</td>
<td>16</td>
<td>160</td>
</tr>
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<td></td>
<td>90</td>
<td></td>
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<td>3</td>
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<td>87</td>
</tr>
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<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>83</td>
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<td>Total</td>
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<td>141</td>
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\( \kappa = 0.54 \)
NCB Audit: Results

Histological Grade

• 211 of 300 cores (70%) were accurately graded

• 89 (30%) incorrectly graded:
  69 (23%) lower grade in NCB
  19 (7%) higher grade in NCB
NCB Audit: Results

Histological Grade

- No cases classified as grade 3 on core but grade 1 on excision specimen
- 4 cases grade 1 on core but grade 3 on excision
- Each 2,2,1 on core but 2,3,3 in excision
- 1 patient had 2 tumours:
  - 2,2,1 tubular
  - 2,3,3 tubular mixed
## NCB Audit: Results

### Tubule Formation

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$\kappa = 0.61$
## NCB Audit: Results

### Nuclear Pleomorphism

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$$\kappa = 0.40$$
# NCB Audit: Results

## Mitotic Frequency

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<td>42</td>
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<td>58</td>
<td>104</td>
<td>300</td>
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κ = 0.35
NCB Audit: Results

Histological Type

Type correctly identified
159 of 172 NSTs

Mis-typed in core
8 tubular mixed
1 NST+special type
1 Atyp medullary
1 Lobular
2 misc. others

21 of 49 tubular mixed

21 NST
7 tubular
# NCB Audit: Results

## Histological Type

<table>
<thead>
<tr>
<th>Correctly Identified</th>
<th>Mis-typed in</th>
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<td>17 of 29 lobular subtypes</td>
<td>11 NST</td>
</tr>
<tr>
<td>11 of 12 tubular</td>
<td>1 lobular + NST</td>
</tr>
<tr>
<td>4 of 5 mucinous</td>
<td>1 Tub Mix</td>
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<tr>
<td>2 of 6 NST+special type</td>
<td>1 cribriform</td>
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2 NST
1 Tub mix
1 Inv papillary
NCB Audit: Results

Type Classification:

216 of 300 (72%) correctly assigned

Misclassified cases usually explicable
NCB Audit: Summary

- Accurate diagnostic test
- Good correlation of histological grade between core and excision specimens
- Underscoring mitotic frequency commonest cause of discrepancy
NCB Audit: Summary

- Good correlation of histological type between core and excision specimens
- Tumour heterogeneity can lead to misclassification of tumour type
- Assessment of VI and DCIS not reliable
NCB Audit: Conclusion

- Grade and Type assessment of breast carcinoma is feasible on core biopsy samples
- Improved methodology for mitotic frequency/growth fraction assessment is required
- Multiple site sampling may improve type assessment
Needle Core Biopsy
Good Practice

• Principles of Breast Disease Diagnosis
• Needle Core Biopsy Reporting Categories
• Problems and Pitfalls in Interpretation
Problems & Pitfalls in Needle Core Biopsy

• Calcification
• Epithelial atypia
  • Minor degrees of epithelial atypia
  • Microfocal high grade atypia
  • Lobular neoplasia
  • Columnar cell change and FEA
• Papillary Lesions
• Sclerosing lesions / adenosis v tubular carcinoma
• Fibroepithelial lesions
• Infiltrating lobular carcinoma
• Presence of invasion
• Artefacts
Problems & Pitfalls in Needle Core Biopsy

- **Calcification**
- **Epithelial atypia**
  - Minor degrees of epithelial atypia
  - Microfocal high grade atypia
  - Lobular neoplasia
  - Columnar cell change and FEA
- **Papillary Lesions**
- **Sclerosing lesions / adenosis v tubular carcinoma**
- **Fibroepithelial lesions**
- **Infiltrating lobular carcinoma**
- **Presence of invasion**
- **Artefacts**
Needle Core Biopsy Reporting Categories

Calcification in core biopsy

- All bx for $\text{Ca}^{2+}$ should undergo immediate specimen Xray
- The representative nature of the calcification should be confirmed by a radiologist
- Specimen examination should be targeted
  - Levels X 3 - 6
  - Polarised light examination
- Multidisciplinary discussion to confirm representative nature of any calcification present
## Number of Calcific Elements on Specimen

**Radiology vs Core Histology**

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<thead>
<tr>
<th>Number of Ca’s</th>
<th>Normal/ Benign</th>
<th>ADH Suspicious</th>
<th>Malignant</th>
<th>Complete Sensitivity</th>
<th>Absolute Sensitivity %</th>
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<td>5 or more</td>
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<td>100</td>
<td>100</td>
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## Number of Cores Containing Radiographic Calcification vs Core Histology

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<th>Number of Cores</th>
<th>Normal/ Benign</th>
<th>ADH Suspicious</th>
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<th>Complete Sensitivity</th>
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## Comparison of re-biopsy rates

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<th>Category</th>
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<td>11.6%</td>
</tr>
<tr>
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<td>14.9%</td>
<td>9%</td>
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LE Philpotts et al AJR 1999;172:683-687
Problems & Pitfalls in Needle Core Biopsy

• Calcification
• Epithelial atypia
  • Minor degrees of epithelial atypia
  • Microfocal high grade atypia
  • Lobular neoplasia
  • Columnar cell change and FEA
• Papillary Lesions
• Sclerosing lesions / adenosis v tubular carcinoma
• Fibroepithelial lesions
• Infiltrating lobular carcinoma
• Presence of invasion
• Artefacts
Needle Core Biopsy Reporting

B3 Atypical Epithelial proliferation

- Uniform population of cells
- Varying degrees of cytonuclear atypia
- Partial duct space involvement or one duct space completely
- Microfocal acinar involvement
- DCIS should have been considered in differential diagnosis
- Range of lesions included
- Often debate between B3 and B4 categorization
Needle Core Biopsy Reporting

B3 Atypical Epithelial proliferation

High chance (50%) of coexisting in situ or invasive cancer on surgical biopsy

Liberman Am J Roetgen. 164, IIII, 1995
Problems in Needle Core Biopsy

Atypical Epithelial Proliferation

- Term “atypical ductal hyperplasia (ADH)” is inappropriate in core biopsies
  - Derived from surgical specimens
  - Dependent on size, cytology & architecture
Problems in Needle Core Biopsy

Atypical Epithelial Proliferation

- Uniform proliferation
- Varying degrees of cytonuclear atypia
- Partial duct involvement or all of only 1 duct space
- DCIS considered in differential diagnosis
“ADH” in Core Biopsy

Excision of 21 of 25 cases of ADH on core
52% = carcinoma (8 DCIS, 3 invasive)

Liberman et al. AJR 1995;164;1111-1113

Excision of 16 of 19
69% = carcinoma

Jackmann. Radiology 1994;193;91-95

8 of 9 lesions
88% = carcinoma (6 DCIS, 1 invasive)

Dahlstrom. Histopathology.1996;28;537-541
Underestimation of ADH with 11g vacuum-assisted devices

15%

10%
  Liberman. Radiology. 1998;208;251-260

19% (14-gauge gun - 44%, 14-gauge vacuum-assisted - 39%)
Needle Core Biopsy Reporting

Epithelial proliferative lesions

I  Usual hyperplasia  B2

II  Microfocal epithelial atypia in lobules
    Minimal degree of atypia  B2
    Moderate degree of atypia  B3
    High grade atypia  B4
Problems & Pitfalls in Needle Core Biopsy

Minor degrees of epithelial atypia

Common problems

• High mag. lens examination
• Minor degrees of cytonuclear variation common
• Fibrocystic change
• Columnar cell change (BDA)
• Apocrine change
• Involution
• Reactive changes
Problems & Pitfalls in Needle Core Biopsy

Minor degrees of epithelial atypia

Dilema - significant? v not significant

- Tendency to overdiagnose
- Look at whole picture
- Reason for biopsy
Needle Core Biopsy Reporting

Epithelial proliferative lesions

IV Low and intermediate grade atypical epithelial proliferation

1 One or few spaces involved
Worrisome - can't ignore
Lacks extent/degree of duct / lobule involvement to classify as suspicious of DCIS.
Surgical excision = ADH

2 Greater extent
Multiple spaces involved
Architecture and epithelial character of low grade DCIS
Insufficient for confident diagnosis of DCIS

3 Multiple spaces
Complete involvement of at least two spaces with definite features of DCIS
Problems & Pitfalls in Needle Core Biopsy

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- Artefacts
Needle Core Biopsy Reporting

Epithelial proliferative lesions

V. High grade atypical epithelial proliferation

Part of one space  B4

One or more complete spaces involved  B5

Caution is advised when a single profile only is present.

Additional features such as necrosis may be useful.
Problems & Pitfalls in Needle Core Biopsy

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Epithelial proliferative lesions

III Lobular neoplasia

Typical  B3

Indistinguishable from low grade DCIS (rare)  B5
Problems in Needle Core Biopsy

Lobular Neoplasia

- Distinction between ALH & LCIS derived from surgical specimens & relies on extent
- Distinction not realistic on core biopsies
- Management implications of LCIS different from DCIS
  - 85% of USA oncological surgeons (Society of Surg Oncol & Society for Study of Breast Disease) suggest observation as the preferred option

Problems in Needle Core Biopsy
Lobular Neoplasia Vs. Low Grade Solid DCIS

- Filling of membrane-bound spaces by uniform, regularly placed cells with clear cytoplasm
- DCIS more sharply defined cell membranes
- LCIS more discohesion
- Intracytoplasmic lumina in LCIS
- Lobulo-centricity of LCIS
- May be impossible to differentiate in core biopsies - E-cadherin negativity alone not sufficient for diagnosis of lobular neoplasia
Pleomorphic LCIS

**Pleomorphic Lobular Carcinoma of the Breast:**
An Aggressive Tumor Showing Apocrine Differentiation

VINCENTO EUSEBI, MD, FATIMA MAGALHAES, MD, AND JOHN G. AZZOPARDI, MD

**Pleomorphic Variant of Invasive Lobular Carcinoma of the Breast**

*Hum Pathol* 23:1167–1171.
NOEL WEIDNER, MD, AND JOSEPH P. SEMPLE, MD

**Clinical, Histopathologic, and Biologic Features of Pleomorphic Lobular (Ductal-Lobular) Carcinoma In Situ of the Breast: A Report of 24 Cases**

Nour Sneige, M.D., Jianzhou Wang, M.D., Barbara A. Baker, M.D., Savitri Krishnamurthy, M.D., Lavinia P. Middleton, M.D.

Division of Pathology and Laboratory Medicine, The University of Texas M. D. Anderson Cancer Center, Houston, Texas

*Mod Pathol* 2002;15(10):1044–1050
Pleomorphic Lobular Ca
Needle Core Biopsy Reporting

Epithelial proliferative lesions

III Lobular neoplasia

Typical \hspace{1cm} B3

Indistinguishable from low grade DCIS (rare) \hspace{1cm} B5
= solid duct involvement and / or pleomorphic cytomorphology

Report as mixed in situ carcinoma (LCIS / DCIS)
E Cadherin negative
Lobular Neoplasia in Core Biopsy

1315 consecutive lesions
LCIS in 16 (1.2 %)
Surgical biopsy in 14 lesions in 13 women
In 5 LCIS was present plus a high-risk lesion (3 RS, 2 ADH); 1 had DCIS at subsequent surgery
In 4 LCIS features overlapped with DCIS in core; 2 surgery revealed DCIS (1) or invasive lobular carcinoma (1)
In 5 surgery revealed no malignancy
But 5 (38%) of 13 women with LCIS lesions had synchronous or metachronous infiltrating carcinoma in the ipsilateral (1) or contralateral (4) breast

Lobular Neoplasia in Core Biopsy CHN

- 3822 core biopsies
- 13 cases (0.3%) classified as B3 with lobular neoplasia, 1 in association with a papillary lesion
- 5 incidental finding
- 8 excised
  - 4 invasive carcinoma
  - 2 DCIS
  - 2 benign - 1 lobular neoplasia
Lobular Neoplasia Nottingham Audit

Detailed radiological-pathological review of 47 patients with cores showing classical lobular neoplasia

• Immediate surgical excision in 25 patients
  - invasive carcinoma in 7
  - ductal carcinoma in situ (DCIS) in 1
  - pleomorphic LCIS in 1

• Radiological-pathological review showed core biopsy
  - missed a mass in 5
  - missed calcification in 2
  - and calcification appeared adequately sampled in 2.

Menon Virchows Arch 2008
Lobular Neoplasia
Nottingham Audit

Nineteen patients had follow-up of at least 2 years
- Four patients developed malignancy at the site of the core biopsy (invasive carcinoma in three, DCIS in one);
- one carcinoma was mammographically occult,
- one patient had dense original mammograms and
- two had calcifications apparently adequately sampled by the core.

Menon Virchows Arch 2008
Lobular Neoplasia
Nottingham Audit

Conclusions

• Most carcinomas identified at the site of core biopsy showing lobular neoplasia were the result of the core missing the radiological lesion, emphasising the importance of multidisciplinary review and investigation of any discordance.

• Some carcinomas were found after apparently adequate core biopsy, raising the question of whether excision biopsy should be considered after all core biopsy diagnoses of lobular neoplasia.
LN in core biopsies

Current Diagnostic Pathology (2004) 10, 183-192

MINI-SYMPOSIUM: BREAST PATHOLOGY

Lobular in situ neoplasia

L.G. Fulford, J.S. Reis-Filho, S.R. Lakhani

• LN incidentally diagnosed in the core biopsy
• Excision should be performed:
  - Another high risk lesion (ADH or DCIS)
  - Discordance between clinical/radiological/pathological findings
  - Mass lesion or architectural distortion
  - Pleomorphic LCIS
  - ALH or LCIS with mixed histological features (LCIS vs DCIS)
Problems & Pitfalls in Needle Core Biopsy

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Needle core biopsy can reliably distinguish between benign and malignant papillary lesions of the breast

- All B2 (n = 1) and B3 (n = 15) papillary lesions were benign (ADH in 4)
- All B4 (n = 4) papillary lesions were malignant

Papillary lesions on core biopsy
NHSBSP categories

B2  Lesion small and/or an incidental finding or believed to be adequately or fully sampled

B3  Lesion only partly sampled or associated UEH or uniform epithelial proliferation

B4  Epithelial proliferation suspicious of DCIS

B5  Unequivocal papillary CIS
Excision of B3 & B4 papillary lesions (NCH 1998 - 2000)

B3 papillary
- 2 malignant (1 DCIS, 1 invasive)
- 17 benign (ADH in 1)
- 4 not excised

B3 papillary + epithelial atypia
- 2 malignant (1 DCIS, 1 invasive)
- 2 benign (ADH in 1)

B4 papillary
- 3 malignant (1 DCIS, 2 invasive)
- 1 benign (ADH in 1)
- 1 not excised
Correlation of image-guided core and excision biopsy in papillary lesions of the breast. Sumkin et al. Mod Pathol 2001;14:34A

<table>
<thead>
<tr>
<th>Core diagnosis</th>
<th>Excision diagnosis</th>
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<tr>
<td>Benign</td>
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</tr>
<tr>
<td>Malignant</td>
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</table>

64 of 105 lesions not excised
Immunohistochemistry increases the accuracy of diagnosis of benign papillary lesions in breast needle core biopsy specimens

Shah et al. Histopathology 2006;48:683-91

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<tr>
<td></td>
<td>Benign</td>
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<td>B2 papillary</td>
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<td>B3 papillary</td>
<td>7</td>
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<tr>
<td>B4 papillary</td>
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<tr>
<td>B5 papillary</td>
<td>1</td>
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</table>

All cores had immuno for CK5/6, p63 & calponin
21 not excised
Problems & Pitfalls in Needle Core Biopsy

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Audit of features in core biopsy

Final diagnosis in surgical excision

• Fibroadenoma 38  (2004)
• Phyllodes 44  (July 1998 - Dec 2005)
Features assessed re phyllodes on core biopsy

- Stromal cellularity (mild increase in 50%+)
- Stromal overgrowth (x10 field with no epithelium)
- Entrapped fat
- Fragmentation
- Irregular edge
- Marked stromal pleomorphism
- Stromal mitoses
Features favouring phyllodes on core biopsy

- Stromal cellularity (mild increase in 50%+)
- Stromal overgrowth (x10 field with no epithelium)
- Entrapped fat
- Fragmentation
- Irregular edge
- Marked stromal pleomorphism
- Stromal mitoses

First four features Kappa ≥ 0.69

(need to test on independent set of biopsies)
Excision diagnosis of phyllodes tumour (n = 44)

Core diagnosis
Fibroadenoma 8 (7 patients)
(review: 1 should have been called B3)
Juvenile fibroadenoma 3
(cf 1757 core diagnoses of fibroadenoma)

Result of tumour heterogeneity (phyllodes tumour with areas like fibroadenoma)
Balance between identifying phyllodes and unnecessary excision of fibroadenomas
Fibroepithelial lesions

Indications for excision
Phyllodes in differential on core
Size 30mm+
Growing
Patient wishes
Core = fibroadenoma
Excision = phyllodes

Reason for excision

- > 30mm: 4
- Growing: 2
- Patient choice: 1
- Contralateral carcinoma: 1
- Prev & subsequent B3 & growing: 1
- Uncertain: 1
B3 cellular fibroepithelial lesion

- Repeat core biopsy not useful
Core showing cellular fibroepithelial lesion? phyllodes

Excision diagnosis:

Phyllodes: 37/50 (74%)
Fibroadenoma: 12
Fibromatosis: 1
Fibrocytic change & scar: 1
Core = ?phylloides

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<th>Number of core features</th>
<th>%phylloides</th>
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<tr>
<td>0</td>
<td>0% (0/1)</td>
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<tr>
<td>1</td>
<td>58% (11/19)</td>
</tr>
<tr>
<td>2</td>
<td>75% (15/20)</td>
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<tr>
<td>3+</td>
<td>91% (10/11)</td>
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</table>

(one lesion not excised)
Features favouring phyllodes on core biopsy

- Stromal cellularity (mild increase in 50%+)*
- Stromal overgrowth (x10 field with no epithelium)
- Entrapped fat
- Fragmentation
- Irregular edge
- Marked stromal pleomorphism*
- Stromal mitoses*

* = Jacobs (also proportion of stroma)
Conclusions

- Core diagnosis of fibroadenoma - <1% turn out to be phyllodes tumours
- About 20% of phyllodes tumours have previous core diagnosis of fibroadenoma
- Clinical and pathological indications for excision of fibroepithelial lesions diagnosed on core biopsy
Problems & Pitfalls in Needle Core Biopsy

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Problems and Pitfalls in Needle Core Biopsy Diagnosis

Common causes of false negative diagnosis

• Tubular carcinoma mistakenly diagnosed as sclerosing adenosis or radial scar / CSL

• Infiltrating lobular carcinoma mistakenly interpreted as chronic inflammation or missed

• Radiotherapy effect with missed foci of carcinoma

• Metaplastic carcinoma mistakenly diagnosed as a stromal proliferation / fibroblastic scar
Problems and Pitfalls in Needle Core Biopsy Diagnosis

Common causes of false negative diagnosis

• Infiltrating lobular carcinoma mistakenly interpreted as chronic inflammation or missed
Problems and Pitfalls in Needle Core Biopsy Diagnosis

Common causes of false negative diagnosis

• Infiltrating lobular carcinoma mistakenly interpreted as chronic inflammation or missed

Be Vigilant!
Needle Core Biopsy

Avoidance of Pitfalls

• Be aware of problem lesions

• Adopt a cautious approach early in learning curve

• Examine levels routinely

• Use immunocytochemistry (ck’s, actin)
Needle Core Biopsy

Good Reporting Practice

- Use specimen radiography for microcalcification
- Is microcalcification character appropriate?
- Understand reporting categories, particularly B3 and B4
Needle Core Biopsy

Good Reporting Practice

- Definitive statements on overt changes only
- Cautious comment on microfocal change
- Correlate with imaging findings whenever possible
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<th>B</th>
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<tr>
<th>Oestrogen Receptor Assay (ERICA) required?</th>
<th>YES</th>
<th>NO</th>
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</table>

Name (Please print) | Signature: | Date: |

If Urgent, Date Required:
Summary of Core Biopsy Handling

- Core biopsies should be received with full clinical information (and X-ray)
- Ideally, cores with microcalcification separately identified
- Fixed, ideally, for 6 hours (or microwaved)
- Routine processing & embedding
- 3 levels for cores with microcalcification initially, although may need more
- Polarised light
- Multidisciplinary discussion
Future improvements in Non Op diagnosis

- Improved diagnosis e.g. B3 lesion - improved accuracy

- Improved staging
  - Axillary & Sentinel node
  - Multifocality
  - DCIS extent and inv. Assoc.

- Non op tumour classification