Intraductal papilloma is a benign breast tumor that develops in lactiferous ducts. Solitary papillomas usually are more common than multiple papillomas. Solitary papillomas are often centrally located, whereas multiple papillomas are peripheral. All 13 cases included in this study were solitary.

The purpose of this study is to assess the value of US guided vacuum-assisted breast biopsy compared to surgery for management of intraductal papilloma.

This retrospective study included 13 patients with hypoechoic nodular lesions corresponding to small benign intraductal papillomas on biopsy and visible by US. Lesions were removed using US-guided vacuum-assisted biopsy and all tissue material was reviewed at histology. The mean size of papillomas was 9.3 mm (5-16 mm). Vacuum-assisted tumor removal was considered total for all 13 lesions. Maximum follow-up was 57 months. Two patients had tumor recurrence at 22 and 28 months respectively. In one case, atypical ductal hyperplasia was present at the periphery of the papilloma, requiring complementary surgery.

US-guided vacuum-assisted excision of small benign tumors such as solitary intraductal papillomas appears to be an alternative to surgical biopsy. Because of the large volume of tissue removed, total tumor excision is possible allowing detection of incidental associated lesions.
Benign papilloma: is US-guided vacuum-assisted breast biopsy an alternative to surgical biopsy?

T Bonaventure et al.

In this study, a retrospective review of clinical, imaging and histological data for all 13 cases is performed. Patients were aged 45 to 76 years (mean age: 54 years). Lesions were detected as follows: mammography (5 cases), US (4 cases), and clinical exam (palpable nodule in 3 cases and nodule with nipple discharge in 1 case).

US and Mammography

All lesions corresponded to well-depicted hypoechoic nodules on US (fig. 1), less than 20 mm in diameter. Lesions were detected on only 53% of corresponding mammograms.

Microbiopsy

All patients had previously undergone FNA microbiopsy (16G or 18G needles). Histology was consistent with isolated benign intraductal papilloma in all cases (fig. 2). Excision of the lesion was then proposed to the patients, either surgical or percutaneous using US-guided vacuum-assisted macrobiopsy.

US-guided vacuum-assisted macrobiopsy

Patients were placed in the supine position during US-guided vacuum-assisted macrobiopsy. The nodule was localized using a Toshiba Power 6000 US unit equipped with a 15 MHz linear transducer. Local anesthesia with a mixture of lidocaine and epinephrine was performed to decrease local bleeding. Anesthesia was performed in 2 steps: the superficial portion of the lesion was injected first followed by the deeper portion of the nodule to separate it from the deeper tissues. A 3 mm skin incision was performed using a scalpel to allow placement of the 8G or 11G macrobiopsy needle (Mammotome H.H.®, Breastcare) (fig. 3). Excisional biopsy was then performed under direct visual control to ensure complete resection of the nodule. The entire procedure was about 20 minutes long.

Histology

The biopsy specimens were immediately fixed in a formol solution. Each core of tissue was 3 or 4.3 mm in diameter according to the size of the needle (11G and 8G respectively). The pathologist then reviewed all specimens, comparing to prior FNA results, in order to confirm a final diagnosis.

Patient follow-up

Follow-up clinical and sonographic evaluation was performed at 15 days, 6 months and then yearly.

Results

All results are summarized in table I.
Benign papilloma: is US-guided vacuum-assisted breast biopsy an alternative to surgical biopsy?

US

All papillomas corresponded to hypoechoic nodules on US with mean diameter of 9.3 mm (minimum: 5 mm; maximum: 16 mm).

Macrobiopsies

Five biopsies were performed an 11G needle (38% of cases) while 8 biopsies were performed using an 8G needle (62% of cases).

The mean number of core samples was 8.5 (minimum: 4; maximum: 12).

Benign intraductal papilloma was confirmed at final histological diagnosis in all cases, consistent with previous FNA results (fig. 4).

However, FNA diagnosis underestimates lesions in 2 cases; case n°4 was associated with a small focus of LCIS, and case n°7 was associated with extensive lesions of LCIS and atypical ductal hyperplasia.

Outcome

Excision was considered complete in all 13 cases.

Ten patients showed no local recurrence after a maximum follow-up of 57 months (median follow-up: 33 months).

Two patients (cases n°1 and n°3) presented local recurrence of hypoechoic nodules on US at 28 and 22 months respectively, measuring 8 and 10 mm. FNA was consistent with isolated benign papilloma in both cases and both patients underwent repeat US-guided vacuum-assisted macrobiopsy. Final diagnosis confirmed isolated intraductal papilloma in both cases, and patients remained recurrence free at 25 and 35 months.

A single patient (case n°7) was referred for complementary surgical tumorectomy because of co-existing lesions of atypical ductal hyperplasia because of co-existing lesions of atypical ductal hyperplasia on the macrobiopsy specimen. Final histological diagnosis of the tumorectomy specimen confirmed the presence of LCIS, atypical ductal hyperplasia, post-macrobiopsy fibrous scar (10) and no evidence of residual papilloma. The patient with co-existing small focus of LCIS (case n°4) did not undergo complementary surgery after expert multi-disciplinary review.

Macrobiopsy related complications were recorded in 4 cases. One patient (case n°9) developed a hemotorax requiring surgical drainage a few hours after the procedure with favorable outcome. This patient had a sternum recurvatum with small breasts and a papilloma located in an inner quadrant.

The three other patients (cases n°6, n°8 and n°13) had a residual hematoma detected on US at 3, 6 and 1 month post procedure respectively, without associated clinical symptoms or esthetic deformity.

Discussion

Intraductal papilloma is a benign tumor of the breast that can be benign, atypical or co-exist with neoplastic lesions such as atypical ductal hyperplasia (ADH) or DCIS (11, 12). The latter may be confined to the papilloma (atypical papilloma) or at the periphery of the papilloma (ADH and DCIS) (12). Such co-existing lesions are rare but require complete excision of the lesion for histological analysis (3-5). Histology of macrobiopsy specimens showed co-existing borderline lesions at the periphery of the papilloma in 2 cases. Evaluation of the breast tissue next to the papillomas was possible due to the sufficient size of the samples from macrobiopsy. Newer techniques of US-guided vacuum-assisted macrobiopsy have already shown their efficacy for histological diagnosis of

<table>
<thead>
<tr>
<th>CASE</th>
<th>SIZE US (mm)</th>
<th>NEEDLE (Gauge)</th>
<th>Number of cores</th>
<th>HISTOLOGY</th>
<th>EXCISION</th>
<th>FOLLOW-UP</th>
<th>COMPLICATION</th>
</tr>
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<tbody>
<tr>
<td>1</td>
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<td>11</td>
<td>12</td>
<td>papilloma</td>
<td>complete</td>
<td>recurrence at 28 months</td>
<td>repeat procedure without recurrence at 25 months</td>
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<tr>
<td>2</td>
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<td>11</td>
<td>10</td>
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<td>no recurrence at 30 months</td>
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<td>3</td>
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<td>11</td>
<td>12</td>
<td>papilloma</td>
<td>complete</td>
<td>recurrence at 22 months repeat procedure without recurrence at 35 months</td>
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<td>4</td>
<td>10</td>
<td>11</td>
<td>9</td>
<td>papilloma</td>
<td>complete</td>
<td>no recurrence at 24 months</td>
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<tr>
<td>5</td>
<td>6</td>
<td>11</td>
<td>11</td>
<td>papilloma + micro focus of LCIS</td>
<td>complete</td>
<td>no recurrence at 36 months</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td>8</td>
<td>12</td>
<td>papilloma</td>
<td>complete</td>
<td>no recurrence at 36 months</td>
<td>residual hematoma at 3 months</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>papilloma + LCIS + ADH</td>
<td>complete</td>
<td>complementary surgery — tumorectomy</td>
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<td>8</td>
<td>4</td>
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<td>complete</td>
<td>no recurrence at 36 months</td>
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<tr>
<td>9</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>papilloma</td>
<td>complete</td>
<td>no recurrence at 36 months</td>
<td>residual hematoma at 6 months</td>
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<tr>
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<td>8</td>
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<td>papilloma</td>
<td>complete</td>
<td>no recurrence at 36 months</td>
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<tr>
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<td>11</td>
<td>8</td>
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<td>papilloma</td>
<td>complete</td>
<td>no recurrence at 24 months</td>
<td>residual hematoma at 1 month</td>
</tr>
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</table>

LCIS: lobular carcinoma in situ; ADH: atypical ductal hyperplasia.
heterogeneous lesions, including papillary lesions, due to the larger size of biopsy specimens (6-8, 13, 14). Some authors have already published on the use of US-guided vacuum-assisted macrobiopsy for removal of isolated papillomas with nipple discharge (15, 16). The smaller size of the lesions appears to be required (15) for successful US-guided vacuum-assisted macrobiopsy. In our population, lesions were 16 mm or less in diameter. Our results show successful complete lesion excision with absence of local papilloma recurrence in 77% of cases. Two patients (cases #1 and #3; 15%) presented with local recurrence of papilloma after the excision had been considered complete by US. This could indicate growth of a second papilloma as opposed to local recurrence following incomplete excision. However, evaluation of the degree of excision on US is less reliable than the evaluation of completeness of lesion excision on histology. Also, US-guided vacuum-assisted macrobiopsy should be performed by experienced sonographers with appropriate training with the technique (8). In addition, evaluation of resection margins is difficult on core samples from macrobiopsy because of lesion fragmentation. This underscores the need for adequate clinical, US and mammographic follow-up. Of note, recurrence of papilloma following surgical excision has also been described (17).

The procedure lasted about 20 minutes and was well tolerated by patients. Complications were infrequent and usually benign (residual hematoma) (8). Our single patient with hemothorax occurred early on in a setting of difficult biopsy and represents our only major complication in a series now of over 200 US-guided vacuum-assisted macrobiopsy procedures. Finally, we believe that it is mandatory to have a multi-disciplinary panel comprised of radiologist, surgeon and pathologist review all indications for macrobiopsy.

**Conclusion**

US-guided vacuum-assisted macrobiopsy is a valuable technique for the diagnosis of breast lesions. This technique may be an interesting alternative to surgery for excision of small presumed benign lesions such as intraductal papilloma. However, additional evaluation is needed to assess its true long term efficacy and further define its indications.

**References**