Integrating the diagnosis of breast lesions

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Gustave Roussy
Disclosures

• Institutional: GE – research funding
• Personal: none
Outline

• Integrated diagnosis: what is the need?
• FNAC-based integrated diagnosis: long-term experience
• Perspectives
Outline

- **Integrated diagnosis: what is the need?**
- FNAC-based integrated diagnosis: long-term experience
- Perspectives
Integrated care

“more coordinated and integrated forms of care provision: Integrated care may be seen as a response to the fragmented delivery of health and social services being an acknowledged problem in many health systems”
# The concept of cancer interception

<table>
<thead>
<tr>
<th>Disease status</th>
<th>Susceptible without cancer</th>
<th>Asymptomatic with precancer</th>
<th>Asymptomatic with cancer</th>
<th>Symptomatic with cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of status</td>
<td>Genetic susceptibility, risk score, exposure to carcinogens, other high risk conditions...</td>
<td>Diagnosis of specific precancer lesion through image, pathology or biomarker</td>
<td>Diagnosis of cancer lesion through image, pathology or biomarker</td>
<td>Early diagnosis</td>
</tr>
<tr>
<td>Type of interventions: screening</td>
<td>Personalized screening to identify precancer and cancer</td>
<td>Personalized screening</td>
<td></td>
<td>Tertiary screening</td>
</tr>
<tr>
<td>Type of interventions: prevention</td>
<td>Primary prevention (active on initiation phases)</td>
<td>Interceptive « chemo » prevention</td>
<td>Interceptive « chemo » prevention?</td>
<td>Tertiary prevention</td>
</tr>
</tbody>
</table>

Adapted from AACR white paper - Lippman et al Cancer Prev Res 2019
Breast Cancer Screening:

We need to improve the risk-benefit ratio

Benefits (specific-survival, lower stage, chemo avoided, mastectomy avoided)

Risks (limited sensitivity, false positive recalls, overdiagnosis, radiation-induced cancers...)

Need for integrated care

Breast screening

Rapid diagnosis of benign lesions could improve the risk/benefit of screening!

Rapid diagnosis and integrated care of cancers is fundamental
- Positive diagnosis
- Complete work up (multiple lesions, axilla)

Further BC risk identification / adapted Follow-up

Molecular characterisation
Prognostication
Treatment targeting
Outline

• Integrated diagnosis: what is the need?

• **FNAC-based integrated diagnosis: long-term experience**

• Perspectives
Objectives of the One Stop Clinic

- Target population: women with abnormal /suspect breast findings
- One place, one time to gather all necessary skills: surgeon + radiologist + medical oncol + pathologist + nurses + dedicated technicians

Provide an exact diagnosis in 1 day as often as possible
Provide trt decisions + individual care program/ 1 day
One Stop Breast diagnostic Clinic at Gustave Roussy

- Patients referred to breast center for suspect lesions
- Started April 5th, 2004
- Once a week
- Mean 26 patients / Monday since 2004
- >18000 patients seen in 15 years
The One Stop Clinic at GR

Radiology team

Volunteers

Nurse navigator

Reception team

Oncologist

Secretaries

Breast surgeon

Cytopathology team

Additional imaging

Psychologists

Social workers

Blood tests, Lab
One Stop Clinic: patients’ journey

PHONE CALL

Visit with a first clinician (surgeon or oncologist)

Information and discussion with patient

SHORT TERM APPOINTMENT

Discussion with radiologists
Planification of necessary images and tests

Examinations, imaging, FNA, biopsies, blood tests, etc

RESULTS given to patients
CARE plan delivery

MEDIAN 6 HOURS
Critical points

- Dedicated high-quality team (loving to work together)
- Detailed flowchart and organisation
- Geographical organisation
- Adaptability
- Regular quality controls and evaluations
One Stop Clinic: a single location

1. Welcome Desk
2. Guided FNA
3. Nurse Navigator
4. Consultation
5. Breast Radiology Platform
6. FNA analysis
Ultrasound-guided FNA is the key of the One Stop Clinic

• US-guided FNA: performed by the cytopathologist under radiologist’s guidance
  – 2 ponctions
  – 5 mn to perform, 10 mn to read
  – Immediate results in One Stop
  – No local anesthesia
  – Fast
  – Accurate with experienced pathologist

• Allows axillary exploration and FNA as needed
Detailed analysis of the first 11000 attendees

- **Population**: all pts seen for a suspect breast lesion at OSBU from 2004-20132 with follow-up data \( N = 10 \, 833 \)
## Patients’ and lesions’ characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age (years) [SD]</td>
<td>55 [13.5]</td>
</tr>
<tr>
<td>Males: n (%)</td>
<td>130 (1.2%)</td>
</tr>
<tr>
<td>Family history of cancer: n (%)</td>
<td>3 477 (32.1%)</td>
</tr>
<tr>
<td>Size of lesion: (in mm) [SD]</td>
<td>Mean 17 [14.5], Median 13 mm</td>
</tr>
<tr>
<td>Palpable abnormality: n (%)</td>
<td>3,830 (35.3%)</td>
</tr>
<tr>
<td>BI-RADS ACR classification</td>
<td></td>
</tr>
<tr>
<td>4 : n (%)</td>
<td>39.4%</td>
</tr>
<tr>
<td>5 : n (%)</td>
<td>21.8%</td>
</tr>
<tr>
<td>3 : n (%)</td>
<td>18.9%</td>
</tr>
<tr>
<td>Other: n (%)</td>
<td>19.8%</td>
</tr>
</tbody>
</table>

Patients’ and lesions’ characteristics

<table>
<thead>
<tr>
<th>Appointments upon medical referral: n (%)</th>
<th>9,525 (87.9%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of detection for the abnormality:</td>
<td></td>
</tr>
<tr>
<td>- Self palpation: n (%)</td>
<td>2,072 (19.1%)</td>
</tr>
<tr>
<td>- Medical palpation: n (%)</td>
<td>2,229 (2.1%)</td>
</tr>
<tr>
<td>- Other symptoms: n (%)</td>
<td>468 (4.3%)</td>
</tr>
<tr>
<td>- Imaging: n (%)</td>
<td>7,655 (70.7%)</td>
</tr>
<tr>
<td>- Unknown: n (%)</td>
<td>409 (3.8%)</td>
</tr>
<tr>
<td>Type of imaging abnormality:</td>
<td></td>
</tr>
<tr>
<td>- Mass: n (%)</td>
<td>7,441 (68.7%)</td>
</tr>
<tr>
<td>- Micro-calcifications: n (%)</td>
<td>2,779 (25.7%)</td>
</tr>
<tr>
<td>- Architectural distortion: n (%)</td>
<td>243 (2.2%)</td>
</tr>
<tr>
<td>- None: n (%)</td>
<td>180 (1.7%)</td>
</tr>
<tr>
<td>- Unknown: n (%)</td>
<td>190 (1.7%)</td>
</tr>
</tbody>
</table>
Diagnostic accuracy: benign vs malignant

Cross-tabulation of one-stop and consolidated diagnosis results (n = 10,833 visits in 10,602 patients).

<table>
<thead>
<tr>
<th>One-stop diagnosis</th>
<th>Consolidated diagnosis</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malignant</td>
<td>Benign</td>
<td>Atypical</td>
<td>Lost to follow-up</td>
<td></td>
</tr>
<tr>
<td>Malignant</td>
<td>3815</td>
<td>12</td>
<td>6</td>
<td>0</td>
<td>3833</td>
</tr>
<tr>
<td>Benign</td>
<td>63</td>
<td>5967</td>
<td>49</td>
<td>0</td>
<td>6079</td>
</tr>
<tr>
<td>Suspect or atypical</td>
<td>192</td>
<td>186</td>
<td>191</td>
<td>0</td>
<td>569</td>
</tr>
<tr>
<td>Undetermined</td>
<td>106</td>
<td>159</td>
<td>19</td>
<td>68</td>
<td>352</td>
</tr>
<tr>
<td>Total</td>
<td>4176</td>
<td>6324</td>
<td>265</td>
<td>68</td>
<td>10,833</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity [95% CI]</th>
<th>Specificity [95% CI]</th>
<th>PPV [95% CI]</th>
<th>NPV [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>98.4% [98.0 – 98.8]</td>
<td>99.8% [99.7 – 99.9]</td>
<td>99.7% [99.5 – 99.9]</td>
<td>99.0% [98.7 – 99.2]</td>
</tr>
</tbody>
</table>

CI: confidence interval; PPV: positive predictive value; NPV: negative predictive value

Results: diagnostic accuracy

✓ All 10833  ➔  75 % exact results in a day

✓ 8,434 masses ➔ 87% exact results in a day

(13% are undetermined (3-4%), or suspect/atypical (8-9%))

“Facing cancer diagnosis remains a stressful situation. However, our study suggested that a substantial part of this anxiety is sensitive to the quality of the patient-doctor relationship.”

Satisfaction, distress and anxiety

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Means, standard deviations, range for satisfaction (Out-Patsat35), state-anxiety (STAI Y-A), and psychological distress (distress thermometer) variables (N=113)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Satisfaction</strong></td>
<td><strong>Evaluation of doctors</strong></td>
</tr>
<tr>
<td>Technical skills</td>
<td>79.3</td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>78.4</td>
</tr>
<tr>
<td>Information</td>
<td>76.8</td>
</tr>
<tr>
<td>Availability</td>
<td>66.8</td>
</tr>
<tr>
<td><strong>Evaluation of nurses</strong></td>
<td></td>
</tr>
<tr>
<td>Technical skills</td>
<td>86.5</td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>86.1</td>
</tr>
<tr>
<td>Information</td>
<td>80.7</td>
</tr>
<tr>
<td>Availability</td>
<td>82.5</td>
</tr>
<tr>
<td><strong>Organization, physical environment</strong></td>
<td></td>
</tr>
<tr>
<td>Exchange of information</td>
<td>71.4</td>
</tr>
<tr>
<td>Other interpersonal skills and information provision</td>
<td>78.8</td>
</tr>
<tr>
<td>Waiting time</td>
<td>69.5</td>
</tr>
<tr>
<td>Physical environment</td>
<td>71.8</td>
</tr>
<tr>
<td>General satisfaction</td>
<td>80.7</td>
</tr>
<tr>
<td>State-anxiety</td>
<td>42.2</td>
</tr>
<tr>
<td>Distress</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Boinon et al The Breast J 2018
Added value of integrated imaging : CESM

55 yo, distorsion left breast
Added value of integrated imaging: CESM

CESM: positive
Directed US-guided FNA: Carcinoma
Multifocal left IDC

Biopsy

FNA
CESM changed diagnostic and treatment strategy in 41 (21%) patients either:

• after detection of additional malignant lesions in 38 patients (19%)
• with a more extensive surgery (n = 21)
• with neo-adjuvant chemotherapy (n = 1)
• Or by avoiding further biopsy for 20 patients with negative CESM.
Results: Full Costs according to lesions

Mean cost per patient (Euros)
Conclusions

• One Stop Breast Unit allows integrated highly accurate diagnoses within a very short time interval, 75% of the women getting their results on the same day
• Multidisciplinarity allows early assessments of complex cases
• Very rapid diagnosis does absolutely not preclude high medical quality and limited costs
• The One Stop Clinic is useful for all women with breast lesions but One-stop diagnosis is possible only for women with masses (best target
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• Integrated diagnosis: what is the need?
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• Perspectives
Perspectives

• FNA: What about immediate molecular characterisation, treatment targeting?

Exonic expression
André... Delaloge Lancet Oncol 2009
Perspectives

• FNA: What about immediate molecular characterisation, treatment targeting?

Methylation profile
Downs Clin Cancer Res 2019
Thank you