Papillary lesions of the breast diagnosed by core needle biopsy: clinicoradiological features and management of 65 cases with surgical follow-up

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Learning objectives

The main objective of this study is to ascertain the diagnostic utility of core needle biopsy (CNB) in papillary lesions of the breast. Other secondary objectives are: to illustrate the pathology classification of papillary tumors of the breast; to recognize clinical and imaging features of papillary breast lesions on mammography, ultrasound, ductography and MRI; to describe the management and surgical or clinical follow up; and to display a case presentation.

Background

Papillary lesions of the breast are unusual and represent less than 10% of benign breast lesions and less than 1% of breast carcinomas \(^1\,^2\) manifested as a wide range of lesions such as intraductal papilloma, papillomatosis, intracystic papillary carcinoma and invasive papillary carcinoma, among others \(^1\,^4\). Papillary carcinomas usually have a slow tumour growth and a better prognosis than other types of ductal carcinomas \(^1\,^5\).

These lesions can be multiple or solitary. Patients with multiple lesions showed in some series a higher risk of presenting breast cancer \(^1\,^5\).

Histopathologic appearance of papillary lesions show a fibrovascular stroma covered by epithelial and mioepithelial cells \(^1\,^5\) and are such heterogeneous lesions that its detection is a challenging task because its wide spectrum of appearances in the benign, atypical and malignant subtypes which makes it difficult to establish the histologic type with percutaneous biopsy (core needle biopsy, CNB).

Nowadays there is still some controversy due to its multiple histologic presentations. Although some authors suggest that patients with a benign type of papillary lesion diagnosed by CNB with image concordance should carry a clinical-radiological follow up as a truthful alternative \(^1,\,^12,\,^13\), other authors sustain that in these same cases a surgical excision should be performed \(^2,\,^6,\,^10,\,^11\).

Recent publications propose the excision by vacuum assisted percutaneous systems as an alternative for surgical excision in this type of lesions, especially the small ones, because it is an ambulatory and safe technique that allows obtaining more pathologic tissue and has less complications than conventional surgery \(^3,\,^4,\,^14\).
According to the imaging presentations they can be solitary or multiple, defined or ill-defined lesions, with solid/homogeneous/cystic structure.

Between years 2006-2012, 65 patients with papillary lesions of the breast were treated in our department. In this poster we will describe the use of ultrasound-guided core needle biopsy (CNB) in papillary lesions detection with the most appropriate indications, benefits and the disadvantages of this technique. A thorough retrospective clinical and radiological revision of the results will be described, correlating the CNB-surgical results.

**Imaging findings OR Procedure details**

**METHODOLOGY**

Clinical series descriptive study with a retrospective examination of 30 breast papillary lesions diagnosed by us-guided CNB in 29 patients (women), with an age range from 35 to 95 years in San Pedro Hospital, Logroño, (Spain) between 2006-2012. The other 35 patients (out of all 65) were treated directly by us-guided vacuum assisted excision by Mammotome® and will be discussed separately.

Mammographies were performed in all patients (oblique and craniocaudal views for each breast) by conventional mammography equipment. Breast ultrasounds were performed in 58 patients with linear probes (7,5 Mhz).

All breast percutaneous biopsies (both CNB and Mammotome®) were ultrasound-guided, obtaining from three to twenty samples.

Clinical presentation will be revised assessing: asymptomatic lesions, palpable lump, secretion, mastalgia or nipple retraction.

Mammographic findings will be classified according to BI-RADS as: well defined nodule (solitary or multiple), ill-defined nodule (solitary or multiple), asymmetric focal density, architectural distortion and microcalcifications.

In ultrasound studies we have assessed the presence (or not) of nodules and its echogenicity (homogeneous or heterogeneous).
The CNB results will be revised and classified as follows: benign papillary lesion, atypical papillary lesion, carcinoma in situ and invasive papillary carcinoma.

The CNB vs. surgical results will be compared in a 2 x 2 contingency table (26 cases with surgical intervention, excluding 4 patients with follow-up). CNB diagnostic indexes with a 95% confidence interval will be calculated (sensitivity, specificity, positive predictive value and negative predictive value).

The CNB underestimation rate (benign percutaneous results and malignant surgical results, or atypical ductal hyperplasia in percutaneous biopsy and surgical carcinoma result or carcinoma in situ result in percutaneous biopsy and invasive carcinoma in surgery) will also be calculated.

RESULTS

Patients presented an age range from 35 to 95 years, with an age average of 60 years.

After diagnosing 30 lesions by CNB, 13 of them were excised by Mammotome® with an 11-gauge needle and 10 to 20 samples were obtained. These excisions were performed in patients with small papillary lesions (less than 2 cm) with a benign CNB result. Eight of these 13 patients were successfully excised without any further recurrence, whereas we found recurrence in 5 of them and had to undergo a full surgical excision (1 segmental mastectomy, 1 excision-surgical biopsy and 3 hook-guided tumorectomies).

Direct surgical intervention was performed in 13 patients (2 hook-guided tumorectomies, 6 radical mastectomies and 5 segmental mastectomies). This decision was based on the malignant result in the percutaneous biopsy (8 cases), atypia result (2 cases), lack of radio-pathological correlation (2 cases), or for the personal wish of the patient (1 case).

The remaining 4 cases got a benign CNB result and underwent a clinical and radiological follow-up.

From the clinical point of view, most patients (60%) presented a palpable lump, while there was a 27% asymptomatic in the moment of diagnosis. Other forms of clinical presentation like nipple secretion (13%) were less prevalent.

The most common mammographic finding was a solitary well-defined nodule (37%), followed by a solitary ill-defined nodule (20%) or invisible in mammography (20%).
Other mammographic findings were multiple ill-defined nodules (3%), focal asymmetry/architectural distortion (3%) and microcalcifications (17%). The results obtained from mammographies did not show enough statistically significance to draw any conclusion according to the benign/malign patterns of these lesions.

Table 2 shows and compares the percutaneous biopsy and the surgical results. The underestimation rate of CNB is presented globally and for each of the results obtained. Table 3 shows the diagnostic index of CNB.

We found one malignant lesion in surgery from the 14 benign cases diagnosed by percutaneous biopsy. Four atypical cases diagnosed by percutaneous biopsy showed two invasive lesions in surgery. The carcinoma in situ diagnosed by CNB turned to be an invasive tumor in surgical biopsy.

Tables 4 and 5 show the mammographic and ultrasound features of these patients, as well as the comparison of these findings with the surgical intervention results.

**Table 1.** Percutaneous biopsy and surgical biopsy correlation (26 cases)

<table>
<thead>
<tr>
<th><em>Percutaneous biopsy</em></th>
<th><em>Surgical biopsy</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>Benign</td>
</tr>
<tr>
<td></td>
<td>TN=14</td>
</tr>
<tr>
<td>Malignant</td>
<td>FP=0</td>
</tr>
<tr>
<td></td>
<td>TP=8</td>
</tr>
</tbody>
</table>

**Table 2.** Percutaneous biopsy and surgical biopsy correlation. Underestimation rate.

<table>
<thead>
<tr>
<th><em>Percutaneous biopsy</em></th>
<th><em>Surgical biopsy</em></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign (16)</td>
<td>Atypical</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Carcinoma in situ</td>
<td>2</td>
</tr>
<tr>
<td>Atypical (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carcinoma in situ (2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Underestimation rate:
- Benign: 0.077
- Atypical: 0.33
- Carcinoma in situ: 0
Malignant invasive (8)

Total: 30

Total: 26*

* 4 follow-up patients without surgical biopsy (biopsy percutaneous results: benign (2), carcinoma in situ (1), malignant invasive (1).

Table 3. Percutaneous biopsy diagnostic indexes from 26 patients with surgery results (follow-up patients are excluded)

<table>
<thead>
<tr>
<th>Benign surg. result</th>
<th>Malignant surg. r.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign CNB</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Malignant CNB</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

Diagnostic Indexes

<table>
<thead>
<tr>
<th></th>
<th>CNB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensibilidad</td>
<td>92%</td>
</tr>
<tr>
<td>Especificidad</td>
<td>100%</td>
</tr>
<tr>
<td>Valor predictivo positivo</td>
<td>100%</td>
</tr>
<tr>
<td>Valor predictivo negativo</td>
<td>93%</td>
</tr>
</tbody>
</table>

Table 4. Mammographic findings

<table>
<thead>
<tr>
<th>Mammographic findings</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well defined nodule:</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>solitary:</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>multiple:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ill-defined nodule:</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>solitary:</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>multiple:</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 5. Ultrasound findings

<table>
<thead>
<tr>
<th>Ultrasound findings</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>solid nodule: 13 (43%)</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>mixed nodule: 17 (57%)</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Total: 30</td>
<td>19</td>
<td>11</td>
</tr>
</tbody>
</table>

Images for this section:
**Fig. 1:** 35 year old woman with a right breast palpable lump. Mammography showed an ill-defined single nodule in SEQ (1) and ultrasound showed a nodular and heterogeneous lesion (2). CNB showed an intraductal papilloma result and an ultrasound guided vacuum excision (Mammotome®) was performed.
Fig. 2: 35 year old woman with a right breast palpable lump. Mammography showed an ill-defined single nodule in SEQ (1) and ultrasound showed a nodular and heterogeneous lesion (2). CNB showed an intraductal papilloma result and an ultrasound guided vacuum excision (Mammotome®) was performed.

Fig. 3: 35 year old woman with a right breast palpable lump. Mammography showed an ill-defined single nodule in SEQ (1) and ultrasound showed a nodular and heterogeneous lesion (2). CNB showed an intraductal papilloma result and an ultrasound guided vacuum excision (Mammotome®) was performed.
Fig. 4: 36 year old woman with a right breast palpable lump with spontaneous nipple discharge. Mammography showed an ill-defined nodules in SIQ (4) and an heterogeneous lesion in ultrasound (5). The lesion was biopsied by CNB with an intraductal papilloma result. A tumorectomy was performed with the same pathologic result.
Fig. 5: 36 year old woman with a right breast palpable lump with spontaneous nipple discharge. Mammography showed an ill-defined nodules in SIQ (4) and an heterogeneous lesion in ultrasound (5). The lesion was biopsied by CNB with an intraductal papilloma result. A tumorectomy was performed with the same pathologic result.
Fig. 13: 64 year old patient with a left breast palpable lump. Mammography showed an ill circumscribed nodular lesion in IIQ (12), and an heterogeneous nodular lesion in US (13). CNB showed an invasive papillary carcinoma and a tumorectomy was performed.

Fig. 6: 36 year old woman with a right breast palpable lump with spontaneous nipple discharge. Mammography showed an ill-defined nodules in SIQ (4) and an heterogeneous lesion in ultrasound (5). The lesion was biopsied by CNB with an intraductal papilloma result. A tumorectomy was performed with the same pathologic result.
Fig. 7: 87 year old woman with a long term right breast palpable lump. Mammography showed a well circumscribed lesion in retroareolar region with inner disseminated calcifications (7). Ultrasound showed a cystic lesion with a polypoid and exophitic part with inner Doppler flow (8). A CNB was performed (9) and became an intracystic papillary carcinoma, which was later surgically excised (segmentary mastectomy).
**Fig. 9:** 87 year old woman with a long term right breast palpable lump. Mammography showed a well circumscribed lesion in retroareolar region with inner disseminated calcifications (7). Ultrasound showed a cystic lesion with a polypoid and exophitic part with inner Doppler flow (8). A CNB was performed (9) and became an intracystic papillary carcinoma, which was later surgically excised (segmentary mastectomy).
**Fig. 10:** 87 year old woman with a long term right breast palpable lump. Mammography showed a well circumscribed lesion in retroareolar region with inner disseminated calcifications (7). Ultrasound showed a cystic lesion with a polypoid and exophitic part with inner Doppler flow (8). A CNB was performed (9) and became an intracystic papillary carcinoma, which was later surgically excised (segmentary mastectomy).
**Fig. 12:** 64 year old patient with a left breast palpable lump. Mammography showed an ill circumscribed nodular lesion in I1Q (12), and an heterogeneous nodular lesion in US (13). CNB showed an invasive papillary carcinoma and a tumorectomy was performed.

**Fig. 14:** 64 year old patient with a left breast palpable lump. Mammography showed an ill circumscribed nodular lesion in I1Q (12), and an heterogeneous nodular lesion in US (13). CNB showed an invasive papillary carcinoma and a tumorectomy was performed.
Fig. 11: 87 year old woman with a long term right breast palpable lump. Mammography showed a well circumscribed lesion in retroareolar region with inner disseminated calcifications (7). Ultrasound showed a cystic lesion with a polypoid and exophitic part
with inner Doppler flow (8). A CNB was performed (9) and became an intracystic papillary carcinoma, which was later surgically excised (segmentary mastectomy).
**Fig. 8:** 87 year old woman with a long term right breast palpable lump. Mammography showed a well circumscribed lesion in retroareolar region with inner disseminated calcifications (7). Ultrasound showed a cystic lesion with a polypoid and exophitic part with inner Doppler flow (8). A CNB was performed (9) and became an intracystic papillary carcinoma, which was later surgically excised (segmentary mastectomy).
Conclusion

Papillary lesions of the breast can be small lesions diagnosed incidentally in a screening mammography\(^6\), or big and easily palpable lesions, with or without nipple discharge. Occasionally they only manifest as a filling defect in galactography.

These lesions usually appear in postmenopausal women, although they can also be seen in younger women. In our study the average age is 60 years.

They usually appear as solitary or multiple nodules in image techniques. Like other studies published so far\(^5\), in our study we conclude that image findings are not useful to ascertain the benign/malignant features of these lesions.

Breast ultrasound has evidenced high utility in the study of these lesions because it detected image findings in all our patients. However, none of these findings had enough sensitivity.

Some authors describe a major frequency of malignancy in patients with multiple lesions\(^9\). However, we have not confirmed this in our study because we only found only one multiple lesion.

The utility of CNB in breast papillary lesions is well known discussed because the underestimation is usually present. The CNB underestimation rate has been established from 5.5% to 26%. The underestimation rate obtained in our study is 14% and it is, therefore, within this interval.

This underestimation could be due to the heterogeneous pathological features of these lesions, so the percutaneous biopsy results depend on the biopsy zone. Other authors suggest that papillary lesions can evolve into more aggressive tumors\(^11\).

Although vacuum assisted percutaneous biopsy methods could improve these results, there is still underestimation\(^9,11\) because focal biopsy of tissue can lead to non biopsied residual tissue with carcinoma or atypical cells, obtaining only a biased part of the whole lesion.
While some authors have published that it is possible to avoid surgical excision (with follow-up only) in those patients with a CNB benign result in concordance with radiological findings, now most authors think that a surgical excision should be done in this kind of patients.

A thorough radio-pathologic correlation is mandatory when we obtain a benign result in percutaneous biopsy, although we cannot avoid false negatives even with concordant findings. Moreover, it is highly recommended to follow-up patients already diagnosed with any papillary disease because they seem to be prone to develop new lesions in the future.

To sum up: breast papillary lesions appear as solitary or multiple nodules, well or ill-defined, homogeneous or heterogeneous in ultrasound. In our hospital the global underestimation index is 14%. Even though it is important to undergo a strict image correlation, a benign result can be malignant in the surgical biopsy or follow-up; so papillary lesions are still a challenge for the core needle biopsy and surgical excision should be proposed in patients with concordant and benign papillary lesion.

References


Personal Information