Aspiration of Breast Abscess Under Ultrasound Guidance: Outcome Obtained and Factors Affecting Success

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OBJECTIVE: To assess ultrasonographically (US) guided needle aspiration of breast abscesses as an alternative to surgical incision and drainage.

METHODS: In our prospective study, 30 patients with 31 breast abscesses (one patient had bilateral breast abscess) underwent percutaneous breast abscess drainage under US guidance with local anaesthesia and oral antibiotics between 1 January 2004 and 31 March 2005. These patients consisted of 16 (53.3%) non-lactating and 14 (46.7%) lactating women, with ages ranging from 18 to 68 years (median, 28 years). The racial distribution comprised 26 (86.7%) Malays, three (10%) Chinese and one (3.3%) Indian. All patients had the chief complaint of breast swelling and 25 (83.3%) had breast pain. Clinically, 28 (93.3%) were found to have a palpable mass. Nine (30%) lesions were in the upper outer quadrant of the left breast. US diameters ranged from 1 to 15 cm (median, 4 cm). The pus volumes varied from 1 to 200 mL (median, 14 mL).

RESULTS: Fifteen (50%) patients required only a single aspiration, 10 required multiple aspirations and five required incision and drainage. Those patients in whom needle aspiration failed had multiloculated lesions irrespective of abscess volume and size.


Key Words: breast abscess, percutaneous drainage, ultrasound guidance

Introduction

Breast abscesses are more frequently observed in non-lactating women than in lactating women, and are a particularly morbid condition because of the intense discomfort caused and the tendency to recurrence. The traditional treatment of breast abscesses is by surgical incision, digital disruption of septa, evacuation of contents with occasional placement of surgical drains and administration of systemic antibiotics. This strategy often requires general anaesthesia, may leave unpleasant scars, is more expensive than aspiration, requires regular postoperative changes of dressing and interferes with lactation. In addition, 10–38% of abscesses recur and need additional surgical drainage.

Needle aspiration of the pus in breast abscesses has been reported both with and without ultrasound guidance. We prospectively assessed the effectiveness of needle aspiration of breast abscesses with ultrasound guidance in conjunction with antibiotic therapy. Success was defined as resolution of the abscess without the need for operative intervention. Failure was defined as no resolution after fine-needle aspiration had been performed.
The aim of this study was to assess ultrasonographically (US) guided needle aspiration of breast abscesses as an alternative to surgical incision and drainage. We also attempted to identify the factors for failure of this management strategy.

**Patients and methods**

In this prospective study, 30 patients (all women) were enrolled between 1 January 2004 and 31 March 2005 (a 15-month period) in our hospital. There were 16 non-lactating and 14 lactating women. The procedure was explained in detail to the patients, and informed consent was obtained in all cases. The mean age was 31.93 years (range, 18–68 years). Diagnosis of breast abscess was based on the clinical examination (tenderness, pain, swelling or mass, redness), ultrasonography and US-guided puncture aspirated material. With ultrasound, the initial size of these abscesses was recorded along with whether they were uniloculated or multiloculated.

Needles used for abscess drainage were initially of smaller calibre 19G. If unsuccessful, gradually larger ones were used consisting of 18G and finally 14G needles. The needles were placed into the abscess cavities by using direct US guidance, and the amount of pus aspirated was recorded. In two patients, a 5-F catheter was placed for drainage after the initial aspiration of large volumes of pus, 150 and 180 mL each.

Local anaesthesia was used at the puncture site. All aspirate samples were sent for pathological examination and for aerobic and anaerobic culture analyses. Breast ultrasonography was repeated every week until the abscesses had completely resolved or until a maximum of five needle aspirations had been performed. If the abscess had not resolved by this time, this was accepted as treatment failure and the patient underwent incision and drainage. Mammo-graphy was performed for cancer screening in patients above 35 years of age. In cases where a breast mass remained after 7 days of treatment, trucut biopsy was performed.

These patients were given oral cloxacillin 500 mg four times daily for 7 days. The following information was recorded in a database for each patient: age, parity, location and ultrasound measurement of the abscess cavity, duration of lactation and of symptoms, results of pus culture, healing time, whether there was any recurrence, pus volume removed, and number of aspirations performed. Lactating patients were encouraged to continue breastfeeding from the unaffected breast, and the breast with the abscess was emptied by means of a pump to prevent milk stasis. Follow-up clinical and ultrasound examinations were performed in all cases weekly until the lesions resolved. For those resolved, they were reviewed again at 12 weeks post drainage before being discharged from the clinic.

Statistical analysis was done by the Mann–Whitney test. A p value of less than 0.05 was considered significant.

**Results**

Between 1 January 2004 and 31 March 2005, a total of 31 abscesses were diagnosed in 30 patients. One patient had bilateral breast abscesses. These patients underwent percutaneous breast abscess drainage under US guidance with local anaesthesia and oral antibiotics. The patients’ median age was 28 years (range, 18–68 years).

Fourteen patients were lactating and 16 were not lactating. One of the 16 patients who were not lactating was pregnant in the third trimester. The racial distribution was as follows: 26 (86.7%) Malays, three (10%) Chinese and one (3.3%) Indian. In terms of the chief complaint, all patients had symptoms of breast swelling, 25 (83.3%) had breast pain and 14 (46.7%) had fever.

Clinically, 28 (93.3%) patients were found to have a palpable mass, 10 (33.3%) had erythema of the overlying skin and 18 (60%) had a painful mass. The most frequent localization of abscesses was the upper outer quadrant (30%), and in 16 patients (53.3%) it was the left breast that was affected. The number of parous women was 22, seven were nulliparous and one was gravid at 28 weeks.

Fourteen patients were lactating, 12 of whom were less than 12 weeks postpartum, one 5 months postpartum and one patient 1 year postpartum. The size of the abscesses ranged from 1 to 15 cm (median, 4 cm). The median pus volume at the initial aspiration was 14 mL (range, 1–200 mL). Bacteriological examination was negative in five (16.7%) of the 30 patients. The specimens grew *Staphylococcus aureus* in 23 (76.7%), *Klebsiella* in one (3.3%) and *Diphtheria* in one (3.3%).

The abscesses were multiloculated in nine (30%) patients. The average length of symptoms was 11.63 days (range, 3–28 days). Fifteen (50%) patients obtained complete resolution of the abscess with one aspiration, seven
(23.3%) with two aspirations, three (10%) with three aspirations, one (3.3%) refused further percutaneous aspiration treatment after failure of the first aspiration and elected for surgical drainage. Four (13%) patients were referred for surgical treatment by the radiologist after one and five aspirations because these abscesses were multiloculated and difficult to aspirate (Table).

The resulting success rate of aspiration without resorting to surgical drainage was 83.3%. Mammography was performed for cancer screening in patients above 35 years of age and were all negative. The trucut biopsies performed in 22 cases, with a palpable mass remaining at 7 days, were found to be abscesses in 13 patients, chronic granulomatous mastitis in seven patients and chronic mastitis in two. Statistical analysis demonstrated that a multiloculated abscess was significantly associated with an approximately 50% failure to cure by aspiration ($p = 0.002$).

Complete resolution of the abscess cavity was seen at between 1 and 8 weeks. There were no recurrences during follow-up. All patients tolerated the percutaneous treatment well and were satisfied with the procedure and outcome. No further complications were observed.

**Discussion**

Patients with breast abscesses are most commonly seen in the emergency room, and drainage is then performed through a small incision.8–11 Battle and Bailey,13 quoted by Uriburu,14 in 1923 first suggested that breast abscesses could be successfully treated with percutaneous aspiration of pus and irrigation of the cavity with Dakin’s solution.

In 1946, Florey et al15 first considered the possibility of daily aspiration of small abscesses and direct injection of penicillin soon after the drug became available at the end of World War II. Apparently, both techniques fell into disuse shortly thereafter. The present-day incidence of breast abscess is less than in previous decades. It is now observed more often in nonlactating women than in lactating women.1,20

In our study, the frequency of lactating and nonlactating abscesses was 46.6% and 53.3%, respectively. Breast abscesses are most frequently located in the upper outer quadrant, which fits in with the fact that most of the breast parenchyma is found in this area.9 In our study, 30% of the patients had abscess in the upper outer quadrant, and 53.3% of the abscesses were in the left breast. The highest incidence of breast abscess during lactation has been reported within the 12 weeks of the postpartum period.9,16

In this study, the mean duration of lactation before abscess formation was 1 month and in 40% the abscesses formed in the first 12 weeks of the postpartum period.

Traditionally, when faced with a breast abscess, it was thought necessary to consider the possibility of an underlying breast carcinoma. However, this association is rarely observed,5,10 and must be considered to be coincidental when found. In this present series, no breast carcinoma was found. We consider it fundamental to perform trucut biopsy in palpable masses unresolved by percutaneous drainage and seen on US imaging and mammography in patients above 35 years of age to prevent missing a malignancy.

The most common pathogen was *S. aureus*,17–19 which was isolated from the pus culture in 76.7% of our cases. It is recommended that when a diagnosis of mastitis or abscess is made, the condition should be treated with the appropriate antibiotics and the breast milk should be drained by frequent nursing or pumping. The recommended duration of antibiotic therapy is 10 days.5,8,9,20

In this study, all patients with mastitis and/or breast abscesses were given cloxacillin for 7 days.

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**Table. Multiloculation and outcome of aspiration**

<table>
<thead>
<tr>
<th>No. of patients</th>
<th>Aspiration number</th>
<th>Abscess cavity</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1</td>
<td>Single</td>
<td>Success</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>6 single</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 multiloculated</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Multiloculated</td>
<td>Success</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Single</td>
<td>Patient requested for surgery</td>
</tr>
<tr>
<td>4</td>
<td>1-5</td>
<td>Multiloculated</td>
<td>Failed aspiration</td>
</tr>
</tbody>
</table>

*Multiloculated abscess associated with approximately 50% failure to cure by aspiration ($p = 0.002$).
High-resolution real-time sonography is a unique means for diagnosing and evaluating the extent, site, size and internal characteristics of breast abscesses. Ultrasonography may be useful both in the diagnosis of breast abscesses and in the guidance of needle placement. Advantages cited for ultrasound-guided aspiration are the ability to recognize a multiloculated abscess and assess the adequacy of drainage and the possibility of ruling out simple mastitis.  

The possibility of using sonographically guided percutaneous aspiration has emerged as a valid alternative to surgical drainage. Karstrup et al first reported the successful use of this technique in 1990, soon followed by other investigators. More recently, Imperiale et al resurrected the local instillation of antibiotics (40 – 160 mg of gentamicin) after sonographically guided aspiration. O’Hara et al reported an 85% cure rate of 22 abscesses, some of them aspirated without sonographic guidance. Schwarz and Shrestha also reported aspiration without sonographic guidance plus oral antibiotics in 33 abscesses, with a resultant cure rate of 82%. Their success rate statistically correlated with a mean volume of pus at the first aspirate of 4.6 mL, compared with failure in abscesses with a mean volume of 21.5 mL. Hook and Ikeda reported a 54% cure rate of 13 breast abscesses treated by aspiration and irrigation. The patients in whom treatment failed had an abscess of more than 3 cm in diameter. Dixon, however, reported successful aspiration of six lactating abscesses with a mean volume of 26 mL. Our study has shown that a high rate of success is achieved with 83.3%. 

The risk factors in failure of ultrasound-guided needle aspiration for breast abscesses were found to be multiloculated abscess. The benefits for the patient of needle aspiration are considerable because surgery is eliminated and no post treatment care is needed.

Our study confirms the previous reports that sonographically guided aspiration of breast abscesses has become the treatment of choice. We have shown a success rate of 83.3% in patients completing treatment, with surgical drainage reserved for the few patients whose treatment has failed. We conclude that needle aspiration and oral antibiotic treatment of breast abscesses are safe and effective. With similar reports from a variety of centres, this technique should become the standard practice in the management of breast abscesses.

References


