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Surgery

Ultrasound-Guided Drainage of Breast Abscess

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Abstract **Original Research Article**

Objective: To assess the efficacy of ultrasound-guided drainage of breast abscesses with special attention to the risk of recurrence and the need for surgical treatment, to avoid postoperative morbidity, to reduce the hospital stay and cost of treatment, to determine the need for termination of breast feeding. ***Methods:*** 100 patients with breast were selected conveniently among those who were admitted in Dinajpur Medical College hospital or visited to surgery OPD with breast abscess. They were evaluated by short history, clinical examination and ultrasonogram. After counseling and taking consent they were treated with ultrasound-guided drainage, by needle or pigtail catheter under local anaesthesia. Follow-up punctures were performed at 2 or 3 day intervals until the clinical condition and ultrasound findings had improved. All patients were treated with oral antibiotics. Mammography was performed to search for underlying cancer. ***Results:*** Among the 100 cases included in the study, ninety-seven 97% patients with puerperal abscesses and 81% with non-puerperal abscesses recovered after the first round of ultrasound-guided drainage. One patient in each group had recurrence in loco but recovered after further ultrasound-guided drainage. Seven patients, 6 with non-puerperal and 01 with puerperal abscesses, underwent surgical excision of the abscess cavity or fistulas. Breastfeeding continued and 23 patients were treated as outpatients. The median number of follow up examinations in the ultrasound-department was four (range 1–10) for the group of patients with puerperal abscess and three (range 1–7) in the group of patients with non- puerperal abscess. The corresponding figure for the median number of punctures was for both groups one (range 1–6 and 1–4). There were no reports of newly diagnosed breast cancer in the 1-year follow-up period. ***Conclusion:*** Treatment of breast abscess with US-guided Percutaneous aspiration or Pigtail catheter drainage both in puerperal and non-puerperal breast abscess has a high rate of success, no need to stop breast feeding, avoids postoperative morbidity, less hospital stay as well as cost of treatment.

Keywords: Mammography, local anaesthesia, breast abscess.

INTRODUCTION

Breast abscess is the most common breast disease in Female. It is common during early weeks of lactation as well as weaning, but not always confined to postpartum state only, a good percentage of abscess occur in non-lactating breast [1]. Most mastitis cases can be treated with antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) without discontinuation of breast-feeding [2-5]. Inadequate or delayed treatment can lead to abscess formation, the incidence of which has been reported to range from 4.6% to 11% in some western studies [3, 4, 6, 7]. Until the last decade, the recommended treatment for breast abscess was surgical incision and drainage [2, 8, 10]. Patients treated with incision and drainage have some problems including poor cosmesis, painful postoperative dressing, and longer healing time; further, the procedure requires general anesthesia and termination of breast-feeding [11, 12]. Even with this aggressive approach, the abscess recurrence rate is reported to be between 10% and 38% [13]. Ultrasonography (US) has been shown to be useful in depicting abscesses in patients with mastitis [14, 15] and subsequently has been used to guide abscess drainage. A group of Scandinavian investigators [16] reported on their treatment of breast abscesses in four patients with techniques developed for percutaneous abdominal abscess treatment. Use of polyethylene Pigtail catheters to drain and irrigate the abscesses resulted in improved cosmetic results and no abscess recurrences. Three years later, the same group reported on 19 additional patients who were treated with this regimen and had similar results [7]. In a

British study [17], blind needle aspiration of breast abscesses without placement of an indwelling catheter was evaluated, and it was found that several separate attempts at aspiration usually were required for complete abscess resolution; these findings raised the question of which approach is best for breast abscess treatment. In another British study [18], 19 of 22 patients with abscesses were treated successfully with needle aspiration only, but neither the abscess sizes nor the aspiration and guidance methods were elucidated.

On this topic no study was conducted at post graduate level in our country.

So I have decided to conduct a prospective observational study to asses the efficacy of ultrasound-guided drainage of breast abscesses with special attention to the risk of recurrence and the need for surgical treatment in a consecutive patient population.

OBJECTIVE

General Objective

The present study has been planned to assess the efficacy of ultrasound-guided drainage of breast abscesses with special attention to the risk of recurrence and the need for surgical treatment in a consecutive patient population.

Specific Objective

In order to fulfill the above general objectives the following specific objectives have been set for the present study:

1. To test the effectiveness of ultrasound-guided drainage of breast abscess.
2. To document the recurrence rate by this procedure.
3. To determine the conversion rate to conventional surgical treatment.
4. To avoid the postoperative morbidity.

METHODOLOGY

Study Design

Prospective observational study.

Place of Study

Different surgical unit of Dinajpur Medical College Hospital, Dinajpur.

Study Period

From 01.07.2010 to 30.11.2011 (1 Year 05 Month).

Sampling

Convenient sampling.

Sample Size

100.

SELECTION CRITERIA

Inclusion Criteria

1. Lactational breast abscess.
   - Puerperal.
   - Non-puerperal.
2. Non lactational breast abscess.

Exclusion Criteria

1. Superficial abscess with skin change.
2. Recurrent abscess.
3. Spontaneously ruptured abscess.
4. Infantile abscess.
5. Abscess in suspected carcinoma.

Data Analysis

Statistical analyses have been performed with SPSS for Windows 9.0 (SPSS inc. Chicago, IL). Descriptives included numbers, percentage and range. Logistic regression analysis was first performed by univariate testing, where variables were tested based on literature and clinical experience. I planned to include variables reaching a significance level of <0.1 in univariate testing in a final multivariate logistic regression model. The outcome variable used was resolution after ultrasound-guided drainage, being defined as no recurrent abscess and no need for surgery. This entire task performed with the help of statistics department of Dhaka University.

RESULTS

Table 1: Clinical characteristics of 100 patients with breast abscesses

	Puerperal abscess	Non-Puerperal
No. of Patients	59	41
Age (Years)	35(15-42)	42(15-72)
Days from symptom onset to diagnosis and treatment	7(2-70)	7(1-30)
Needle puncture / Catheter drainage	15(26%)/44(74%)	30(74%)/11(26%)
Hospital admittance / Outpatients	51(87%) / 8(13%)	26(64%)/15(36%)
Median no. of follow-up ultrasound examination (Range)	4(1-10)	3(1-7)
Central vs. Peripheral localization of abscess	34.5% / 65.5%	43.5%/56.5%
Median size of abscess (in cm) (range)	3.5(1.0-8.0)	2.0(0.5-8.0)
No. of punctures	1 (1-6)	1(1-4)

Data are given as median (range) except where indicated otherwise.

Table 2: The outcome of the treatment in the 100 patients

Outcome of the treatment	Breast abscess	
	Puerperal no. of patients	Non-Puerperal no. of patients
Recovered after the first round of ultrasound – guided drainage	57(97%)	33 (81%)
Had recurrent abscess after the ultrasound-guided drainage	1(1%)	1(1%)
Underwent surgery (see result for details)	2(3%)	5 (12%)

Table 3: Univariate logistic regression analyses of factors possibly affecting breast abscess resolution in 100 females treated with ultrasound-guided drainage of breast abscesses

	OR	CI	p-value
Puerperal vs. Non-Puerperal	4.1	1.02-16.2	0.0471
Age+10 years	0.8	0.5-1.4	0.504
Delay from symptom onset to treatment	1.0	0.9-1.1	0.6531
Total number of abscess	0.9	0.1-6.8	0.896
Largest diameter + 10 mm	1.6	0.8-3.0	0.175
Central vs. peripheral localization	1.5	0.5-4.1	0.475
Catheter drainage vs. only puncture	0.6	0.1-2.9	0.515

OR, odds ratio; CI, confidence interval

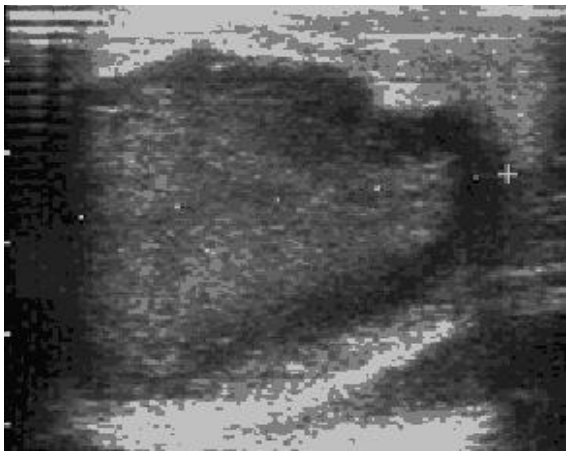

Figure 1a: Longitudinal US images of US-guided drainage of abscess in lower inner quadrant of right breast in a 27-year-old woman 8 weeks after delivery. Image shows 6 × 4-cm well-defined, slightly lobulated, inhomogeneous hypoechoic abscess. Dots extend across abscess, with cursor at one margin of abscess

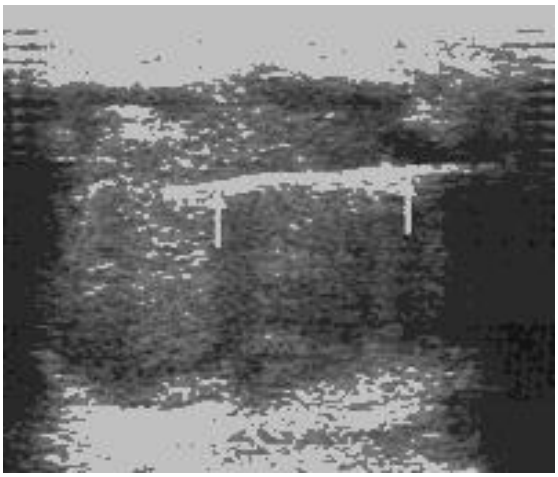

Figure 1b: Longitudinal US images of US-guided drainage of abscess in lower inner quadrant of right breast in a 27-year-old woman 8 weeks after delivery. Image shows 7-F pigtail catheter containing trocar (arrows) in the abscess cavity

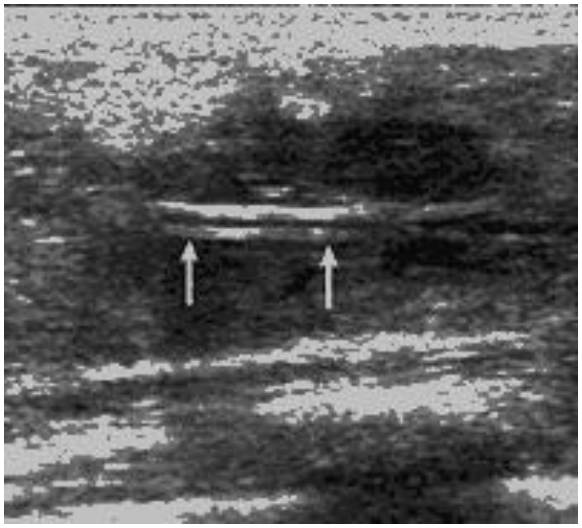

Figure 1c: Longitudinal US images of US-guided drainage of abscess in lower inner quadrant of right breast in a 27-year-old woman 8 weeks after delivery. Image obtained after trocar removal and aspiration of 70 mL of pus. Parallel lines represent catheter walls (arrows)

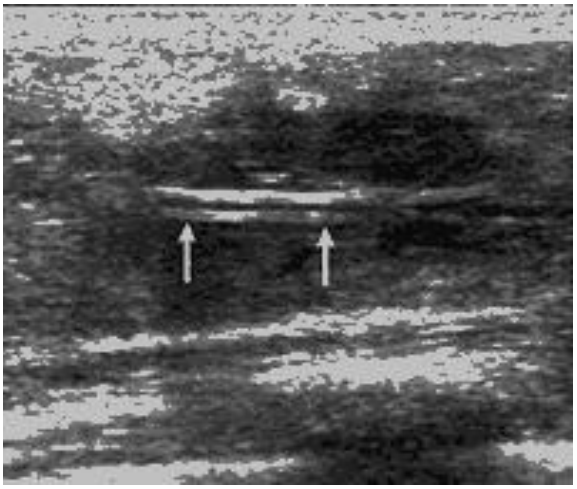

Figure 2: Longitudinal US image of organised sub-areolar abscess in left breast of a 28-year-old woman 1 week after delivery. Image shows 3-cm circumscribed, slightly lobulated in homogenous mass. Dots extend across abscess and cursors define abscess margins. Abscess was treated with drainage with 6-f catheter (not shown)

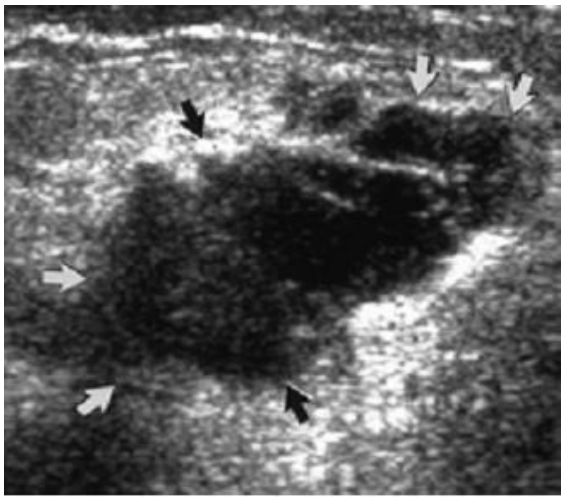

Figure 3: Transverse US image of a 4-cm, irregularly shaped abscess (arrow) with septa in the breast of a 31-year-old postpartum woman. Aspiration yielded small amount of pus. The abscess was treated incision and drainage

Patient data are given in Tables 1 and 2. 90 patients, 57(97%) of the 59 patients with puerperal breast abscess and 33 (81%) of the 41 patients with non-puerperal breast abscess had no signs of remaining infection in the breasts after the first ultrasound-guided drainage treatment. 51 (87%) of the patients with puerperal breast abscess were treated as Hospital admittance. The catheters were cared for by the patients themselves after instruction and removed after (median) 4 days (range 2–6 days).

After successful ultrasound-guided treatment of the abscess, three of these patients underwent surgery based solely upon an unconfirmed suspicion of cancer: the findings of a solid nodule in one patient, atypical cell in a biopsy in another patient and an abscess in an atypical cyst.

Two patients, one patient in each group had a recurrent abscess (after 5 months and 10 months, respectively) but recovered after further ultrasound-guided drainage.

7 patients, two with puerperal and 5 with non-puerperal abscesses, underwent surgical excision of the abscess cavity. One patient preferred surgery to ultrasound-guided drainage, one had pain after the abscess resolved and one other patient had an abscess that perforated during treatment. In four cases surgery was for a complicating fistula, one puerperal and three non-puerperal – two of the non-puerperal fistulae were present prior to commencement of treatment. The median number of follow up examinations in the ultrasound department was four (range 1–10) for the group of patients with puerperal abscess and three (range 1–7) in the group of patients with non-puerperal abscess. The corresponding figure for the median number of punctures was for both groups one (range 1–6 and 1–4). The two patients who had the most extensive treatment without reference to surgery needed six punctures and 10 ultrasound examinations each. Both patients had continuous improvement in both clinical condition and ultrasound findings which was why surgery was not performed.

The results of the univariate logistic regression analysis are presented in Table 3.

Recovery was seen in 87 out of the 100 patients (87%). In this analysis only a puerperal history reached significance. A multivariate analysis was therefore not performed.

17 patients with puerperal and 34 patients with non-puerperal abscess were referred for clinical evaluation and mammography. All of the 17 patients with puerperal abscess had palpation findings as the basis for referral for mammography. The patients with non-puerperal abscess were referred for mammography unless the abscess was situated centrally and sub-areolar (only three patients with lateral abscesses were not referred). In the follow-up period there were no reports of cases of *de novo* diagnosed breast cancer in the two patient groups.

DISCUSSION

Ultrasound-guided drainage of breast abscess in combination with oral antibiotics was shown to be better and equally effective than conventional treatment, especially for the group with puerperal abscesses. No other factors, including whether treatment was conducted using needle puncture and aspiration or catheter drainage, had any independent effect on the recovery rate.

The high rates of recovery found in this study confirm previous studies, where recovery rates exceeding 90% using ultrasound-guided drainage have been reported [7, 16, 20]. To my knowledge no previous study has included more than 30 patients except a British study where they included 151 patients. Treatment failure using ultrasound-guided drainage has been reported in cases where either the abscess has been larger than 3 cm in diameter or it was placed centrally in a sub-areolar position [20]. This study did not support these findings since neither size nor localization showed any independent effect on the recovery rate which is almost similar with British study [19].

In some institutions the standard treatment still remains early incision under general anaesthesia combined with drainage tube insertion [23]. The side effects of this treatment include scarring and termination of breast-feeding [12]. Ultrasound-guided drainage causes less scarring, does not affect breast-feeding and does not require general anaesthesia or hospitalization [12]. Ultrasound-guided drainage is a less expensive procedure than surgery [24].

Based on my findings, ultrasound-guided drainage treatment should replace surgery as the first line of treatment in uncomplicated puerperal or non-puerperal breast abscess. Furthermore this technique is not difficult to master and the service can be provided on a 24 h basis. In treatment resistant cases, where the abscess is unresponsive to the combination of repeated drainage and oral antibiotics, surgical treatment still has a role. It is unclear why some abscesses are unresponsive to treatment. Surgery is also needed in cases with superficial abscesses with skin changes. This can make a surgical excision necessary for healing. Surgery can also be necessary in special cases where other concerns such as suspicion of malignancy or the need for focus excision are important factors. Carcinoma of the breast may be confused with inflammatory conditions and thus pose a diagnostic problem [25].

I use early follow-up mammography within 3 months and when appropriate ultrasound-guided biopsy to exclude this diagnosis. In this study no patients had diagnosed breast cancer in the follow-up period. The number of patients included in this study is in my opinion not large enough to substantiate any statement about whether clinical mammography should be routinely undertaken. Likewise I have not found any reason to alter indications for mammography.

Needle puncture of lactating breasts has previously been associated with fistula formation [26]. In this study, four patients had a fistula in connection with a breast abscess. However only three of the 100 patients receiving ultrasound-guided drainage developed a fistula, of which only one had a puerperal abscess. Two of the four patients had a fistula before treatment started. These data indicate that ultrasound-guided drainage does not cause more fistula formation in puerperal than in non-puerperal abscesses.

CONCLUSION

Ultrasonography is a useful method for facilitating the diagnosis of breast abscesses both in lactating and non- lactating women. It has added advantage of no need to stop breast feeding during procedure which is the major drawback of conventional method, avoids postoperative morbidity as no need of operation, no General anaesthetic hazards, less hospital stay as well as cost of treatment. Recurrence rate by this procedure is very minimum. Conversion rate to conventional surgical treatment is also less. Practicing this method can revolutionize the treatment of breast abscess which is supported by the various western studies. This process creates no scar on most sensitive female organ the breast. For this reason this can be an attractive choice of procedure for treating breast abscess to the patients of all ages as well as surgeons. This can save the lots of money to the patients, to the health sector as well as to the poor country like Bangladesh every year for treating this benign condition.

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