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Ultrasound Guided Aspiration versus Drainage under General Anesthesia in Breast Abscesses

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Abstract

Background Despite the fact that breast abscess is becoming less common in developed countries, it has remained one of the leading causes of morbidity in women in developing countries. Ultrasound has been shown to be useful in diagnosis of breast abscesses, guiding needle placement during aspiration and also enables visualization of multiple abscess loculation and thus useful in needle aspiration of breast abscesses and is associated with less recurrence, excellent cosmetic result and has less cost.

Objective To establish whether ultrasound guided needle aspiration is a feasible alternative treatment option for breast abscesses.

Methods A prospective interventional study conducted on 144 female patients with and age range from 15 to 55 years. One hundred and twenty four are lactating and the other 20 are non-lactating. They were divided into two groups; the first group comprised 72 patients treated as outpatients by ultrasound assisted aspiration of pus while the second group serves as the control comprised 72 patients who are treated by drainage under general anesthesia. For both groups, data regarding early complications, hospital stay, return to daily activity and late complications were recorded. Follow up for up to 3 months was done for both groups.

Results Healing rate of the two groups had no statistically significant difference both overall and at each visit. There was only 1.4% recurrence rate observed in the ultrasound guided needle aspiration group while there was 6.9% recurrence rate observed in the incision and drainage group.

Conclusion Sonographically guided percutaneous aspiration of breast abscesses represents a less invasive and very promising alternative to surgical incision, showing the following advantages: no general anesthesia required a superior cosmetic result and shorter hospitalization.

Key words Breast abscess, Ultrasound guided aspiration, Incision and drainage

List of abbreviation: BA = breast abscess, PPW = primiparous women, GA = general anesthesia, U/S = ultrasound, UGNA = ultrasound guided needle aspiration.

Introduction

Breast abscess (BA) is a common cause of morbidity in women. Mastitis is a potential complication of breast-feeding that occurs more commonly in primiparous women (PPW). The reported incidence varies widely, from 1% to 24% [1,2]. BA can result as a complication of mastitis, especially if treatment is delayed or inadequate [3,4]. Treating mastitis with a combination of breast-emptying procedures and a course of antibiotics usually prevents abscess formation [4]. On occasion, an abscess may occur after medically induced weaning [5]. The reported incidence of abscess in lactation-related mastitis is 4.8% to 11% [1]. PPW, mothers over 30 years of age and those giving birth post-maturely may be more likely to develop BA during lactation than other groups [5].

It has been demonstrated earlier that stress to the mother and fetus during labor and delivery

are risk factors for delayed lactogenesis. It is possible that the release of oxytocin as a result of suckling may be somewhat slower in mothers, whose labor may have been induced with artificial oxytocin, predisposing them to engorged breasts, subsequent inflammation and abscess formation. The delaying of pregnancy may play a part in lactation difficulties [6].

While they are less common in developed countries as a result of improved maternal hygiene, nutrition, standard of living and early administration of antibiotics, BA remains a problem among women in developing countries [7].

Traditionally, management of BA involves incision and drainage; however this is associated with need for general anesthesia (GA), prolonged healing time, regular dressing, difficulty in breast feeding, and possible unsatisfactory cosmetic outcome [8].

The treatment of BAs sometimes represents a difficult clinical problem. Even with the aggressive approach of incision and drainage combined with use of antibiotics, BAs recurrence rate is reported to be between 10 and 38% [9].

The breast is one of female sex organs, in case of breast disease care should be taken to insure that its beauty is minimally compromised in order to preserve its value and function.

BAs can be treated by repeated needle aspiration with or without ultrasound (U/S) guidance [10-12]. U/S has been shown to be useful in diagnosis of BAs, guiding needle placement during aspiration and also enables visualization of multiple abscess loculation and thus useful in needle aspiration of BAs [13].

This procedure has been used successfully and is associated with less recurrence, excellent cosmetic result and has less coasty [14].

The aim of our study is to establish whether ultrasound guided needle aspiration (UGNA) is a feasible alternative treatment option for BAs.

Methods

A prospective interventional study conducted for 144 female patients with an age range between 15 and 55 years (mean 36 years) who attend the Accident and Emergency Department and Breast Outpatient Clinic in Al-Kindy Teaching Hospital, Baghdad, Iraq for the period between March 2013 and October 2014.

One hundred and twenty two out of the total patients are lactating and the rest 22 were not. Patients with recurrent or chronic BA and those with necrotic skin overlying the abscess or abscess already draining were excluded from the study.

The clinical diagnosis based on the presence of breast pain, swelling, fever and presence of a fluctuant tender breast swelling. The patients diagnosed clinically were subjected to U/S scan equipped with high frequency linear transducer of 7.5 MHZ (HD11 XE, Philips) in the radiology department. The diagnosis was confirmed by the presence of a thick walled echo complex mass, predominantly cystic with internal echoes and septations. The radiologist studied the site, size, number of abscess cavities as well as presence or absence of any other concomitant breast pathology, so we met the inclusion criteria which included the well-formed pus cavities, superficial or peripherally located pus cavity, absence of concomitant breast lump and no suspicion of malignancy.

The patients were divided into two groups; the first group comprised 72 patients who were treated as outpatients by U/S assisted aspiration of pus, for those a short history was taken regarding demographic data and lactation state. This group was subjected to U/S assisted aspiration of pus by 16G needles and a 20 ml syringe after scrubbing the field by suitable antiseptic solution and infiltration of 1 - 4 ml xylocaine 2% at the site of maximum tenderness. Those patients were followed up by U/S in the next day; if no pus residual seen, no further action will be required other than oral antibiotics for few days. If there was still residual collection, another session of

aspiration was performed until improvement in general conditions and U/S showing no residual collection. The time interval between each session of aspiration and the next was 24 hours and the median number of these sessions was 3.

The other group which was treated by surgical drainage also comprised 72 patients who either refused the aspiration or those with large cavity collection (more than 10 cm) when the pus is too superficial with skin changes. For those patients, preparation was done including investigations (HB, blood sugar, blood urea, chest x-ray and ECG when indicated). Drainage under GA was done, sample of pus was sent for bacteriological study, injectable or oral antibiotics were given for all patients postoperatively**.**

For both groups, data regarding early complications, hospital stay, return to daily activity, and late complications were recorded. Follow up for up to 3 months was done for both groups.

In this study, healing was defined as achieving BA resolution and the latter defined as clinically no breast tenderness, swelling or wound at the previous site of the abscess and via U/S complete absence of fluid collection, normal breast glandular and fibro-fatty tissue with no edema**.**

Statistical analysis

Statistical analysis was done using Statistical Package of Social Sciences (SPSS) computer software version 17. Categorical data was summarized into proportions, percentages and rates. Continuous data was summarized into mean, median and range. Tables were used to present data. Statistical significance was defined as a P value of less than 0.05.

Results

Out of the total number, 72 (50%) patients underwent U/S assisted aspiration under local anesthesia with age range from 15 to 47 year (mean 34), those referred to as group A. The remaining 72 patients (50%), those treated by classical incision and drainage under GA with age range from 20 to 55 years (mean 36) and referred to as group B. Sixty 60 patients (83 %) of group A were lactating and 12 patients (17%) were non-lactating, whereas 62 patients (86%) of group B were lactating and 10 patients (14%) non-lactating**.** Median size of pus cavity was 3 cm (range 2 - 5 cm) for group A while for group B, the median size was 9 cm (range from 5-15) as shown in table 1.

Table 1. Number of patients, their age and abscess size of each group

Character		Group A	Group B
No. of patients		72	72
Lactation	Yes	60	62
	No	12	10
Age range (mean)		15-47 (34)	20- 55 (36)
Abscess size		2-5cm (3)	5-15 (9)

Of the 72 patients of the group A, 67 patients (93%) had peripherally located abscesses and 5 patients (7%) with centrally (subareolar) located abscesses. In group B there were 70 patients (97%) with peripherally located and 2 patients (3%) with subareolar location.

Regarding the number of U/S assisted aspiration of group A, there were 55 patients (76.3%) treated successfully with single aspiration, 10 patients (13.8%) were re-aspirated on the first visit due to persistence of the abscess and 5 patients (6.9 %) treated successfully and efficiently by third session. Two patients underwent surgical drainage under GA, one for residual mass (which was excised and proved to be a benign inflammatory mass) and other for persistent fistula because of ectatic duct.

The median number follow up U/S examinations was 3 (range from 2 to 5). In group B, the median number of post operative visit for dressing change was 7 visits (5-10).

Regarding the hospital stay, for group A, 65 patients (90.3%) were discharged within 1 or 2 hours after aspiration to be attend at the next

day for re-examination clinically and ultrasonically, 7 patients (9.7%) were admitted for one day to be discharged on the next day after second aspiration. They return to normal daily activity on the same day and for lactation (for lactating women) on the next day. In group B, 20 patients (27.78%) were discharged in the same day, 43 patients (59.72%) were admitted overnight, 7 patients (9.72%) were admitted for 48 hours and 2 patients (2.78%) were admitted for 5 days because of mammary fistulas. They return to daily work after 48 hours in 55 patients (76.4%) and 72 hours in 15 patients (20.8%) and 2 patients (2.78%) after 10 days (Table 2).

Table 2. Duration of hospital stay in both groups

Duration of hospital staying	Group A	Group B
Few hrs (<1 day)	65 (90.3%)	20 (27.78%)
One day	7 (9.7%)	43 (59.72%)
48 hrs	0	7 (9.7%)
>2days	0	2 (2.78%)

Lactation was resumed after 24 hours in 32 patients, after 48 hours in 18 patients, on third day in 6 patients, 4 days in two patients and after 10 days in 2 patients (Table 3).

Table 3. Resuming of lactation in both group

Resume lactation	Group A	Group B
Within 24 hrs	62	---
1^{st}-2^{nd} day	---	32
2^{nd}-3^{rd} day	---	18
3^{rd}-4^{th} day	---	6
4^{th}-5^{th} day	---	2
>5 days	---	2

Regarding wound complication, there was only one patient belong to group A with hematoma formation, one with recurrent abscess formation within 3 months. No patient with residual scar formation. In group B, a large or hypertrophic scars in 2 patients, mammary fistula in 2 patients (one in an ectatic ducts and other in uncontrolled diabetic patient), and both fistulas were treated conservatively and closed within 10 and 14 days respectively (Table 4).

Table 4. Complication rate at both groups

Complication	Group A No (%)	Group B No (%)
Hematoma	1 (1.39)	0
Fistula	0	2 (2.78)
Hypertrophic scar	0	2 (2.78)
Recurrence after 3 months	1 (1.39)	5 (6.9)

In group B, wick drains were used in 55 patients while corrugated plastic drains were used in 17 patients. The drains removed after 24 hours in 44 patients, after 48 hours in 10 patients, after 3 days in 8 patients, after 5 days in 8 patients and in 2 patients removed after 10 and 14 days. Dressing and follow up were for 5 - 20 days.

During the study period, one BA recurrence was observed in the U/S aspiration group; while 5 (6.9%) recurrence were recorded in the group B. Almost all the patient (97%) treated by U/S aspiration highly accepted the procedure.

Seventy (65.5%) patients belongs to group A exhibited complete healing by the third visit and 68 (58.1%) in group B. There was no difference in healing rate between the two study arms at all the three visits (P = 0.55) as observed figure 1.

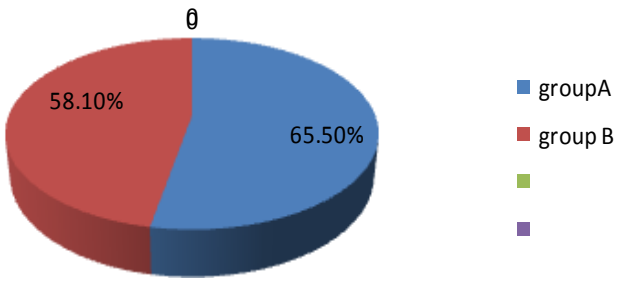

Fig. 1. Pie chart showing healing rate after 3 month (P = 0.63)

Discussion

Healing rate of the two groups had no statistically significant difference both overall and at each visit and this was similar with what was found by other study [10]. This similarity in the healing rate between the two treatment option could be explained by the fact that regardless of the way pus is removed from the cavity (that is incision and drainage, needle aspiration or spontaneous rupture onto the skin surface) the healing process is the same which is by collapse of the cavity wall and adherence to one another by fibrin, later by granulation tissue. The remaining bacteria destroyed by polymorphs [15].

There was only one recurrence (1.4%) of breast abscess observed in the ultrasound guided needle aspiration group during the study period and this may be explained by small pus cavity selection for group A. There was 6.9% (5 /72) recurrence rate observed in the incision and drainage group; however this recurrence rate was less than 31% recurrence in the incision and drainage group which has been reported in another study [14]. This small recurrence rate observed may have been resulted from a short follow up period and it was not possible to compare the recurrence rate of the two study groups.

Almost all the patients treated with ultrasound guided needle aspiration highly accepted this modality (97%). This was consistent with other studied [14,16,18]. This high acceptance rate may have been resulted from the convenience of the procedure which was an outpatient one, having no wound to nurse and absence of scar after healing.

The total cost of ultrasound guided aspiration was found to be much less than that of incision and drainage, thus indicating that ultrasound guided aspiration provides savings to the hospital and the patient, hence more cost effective than incision and drainage. This was consistence with what was found elsewhere [17,19]. Since ultrasound guided aspiration is an outpatient procedure as opposed to the incision and drainage which is inpatient procedure. Studies done to compare outpatient versus inpatient surgical procedures showed that outpatient procedures were cost effective [20,21].

In conclusion, there is no difference in terms of healing rate of breast abscess between ultrasound guided aspiration and surgical incision and drainage. Ultrasound guided needle aspiration is highly accepted by women with breast abscesses. Ultrasound guided aspiration is more cost effective than incision and drainage in management of breast abscess, therefore ultrasound guided needle aspiration was an effective treatment option for both lactating and non-lactating breast abscess. Sonographically guided percutaneous aspiration of breast abscesses represents a less invasive and very promising alternative to surgical incision, showing the following advantages: no general anesthesia required, a superior cosmetic result and shorter hospitalization

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Author contribution

Dr. Al-Marzooq did the study conception, design and acquisition of data; Dr. Mehsen analyze and interpret the data and Dr. Al-Timimy made the drafting of manuscript and critical revision.

Conflict o Interest

The authors declare no conflict of interest

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