The Breast (2005) **14**, 375–379

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THE BREAST

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ORIGINAL ARTICLE

Management of lactational breast abscesses

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Received 9 August 2004; received in revised form 16 November 2004; accepted 24 November 2004

KEYWORDS
Breast abscess;
Lactation;
Incision and drainage;
Needle aspiration;
Cosmetic result

Summary The purpose of the present prospective study was to compare incision and drainage against needle aspiration for the treatment of breast abscesses in lactating women. During the 3-year study period, patients with breast abscesses were randomized 1:1 to undergo either incision and drainage (23 patients) or needle aspiration (22 patients). Ultrasound guidance was not used for any of these patients. Age, parity, localization of abscess, whether or not nipples were cracked, duration of symptoms and lactation, abscess diameter, pus culture results, breast infection history during any previous period of lactation, healing time, recurrence, cosmetic outcome in the case of incision and drainage, and volume of pus removed and number of aspirations needed in the case of aspiration were recorded. The treatment value of each of these techniques was investigated. Student's *t*-test, Fisher's exact test, a Chi-square test and the Mann–Whitney *U*-test were used for statistical analysis. In the incision and drainage group all patients were treated successfully, but 1 patient (4%) had a recurrence 2 months after complete healing and 16 patients (70%) in this group were not pleased with the cosmetic outcome. In the needle aspiration group, overall 3 patients were treated with a single aspiration and 10 patients (45%) with multiple aspirations, but 9 patients (41%) did not heal following needle aspiration and subsequently required incision and drainage in addition. No recurrences were observed in the needle aspiration group during the follow-up period. The risk factors for failure of needle aspiration for breast abscesses were abscesses larger than 5 cm in diameter, unusually large volume of aspirated pus, and delay in treatment. In conclusion, breast abscesses smaller than 5 cm in diameter on physical examination can be treated with repeated aspirations with good cosmetic results. Incision and drainage should be reserved for use in patients with larger abscesses.

Introduction

Breast infection is a common problem in lactating women presenting with a wide spectrum of

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doi:10.1016/j.breast.2004.12.001

pathology, ranging from mastitis to abscess formation. The incidence of breast abscess ranges from 0.4% to 11%.[1–4] The traditional management of breast abscesses involves incision and drainage, but this is associated with prolonged healing time, regular dressings, difficulties in breastfeeding, and the possibility of an unsatisfactory cosmetic outcome.[5,6]

It has recently been reported that breast abscesses can be treated by repeated needle aspirations.[1,7–9] There are no prospective, randomized studies comparing the effectiveness of this technique and that of incision and drainage of breast abscesses in the literature. The purpose of the present study was to compare the classic incision and drainage method and the novel approach of needle aspiration of breast abscesses in lactating women.

Patients and methods

From January 2000 to July 2003, a total of 45 lactating women with breast abscesses presented at our surgical clinic. In this period, we diagnosed mastitis in 180 patients, all of whom were treated with ampicillin-sulbactam orally at a dose of 375 mg twice daily for 10 days; 7 of these patients developed breast abscesses during follow-up. The other 38 breast abscess patients presented with breast abscess at their initial admission. Informed consent was obtained from all the patients enrolled in this study. Patients with breast abscesses were randomized 1:1 to proceed either to incision and drainage (23 patients) or to needle aspiration (22 patients).

The diagnosis of breast abscesses was based on redness, warmth, tenderness, induration, and presence of a fluctuant mass. Ultrasound guidance was not used for any of these patients. The overall diameter of each breast abscess was assessed clinically.

(A) *Incision and drainage*: The abscess was incised near the areolar margin and along skin lines under local anesthesia. All pus was evacuated, and loculi were broken down digitally. The wounds were left open to drain and dressed daily until the wound was clean. The healing time in this group was the time from incision and drainage to wound closure.
(B) *Needle aspiration*: An 18-G needle and a 20-ml syringe were used in each case. Aspiration was repeated every other day until the mass had completely resolved or until five needle aspirations had been performed. If the abscess had not resolved by this time, this result was accepted as a treatment failure and the incision and drainage procedure was then implemented.

All breast abscess patients were given oral 375 mg ampicillin-sulbactam twice daily for 10 days unless their abscesses were larger than 10 cm in diameter, in which case ampicillin-sulbactam 1 g was injected i.v. twice daily for 3 days and 7 days of oral medication as described above followed. For each patient, a sample of pus was sent for bacteriological examination. All patients were treated as outpatients.

The following information was recorded in a computerized database for each patient: age and parity, localization and diameter of abscess, whether her nipples were cracked, duration of lactation and of symptoms, results of pus culture, history of breast infection during any previous period of lactation, healing time, whether there was any recurrence, cosmetic outcome in the case of incision and drainage, and pus volume removed and number of aspirations needed in the case of the aspiration technique; the treatment value of these techniques was then investigated.

All patients were followed up throughout the lactation period. 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. Student's *t*-test, Fisher exact test, a Chi-square test, and the Mann–Whitney *U*-test were used for statistical analysis. $P < 0.05$ was accepted as significant.

Results

The mean age of the patients was 25 (range 17–36) years. Sixteen of the patients (36%) were primiparae and 29 (64%) were multiparae. The most frequent localization of abscesses was the upper outer quadrant (35%), and in 26 patients (58%) it was the left breast that was affected. In 14 patients (31%) the abscess had been preceded by cracked nipples. The pus cultures from breast abscesses revealed *Staphylococcus aureus* in 55% of cases. Patient characteristics of the incision and drainage and the needle aspiration groups are shown in Table 1.

There was no significant difference between the incision and drainage and the needle aspiration groups in terms of age, parity, presence of cracked nipples, duration of symptoms and lactation, diameter of abscess, a history or not of abscess or

mastitis during earlier periods of lactation, and presence or not of *S. aureus* in the pus culture.

The mean healing time was significantly longer in the incision and drainage group than in the needle aspiration group when nonhealed cases in the needle aspiration group were excluded. All patients in the incision and drainage group were treated successfully, but in 1 patient (4%), whose abscess was 12 cm in diameter, there was a recurrence 2 months after complete healing. It was drained once again, and then healed uneventfully. Unfortunately, 16 patients (70%) in the incision and drainage group were not pleased with the cosmetic outcome.

In the needle aspiration group, the mean number of aspirations performed was 3.5 (range 1–5) and the mean volume of pus aspirated was 44.3 (range 5–100) ml. Overall, 3 of these patients (14%) were each treated with a single aspiration and 10 patients (45%), with multiple aspirations (Table 2). In 9 patients (41%), needle aspiration was not followed by healing and implementation of the incision and drainage technique was required (Table 3). There were no recurrences in the needle aspiration group during the follow-up period. We noted that in the needle aspiration group all 10 patients with abscesses smaller than 5 cm in diameter were treated successfully, but needle aspiration was successful only in 3 of the 12 patients with abscesses larger than 5 cm in diameter ($P<0.05$). In addition, the duration of symptoms and the volume of pus aspirated were

Table 1 Characteristics of the patients with breast abscesses by treatment group.

Characteristics	Incision and drainage ($N=23$)	Needle aspiration ($N=22$)	*P*-value
Mean age (years)	24.48 ± 4.20	26 ± 5.44	0.298 (Student's t)
Mean parity	1.65 ± 0.65	2.1 ± 0.92	0.104 (Mann–Whitney *U*)
Mean duration of lactation (months)	3.87 ± 1.366 (26%)	4.32 ± 2.758 (36%)	0.926 (Mann–Whitney *U*)
Mean duration of symptoms (days)	6.70 ± 3.94	8.05 ± 4.26	0.289 (Mann–Whitney *U*)
Mean diameter of abscess (cm)	6.48 ± 2.66	6.09 ± 2.83	0.590 (Mann–Whitney *U*)
Presence of cracked nipples	6 (26%)	8 (36%)	($X^2=0.55$) 0.457
Staphylococcus in pus culture	14 (61%)	11 (50%)	0.453 ($X^2=0.53$)
Abscess or mastitis in previous lactation	4 (17%)	5 (23%)	0.722 (Fisher exact)
Healing rate	23 (100%)	13 (41%)	0.001 (Fisher exact)
Mean healing time (days)	12.43 ± 2.76	6.36 ± 2.43	<0.001 (Mann–Whitney *U*)

Table 2 Data on abscess diameter, number of aspirations, volumes of pus aspirated, and location of abscesses in cases successfully treated by needle aspiration.

Case no.	Diameter of abscess (cm)	No. of aspirations	Volume aspirated (ml)	Location of abscess
1	4	3	25	Right upper outer quadrant
2	3	1	5	Left upper outer quadrant
3	3	2	10	Left lower outer quadrant
4	4	3	40	Right retroareolar
5	3	2	15	Right lower inner quadrant
6	4	3	25	Left upper inner quadrant
7	3	1	15	Left lower outer quadrant
8	6	4	40	Left retroareolar
9	6	4	40	Right upper outer quadrant
10	5	3	40	Left lower inner quadrant
11	3	1	10	Right upper outer quadrant
12	4	2	40	Left upper outer quadrant
13	6	3	35	Right lower inner quadrant

found to be factors predisposing to failure, while the presence of a cracked nipple, *S. aureus* in the pus culture, and a history of abscess or mastitis during previous periods of lactation were not factors in the failure of needle aspiration of breast abscesses in lactating women (Table 4).

Discussion

Patients with breast abscesses are most commonly seen in the emergency room, and drainage is then performed through a small incision.[1,2,5,10,11] It has been suggested that surgical drainage might be replaced by repeated aspiration. Needle aspiration is performed with a large needle, and as much pus as possible is aspirated at each attempt at aspiration; antibiotics are also administered.[2,7–9,12] These findings give rise to the question of which technique is better for the management of breast abscesses.

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.[2] In our study, 35% of the patients had abscess in the upper outer quadrant, and 58% of the abscesses were in the left breast. The highest incidence of breast abscess during lactation has been reported within the first 12 weeks of the postpartum period.[2,13] In this study, the mean duration of lactation before abscess formation was 4 months, but in 24% of cases the abscesses formed in the first month.

The most common pathogen was *S. aureus*,[2,14–16] which was isolated from the pus culture in 55% of our cases. It is recommended that when a diagnosis of mastitis or abscess is made, the condition should be treated with antistaphylococcal antibiotics and the breastmilk should be drained by frequent nursing or pumping. The recommended duration of antibiotic therapy is 10 days.[1,2,9,12,17] In this study, all patients with mastitis and/or breast abscesses were given ampicillin-sulbactam for 10 days.

A break in the skin may provide a portal of entry for pathogenic organisms. Theoretically, bacteria could enter through the cracks or fissures in the nipple or areola; however, mothers with cracked or sore nipples usually avoid breastfeeding on the affected side, leading to milk stasis. Milk stasis, rather than the presence of bacteria entering through a break in the skin, may be a major cause of the development of breast infection.[1,2,5,16,18,19] In our series, abscesses were preceded by cracked nipples in 31% of cases.

All patients treated with incision and drainage initially made uneventful recoveries, but 1 patient had a recurrence 2 months later. In this group, 70% of the patients were not satisfied with the cosmetic appearance of the scar. In the needle aspiration group, 9 patients (41%) failed to respond to needle aspiration and subsequently required incision and drainage. The mean healing time was significantly longer in the incision and drainage group than in the needle aspiration group when the nonhealed cases in the needle aspiration group were excluded from the analysis.

Ultrasonography may be useful both in the diagnosis of breast abscesses and in the guidance of needle placement. Advantages cited for ultra-

Table 3 Abscess diameter, volume of pus aspirated, and location of abscesses in patients unsuccessfully treated with needle aspiration.

Case no.	Diameter of abscess (cm)	Volume aspirated (ml)	Location of abscess
1	8	40	Left retroareolar
2	9	80	Right lower inner
3	9	75	Left lower inner
4	8	60	Left upper outer
5	12	100	Right upper outer
6	12	90	Left lower outer
7	6	50	Right upper outer
8	8	60	Right lower outer
9	8	80	Left upper outer

Table 4 Risk factors in failure of needle aspiration for treatment of breast abscesses.

Characteristics	Failed ($N = 9$)	Successful ($N = 13$)	P
Mean diameter of abscess (cm)	8.89+1.96	4.15+1.21	<0.001 (Mann–Whitney U)
Mean duration of symptoms (days)	12.67+2.00	4.85+1.41	<0.001 (Mann–Whitney U)
The amount of aspirates (ml)	70.56+19.44	26.15+1372	<0.001 (Mann–Whitney U)
Presence of cracked nipple	4 (44%)	4 (30%)	0.662 (Fisher exact)
Staphylococcus aureus in pus culture	6 (67%)	5 (46%)	0.387 (Fisher exact)
Abscess or mastitis in previous lactation	4 (44%)	1 (8%)	0.116 (Fisher exact)

sound-guided aspiration are the ability to recognize multiloculation and assess the adequacy of drainage and the possibility of ruling out simple mastitis.[12,17,19–23] Ultrasound guidance was not used in our study. Some authors have claimed that needle aspiration without ultrasound guidance is effective in the treatment of breast abscesses,[7–9] whereas others recommend ultrasound guidance for needle aspiration.[12,20–23] Hook et al.[21] report that percutaneous aspiration of breast abscesses can allow the diagnosis of breast abscesses and be used to treat small abscesses if they are completely drained. In addition, while partial drainage of abscesses larger than 3 cm can be palliative, incision and drainage may still be necessary for definitive treatment. In this study, we aimed to assess the value of blind needle aspiration. A randomized clinical study is necessary to evaluate the benefit of ultrasound guidance during needle aspiration in patients with breast abscesses.

There was a significant difference between the incision and drainage and the needle aspiration group in terms of whether treatment of the breast abscesses was successful ($P < 0.05$). The risk factors in failure of needle aspiration for breast abscesses were found to be abscess larger than 5 cm in diameter, larger than average volume of aspirated pus, and delay in treatment.

In conclusion; breast abscesses smaller than 5 cm in diameter on physical examination can be treated with repeated needle aspirations with good cosmetic results. Incision and drainage should be reserved for patients with larger abscesses.

References

1. Dener C, Inan A. Breast abscesses in lactating women. *World J Surg* 2003;**27**:130–3.
2. Marchant DJ. Inflammation of the breast. *Obstet Gynecol Clin North Am* 2002;**29**:89–102.
3. Devereux WP. Acute puerperal mastititis: evaluation of its management. *Am J Obstet Gynecol* 1970;**108**:78–81.
4. Thomsen AC, Espersen T, Maigaard S. Course and treatment of milk stasis, noninfectious inflammation of the breast, and infectious mastitis in nursing women. *Am J Obstet Gynecol* 1984;**149**:492–5.
5. Benson EA. Management of breast abscesses. *World J Surg* 1989;**13**:753–6.
6. Scholefield JH, Duncan JL, Rogers K. Review of a hospital experience of breast abscesses. *Br J Surg* 1987;**74**:469–70.
7. Dixon JM. Repeated aspiration of breast abscesses in lactating women. *BMJ* 1988;**297**:1517–8.
8. Schwarz RJ, Shrestha R. Needle aspiration of breast abscesses. *Am J Surg* 2001;**182**:117–9.
9. Tan SM, Low SC. Non-operative treatment of breast abscesses. *Aust NZ J Surg* 1998;**68**:423–4.
10. Knight IC, Nolan B. Breast abscess. *BMJ* 1959;**I**:1224–6.
11. Bates T, Down RH, Tant DR, et al. The current treatment of breast abscesses in hospital and in general practice. *Practitioner* 1973;**211**:541–7.
12. O'Hara RJ, Dexter SP, Fox JN. Conservative management of infective mastitis and breast abscesses after ultrasonographic assessment. *Br J Surg* 1996;**83**:1413–4.
13. Fetherston C. Characteristics of lactation mastitis in a Western Australian cohort. *Breastfeed Rev* 1997;**5**:5–11.
14. Marshall BR, Hepper JK, Zirbel CC. Sporadic puerperal mastitis. An infection that need not interrupt lactation. *JAMA* 1975;**233**:1377–9.
15. Matheson I, Aursnes I, Horgen M, et al. Bacteriologic findings and clinical symptoms in relation to clinical outcome in puerperal mastitis. *Acta Obstet Gynecol Scand* 1988;**67**:723–6.
16. Inch S. *Mastitis: a literature review.* Geneva: World Health Organization, Division of Child Health and Development; 1997.
17. Ferrara JJ, Leveque J, Dyess DL, Lorino CO. Nonsurgical management of breast infections in nonlactating women: a word of caution. *Am Surg* 1990;**56**:668–71.
18. Kaufmann R, Foxman C. Mastitis among lactating women: occurrence and risk factors. *Soc Sci Med* 1991;**33**:701–5.
19. Hayes R, Michell M, Nunnerley HB. Acute inflammation of the breast—the role of breast ultrasound in diagnosis and treatment. *Clin Radiol* 1991;**44**:253–6.
20. Karstrup S, Solvig J, Nolsoe CP, et al. Acute puerperal breast abscesses: US-guided drainage. *Radiology* 1993;**188**:807–9.
21. Hook GW, Ikeda DM. Treatment of breast abscesses with US-guided percutaneous needle drainage without indwelling catheter placement. *Radiology* 1999;**213**:579–82.
22. Blaivas M. Ultrasound-guided breast abscess aspiration in a difficult case. *Acad Emerg Med* 2001;**8**:398–401.
23. Garg P, Rathee SK, Lal A. Ultrasonically guided percutaneous drainage of breast abscess. *J Indian Med Assoc* 1997;**95**:584–5.