Personalized Diagnosis in Breast Cancer Management

Corinne BALLEYGUIER
Radiology Dpt
Gustave Roussy, Villejuif, France

Disclosure of interest:
Invited lectures for GEHC
One Stop:
Post screening imaging

Mammogram
Additional views

Ultrasound

Fine Needle Aspiration

Biopsy

Specific cases
CESM
Tomosynthesis
Focus on BI-RADS

- BI-RADS categories on MG and US to classify images according to the malignancy probability
  - **BI-RADS 1**: normal
  - **BI-RADS 2**: typically benign lesion
  - **BI-RADS 3**: probably benign (follow-up)
  - **BI-RADS 4**: suspicious, FNA or biopsy required
    - **BI-RADS 4A**: 2-10 % malignancy
    - **BI-RADS 4B**: 10-50 %: if FNA is benign, biopsy required
    - **BI-RADS 4C**: 50-95 %: if FNA is benign, biopsy required
  - **BI-RADS 5**: > 95 % suggestive of malignancy
    - FNA first in One Stop, +/- biopsy
Case 1: Nodule BI-RADS 5

52 yo
Screening
Spiculated mass right breast

BI-RADS 5
Breast ultrasound

- Breast ultrasound: one of the key points in One Stop: required high quality devices and high frequency probe

- Suspicious nodule:
  - Irregular shape: BI-RADS 5

- FNA or biopsy are mandatory
  - 2 puctions
  - 5 mn to perform, 10 mn to read

- FNA under US first: key point
  - Immediate results in One Stop
  - No local anesthesia
  - Fast
  - Accurate with experienced pathologist
FNA

- Non cohesive cells
- Typically malignant
- Concordant with suspicious imaging
- Carcinoma
Don’t forget the Axilla!

- In case of breast cancer
- Lesion size < 5 cm
- SNB is required when no suspicious LN are depicted

- Suspicious LN:
  - Hypoechoic
  - Round shape
  - Asymmetry
  - Spiculated margins

- In case of suspicious LN, FNA is required in the same examination
Strategy

- No biopsy required in One Stop
- Results are announced to the patient by the surgeon/oncologist
- Surgery required, scheduled in One Stop:
  - Lumpectomy with Sentinel node biopsy
- Diagnostic and treatment plan in One Day
Case 2 Nodule: BI-RADS 4A

- BI-RADS 4A mass, 30 yo

Fibroadenoma

Benign, FNA concordant with imaging and physical examination

No biopsy: short time follow-up at 6 months

Results announced in One Stop
When a US biopsy must be done?

- Discordant results with imaging and FNA
- FNA Benign results BI-RADS 4B and 4C
- Lesion size > 3 cm
- Inflammatory cancer
- Suspicion of recurrence
- Multiple lesions
- if NAC or mastectomy is scheduled
US Biopsy

- 2 radiologists dedicated for Biopsy in One Stop
- 1 radiologist for US and FNA

US core biopsy:
- Local anesthesia
- 15-20 mn
- Skin incision
- 3-4 samples, 14-16 G

Results may be obtained in 48 H with a dedicated pathway
Strategy

In this case:
- Multiple malignant lesions in the left breast
- Results obtained in 48H
- Discussed in multidisciplinary session at H48
- Mastectomy is required followed by chemotherapy

FNA is performed also in One Stop to announce the results
In case of doubtful imaging

- Screening MG is judged suspicious but:
  - Lesion is not clearly seen on all views
  - Subtle image (asymmetry, density, fuzzy image)
- It might be a false image on MG
- Additional MG is required
- Frequent situation!
Additional MG required

1- **Spot compression**: to better analyze margins
   - Asymmetry
   - Small nodule

2- **Tomosynthesis**: to differentiate normal tissue and real nodules

3- **CESM**: in very subtle images
   - To assess MG is normal (no contrast uptake)
   - To depict multiple nodules: in case of suspicious image

**Advantages**: everything done by the same radiologist, in One Day
   - May be performed instead of breast MRI
Tomosynthesis: Principles

- 9-15 exposures
- 25°-40°

- Higher detection rate as 2D MG
- Decrease recall rate
- Input on screening

Reconstructions in tomographic views
Plan // detector
## Cancer detection rate /1000 Screening test European countries

<table>
<thead>
<tr>
<th>Country</th>
<th>2D</th>
<th>2D + 3D</th>
<th>Multiplication rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>7,1</td>
<td>9,4</td>
<td>1,31</td>
</tr>
<tr>
<td>Italy</td>
<td>5,3</td>
<td>8,1</td>
<td>1,51</td>
</tr>
<tr>
<td>Sweden</td>
<td>6,3</td>
<td>8,9</td>
<td>1,41</td>
</tr>
</tbody>
</table>

*Courtesy: Pr Taourel, Montpellier*
Cancer detection rate /1000 Screening test USA

<table>
<thead>
<tr>
<th>Publication</th>
<th>2D</th>
<th>2D + 3D</th>
<th>Multiplication rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,2</td>
<td>5,7</td>
<td>1,1</td>
</tr>
<tr>
<td>Res asthma</td>
<td>4,9</td>
<td>6,3</td>
<td>1,3</td>
</tr>
<tr>
<td>AJR</td>
<td>4</td>
<td>5,4</td>
<td>1,35</td>
</tr>
<tr>
<td>AJR</td>
<td>4,6</td>
<td>5,5</td>
<td>1,2</td>
</tr>
<tr>
<td>JNCI</td>
<td>4,2</td>
<td>5,4</td>
<td>1,29</td>
</tr>
</tbody>
</table>

Courtesy: Pr Taourel, Montpellier
# Recall rate/1000 Screening test: Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>2D</th>
<th>2D + 3D</th>
<th>Gain percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>103</td>
<td>85</td>
<td>17%</td>
</tr>
<tr>
<td>Italy</td>
<td>45</td>
<td>35</td>
<td>18%</td>
</tr>
<tr>
<td>Sweden</td>
<td>26</td>
<td>38</td>
<td>-43%</td>
</tr>
</tbody>
</table>

*Courtesy: Pr Taourel, Montpellier*
Distorsion on left MG
Normal US
Distorsion on left MG
Spot compression : not seen
Distorsion on left MG
Tomosynthesis: distorsion found
Tomosynthesis > spot compression for distorsion
Second Look US

- Focused ultrasound on a specific area of the breast:
  - More accurate in comparison with ultrasound of whole breast
  - Useful to depict subtle lesions seen on MG
  - Useful after suspicious MRI or CESM

Radial Scar found on Second look US in this case
FNA and biopsy performed in One Stop
Tomo or CESM in One Stop?

- Non conclusive screening MG

- Tomo first usually:
  - May solve the question in most of the cases:
    - Image seen on one view only
    - Distorsion
    - Asymmetry

- Anyway, Tomo or CESM is feasible
  - Decision is made according: patient age, contra-indication for iodine injection, lesion type, breast density
CESM

- CESM:
  - MG + Iodine contrast injection
  - Spectral mammography

- Alternative to MRI in case of contra-indication of breast MRI:
  - Same indications of MRI excepted High Risk Screening
  - Pace-Maker
  - Claustrophobia

- Advantages:
  - Faster examination
  - Feasible immediately after CESM / US
  - Analysed by the same radiologist, in same conditions
55 yo, distorsion left breast
US: not conclusive
CESM: positive Carcinoma
CESM or Tomo in One Stop?

- Breast cancer staging
- CESM may be performed instead of breast MRI in One Stop

Limits:
- DCIS
- Small ILC

CESM is probably more accurate than tomosynthesis in this situation
Case 3: Microcalcifications

- If categorized as BI-RADS 4 or 5:
  - Vacuum biopsy on stereotactic guidance is required
  - Magnification views to analyse microcalcifications
  - Usually not seen on US
  - Suggestive of DCIS

- FNA not useful

- Results will be obtained in 2-10 days

- Discussed in MS

- Results will be announced to the patient 10 days later
DCIS
Prone table

Bed linked to mammography unit
Prélever

Samples: 3

Un instant svp

PRÊT

VAC

STÉRÉOTAXIE 10G
Specific situation

- **Locally advanced cancer:**
  - Size > 5 cm
  - Multiple lesions
  - High grade, triple negative
  - Inflammatory breast cancer
  - Age < 35 yo

- **Staging must be scheduled quickly**
  - Pet-CT
  - Bone scan
  - MRI
Inflammatory cancer on the left: axillary and chest LN
Indications of Breast MRI in 2016

- Breast cancer staging
- High Risk screening
- Treatment evaluation
- Suspicion of recurrence
- Implants complication
- Occult breast cancer
- Non conclusive MG
Conclusion

- Imaging:
  - One of the key point of personalized diagnosis of breast cancer
  - High quality imaging required:
    - MG
    - US
  - Input of advances imaging techniques
    - Tomosynthesis
    - CESM
    - MRI
  - Multidisciplinary assessment is mandatory