The value of ultrasound and ultrasound-guided FNA for pre-operative axillary staging in early breast cancer patients

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Purpose

Breast cancer prognosis is heavily dependent on the presence or absence of lymph node metastases at presentation (1). For many years, the status of axillary lymph nodes has been determined by a total axillary lymphadenectomy, with its inherent high rate of morbidity. In the last decades, with screening mammography, the increasing number of breast cancer diagnosis in earlier stages, led to the development of alternative techniques, sentinel lymph node biopsy (SNB) and axillary ultrasound, to determine the staging of the axillary lymph nodes.

In recent years, it has been shown that the axillary ultrasound and the axillary lymph node US guided fine-needle aspiration biopsy (FNAB) can be very useful for determining the axillary staging. The purpose of this study was to evaluate the diagnostic accuracy of these techniques, used daily in our unity for axillary evaluation and estimate its advantages in the preoperative strategy, by enabling the selection of patients candidates to SNB, when classified as cN0, or rather by defining the need of a axillary dissection, when the axillary was previous classified as positive.

Methods and Materials

A retrospective analysis of our Breast Center database, was undertaken. One hundred and fifty consecutive patients with early breast carcinoma and subsequent surgery treated in our Breast Center between November 2008 and May 2009 were studied.

Axillary ultrasound as a complement to the clinic evaluation was performed on all patients. Patients underwent US-FNAB, with a 22-gauge needle connected to a standard 20-cc syringe, when abnormal lymph node morphology was identified (rounded shape, hypoechogenicity, focal or diffuse cortical thickening, obliteration of the hilum).

Sentinel node biopsy (SNB) was performed on clinic, US and US-FNAB axillary negative patients.

When cytological results of axillary nodes were positive for malignancy an axillary dissection was outset scheduled.

The diagnostic accuracy - sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) - for the presence of axillary nodes dissemination was evaluated using SNB and axillary clearance pathological as gold standards.
Statistical assessment was performed by excluding six incomplete cases.

**Results**

The axillary US showed lymph nodes with features of benignity in 106 cases (74%), while 38 cases (26%) were suspicion. The association between the US and the histological diagnosis of the axillary lymph nodes is shown in table 1.

US-FNAB in this 38 cases showed lymph nodes metastases in 25 cases, and no malignant cells in 13 cases. In table 2 the association between the cytological and histological results of the axillary lymph nodes is shown. There was no morbidity associated with FNAB.

A comparison between the cytological and histological results, the latter obtained by a lymph node analysis after either an axillary clearance or a SNB, has shown a high sensitivity and a 100% specificity for US-FNAB. In fact, all 25 cases with positive cytology were histologically positive. Six out of 13 cases that were cytologically negative were instead histologically positive (false negatives), due to the presence of micrometastases in 4 cases.

The 25 patients (17%) were proposed and directly underwent an axillary lymphadenectomy, because of their classification as cN+. Time and costs related to SLN were spared.

Tumoral metastases were cytologically identified in 66% of the patients (25/38) with US suspicion lymph nodes (Table 2). Excluding six cases with inadequate results, axillary US sensitivity was 51%, specificity 91%, PPV 82% and NPV 72% (table 3). In US suspicion lymph nodes, US-FNAB sensibility was 81%, specificity 100%, PPV 100% and NPV 53%.

**Images for this section:**
**Fig. 1:** Correlation between ultrasound results and histological diagnosis

<table>
<thead>
<tr>
<th>Ultrasound</th>
<th>Benign</th>
<th>Malignant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probably Benign</td>
<td>76 true negatives</td>
<td>30 false negatives</td>
<td>106</td>
</tr>
<tr>
<td>Probably Malignant</td>
<td>7 false positives</td>
<td>31 true positives</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>83</td>
<td>61</td>
<td>144</td>
</tr>
</tbody>
</table>

**Fig. 2:** Correlation between FNAB results and histological diagnosis

<table>
<thead>
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<th>FNAB</th>
<th>Benign</th>
<th>Malignant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probably Benign</td>
<td>7 true negatives</td>
<td>6 false negatives</td>
<td>13</td>
</tr>
<tr>
<td>Probably Malignant</td>
<td>0 false positives</td>
<td>25 true positives</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7</td>
<td>31</td>
<td>38</td>
</tr>
</tbody>
</table>

**Fig. 3:** Comparison between sensitivity, specificity, PPV and NPV of a ultrasound alone or an ultrasound scan plus FNAB.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound</td>
<td>144</td>
<td>51 %</td>
<td>91 %</td>
<td>82 %</td>
<td>72 %</td>
<td>74 %</td>
</tr>
<tr>
<td>BAAF</td>
<td>38</td>
<td>81 %</td>
<td>100 %</td>
<td>100 %</td>
<td>53 %</td>
<td>84 %</td>
</tr>
</tbody>
</table>
Conclusion

Axillary staging of breast cancer remains one of its most important prognostic factors. The definition of the preoperative staging in breast cancer is increasingly important, for both the surgeon and the patient, in planning the right operative strategy, especially when considering Oncoplastic techniques.

Axillary US is a simple, noninvasive and economical technique. It may be associated with a FNAB guided by ultrasound, a noninvasive technique of easy execution with low or no morbidity. Its use routinely as a complement to physical examination is extremely helpful in defining preoperative axillary staging, with the advantage of allowing a better selection of candidates for SNB or, alternatively, an axillary dissection.

Considering the morphostructural alterations of axillary lymph nodes and using as a basis the histological findings after SNB and/or axillary dissection, we define in our series, a sensitivity for ultrasound of 51% and a specificity of 91%, according to the values described in the literature: high specificity (80.4% - 95.2%) and more variable sensitivity (64.3% - 92.3%) (3).

Previous studies have shown to be possible to increase the accuracy of axillary US by combining it with the FNAB of suspicious lymph nodes. In our study, the BAAF in this group of ultrasonographic suspect lymph nodes had an accuracy of 84% with a specificity and a PPV of 100%. This allowed to spare 17% of the patients to an inappropriate surgical procedure (SNB) and, therefore, indicate them to a direct axillary dissection.

In conclusion, according to our study, we propose that the axillary US and US guided FNAB of suspicious nodes are included in the axillary staging in early breast cancer. With this simple, noninvasive, low cost and good accuracy methodology, the best candidates for SNB and axillary dissection are selected. Thus not only reduce costs for the health system as it also reduces possible false results of SNB or the need of a 2nd surgery.

References


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