Preoperative diagnosis and treatment planning in breast cancer
The pathologist’s perspective
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Breast screening

- If 2000 women are screened regularly for 10 years, one will benefit from the screening, as she will avoid dying from breast cancer.
- At the same time, as a consequence, 10 healthy women will become cancer patients...
- Furthermore, about 200 healthy women will experience a false alarm.

Non-operative diagnosis

- The role of non-operative diagnosis in the assessment of breast lesions is to provide, whenever is possible, a conclusive diagnosis.
- The highest levels of diagnostic accuracy in the non-operative diagnosis of breast disease are achieved by means of a triple approach, combining the results of imaging and clinical examination with the fine needle aspiration cytology and/or needle core biopsy.
## Preferred terminology for radiologists, and the main histopathological differential diagnosis

<table>
<thead>
<tr>
<th>Feature</th>
<th>Differential Diagnosis</th>
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<tbody>
<tr>
<td>Spiculate mass</td>
<td>Invasive carcinoma</td>
</tr>
<tr>
<td>Stellate lesion</td>
<td>Radial scar, complex sclerosing lesion, invasive carcinoma, usually low/intermediate grade</td>
</tr>
<tr>
<td>Well defined mass</td>
<td>Cyst, fibroadenoma, hamartoma, phyllodes tumor, invasive carcinoma (high grade), encysted papillary carcinoma, mucinous carcinoma, medullary carcinoma</td>
</tr>
<tr>
<td>Microcalcifications, coarse branching</td>
<td>Plasma cell mastitis, DCIS high grade</td>
</tr>
<tr>
<td>Microcalcification, coarse clustered</td>
<td>Fat necrosis, fibroadenoma, cysts, DCIS intermediate/high grade; LCIS (rarely)</td>
</tr>
<tr>
<td>Microcalcification, fine clustered</td>
<td>Sclerosing adenosis, cysts, DCIS low/intermediate grade</td>
</tr>
<tr>
<td>Architectural distortion</td>
<td>Involution, radial scar, ILC, DCIS (rarely)</td>
</tr>
</tbody>
</table>
Tissue sampling technique

- Needle core biopsy (NCB)
- Fine needle aspiration cytology (FNAC)
Fine needle aspiration cytology (FNAC)

- Sample must be adequate and representative of the lesion (aspiration, spreading and fixation are extremely important)
- Suitable staining and processing without artifacts
- Accurate interpretation of the cytological material with a clear report requires a highly skilled and trained pathologist
FNAC

YES

NO
Needle core biopsy (NCB)

- NCB is able to characterize lesions more completely than FNAC and can provide a definitive diagnosis in higher proportion of cases.
- It may differentiate between invasive and in situ carcinoma.
- It allows better characterization of lesions associated with microcalcification than FNAC.
- It can be used for immunohistochemical analysis (ER, PR, ki67, Her2/neu).
Vacuum-assisted needle core biopsy (VANCB)

- Useful for particular types of mammographic abnormalities where a larger volume of tissue is required for accurate diagnosis.
- Should be reserved for non-palpable lesions.
- Consumables are expensive.
- Require highly trained radiologists.
### Reporting categories

<table>
<thead>
<tr>
<th>B1</th>
<th>Uninterpretable, normal tissue only</th>
<th>C1</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>Benign</td>
<td>C2</td>
<td>Benign</td>
</tr>
<tr>
<td>B3</td>
<td>Lesion of uncertain malignant potential</td>
<td>C3</td>
<td>Atypia, probably benign</td>
</tr>
<tr>
<td>B4</td>
<td>Suspicious of malignancy</td>
<td>C4</td>
<td>Suspicious of malignancy</td>
</tr>
<tr>
<td>B5</td>
<td>Malignant</td>
<td>C5</td>
<td>Malignant</td>
</tr>
</tbody>
</table>

European guideline for quality assurance in breast cancer screening and diagnosis. 4th Edition
Wells CA et al. Cytopathology 1994, 5:316
Why do we need reporting categories

- Better communication of the pathology report
- It facilitates analysis of sensitivity and sensibility
- It allows comparison between institutions
- Useful quality indicator
<p>| | |</p>
<table>
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</table>
| **B1** | Normal tissue, whether or not breast parenchymal structures are present  
Normal histology may indicate that the lesion has not been sampled |
| **B2** | Core biopsy contains a benign abnormality (fibroadenomas, fibrocystic changes, sclerosing adenosis, duct ectasia, usual epithelial hyperplasia but also non-parenchymal lesions, such as abscess and fat necrosis) |
A benign result (B2/C2) should be correlated with the mammographic/ultrasound image and the degree of radiological suspicion, to determine whether the sample is representative to differentiate between non-representative results from benign representative results.
| B3 | Lesions that may provide benign histology on core biopsy, but either are known to show heterogeneity or to have increased risk (albeit low) of associated malignancy. The B3 category has a lower rate of malignancy on further surgical biopsy (25%) when compared to B4 (66%)

- Atypical duct hyperplasia
- Flat epithelial atypia
- Papillary lesions
- Radial scar/complex sclerosing lesion
- Phyllloides tumor
- Lobular intraepithelial neoplasia
- Mucocele-like lesions |
| B4 | Technical problems such as crushed or poorly fixed cores that contain probable carcinoma. Apparently neoplastic cells contained within blood clot Very small focy of invasive carcinoma |
| B5 | DCIS, invasive carcinoma, other malignant tumor, such as lymphoma, malignant pylloides tumor |
Pitfalls

- Fibroadenoma
- Papillary lesions
- Metaplastic carcinoma
- Invasive lobular carcinoma
- Others
## Microcalcifications

<table>
<thead>
<tr>
<th>Category</th>
<th>% with microcalcification</th>
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<tbody>
<tr>
<td>B1</td>
<td>2.8%</td>
</tr>
<tr>
<td>B2</td>
<td>56.9%</td>
</tr>
<tr>
<td>B3</td>
<td>70.3%</td>
</tr>
<tr>
<td>B4</td>
<td>55.5%</td>
</tr>
<tr>
<td>B5</td>
<td>30.5%</td>
</tr>
</tbody>
</table>

Hungermann D et. Der Pathologe 2009, 30:31
Microcalcifications

- Multiple levels
- Report lesions associated with microcalcifications
- X-rays pictures should be available to pathologists
Conclusions

- The histological examination of core biopsy samples is performed to fulfill the assessment process role, by giving a pathology category classification (B1-5)
- It is not designed to give a definitive diagnosis
- The reporting categories take into account purely the histological nature of the specimen and not the clinical or imaging characteristics
- Decisions on subsequent diagnostic procedures/resections should consider histopathological diagnosis (B-categories) as well as clinical and imaging characteristics