

Comparison of Needle Aspiration and Incision & Drainage in the Management of Lactational Breast Abscess

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Abstract

Objective: To compare the results of needle aspiration against Incision & Drainage in the management of breast abscess among lactating patients.

Methodology: This cross-sectional comparative study was carried out at the Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad, from July 2014 to June 2017. One hundred and eight patients with lactational abscess less than 5 cm who agreed to participate were included, randomly assigned to "Needle Aspiration" or "Incision and Drainage" groups, and followed for four weeks. Re-aspiration and conversion to open drainage were considered for aspirated patients. Descriptive statistics, t-test, and chi-square test was used to analyze the data.

Results: The mean healing time (days) in needle aspiration group was 8.59 + 1.89 versus 18.16 + 5.00 in Incision and Drainage, which was significant. Continued breast-feeding rate was 96 % in needle aspiration versus 69.6 % of Incision & Drainage (I & D). There was scar in only 5.76 % patients of needle aspiration group who converted to I & D as compared to scar in 100 % patients of I & D. Mean healing time, continued breast-feeding rate and cosmetic outcome were significantly better in needle aspiration group (P <0.001).

Conclusion: In patients with small lactational breast abscesses, needle aspiration is a better management option with better healing time, healing rate, continued breast-feeding rate, and cosmetic outcome.

Keywords: Lactational Abscess, Incision and Drainage, Needle Aspiration.

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Introduction

Breast Abscess is a common condition in especially lactating mothers and poses a difficult period of a painful and tender abscess with constitutional symptoms with difficulty in breast feeding. The conventional incision and drainage extends the morbidity while aspiration is emerging as a technique to alleviate the problem more easily.

A breast abscess is defined as a localized infection with accumulation of pus in the breast tissue.¹ Breast abscesses are common during lactation and remain a frequent reason for women to stop breast feeding,² with manifestations ranging from mastitis to abscess formation.¹⁻⁸ Breast abscess remains the most frequent reason of morbidity in puerperal women, particularly in the developing countries.²⁻⁸ Breast abscess is reported

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a lot less in developed countries owing to improved puerperal hygiene, nutrition, early administration of antibiotics and a higher standard of living.^{6,7} The incidence of breast abscess is reported around 10.2% in Pakistan.⁹ This is related to nipple piercing by a child while feeding, bacterial colonization due to improper nursing technique and partial emptying of the breast.

Staphylococcus aureus is cited as the most common pathogen known for gaining entrance from the nursing mother's skin flora or from the mouth of the nursing infant.^{5,7,10} Less commonly, *Streptococcus* (Group A or Group B streptococcus) or *Escherichia coli* are responsible. The most commonly applied treatment strategies in the management of breast abscess include symptomatic treatment like simple analgesia, warm and cold applications, antibiotics and encouraging continued milk flow from the affected breast.^{10,11} Pus removal is the cardinal principle of medical intervention as soon as a breast abscess is formed.^{4,5,11} The conventional first line treatment of breast abscesses was 'Incision and Drainage (I & D) with antibiotic therapy',^{2-5,11} which, if possible, is carried out under general anesthesia.^{12,13} The abscess cavity is left open and packed with gauze and subsequent dressings may last up to 6 weeks while the wound granulates. Wounds do heal eventually but this approach requires regular dressings, a lengthy healing time, problems in breast feeding and many a times an unsatisfactory cosmetic outcome.¹³⁻¹⁵

Numerous studies have lately testified that breast abscesses can be managed by ultrasound-guided catheter placement or needle aspiration.^{3,5,8,10} A deep seated abscess may lead to an inaccurate clinical assessment. Ultrasonography is a very valuable tool in the detection of breast abscesses in event of complicated mastitis.^{1,8} Needle aspiration with antibiotic therapy has ousted I & D as the first line management in many clinical situations and has been validated as an effective treatment choice.^{11,14-18} It is low cost, feasible and cosmetically better. Besides, needle aspirations make lactation easier for mothers.^{4,5,13-14} However, there are certain clear limitations for needle aspirations like large size abscesses, long standing abscesses, multi-loculated and abscesses with thick walls.^{3,13} Presently, surgery is the treatment of choice for recurrent or very large abscesses.^{13,19} Early and effective resolution of abscess is the aim of management, ensuring maximum benefit to the mother with minimal interruption of breastfeeding.^{13,14} We decided to conduct this first ever study in our setup to

compare the results of 'needle aspiration' and 'Incision & Drainage' techniques in the management of lactational breast abscesses.

Methodology

This cross-sectional comparative study was conducted at Department of General Surgery, Pakistan Institute of Medical Sciences, Islamabad from July 2014 to June 2017. Sample size was calculated by using WHO sample size calculator; taking level of significance=5%, power of test=95%, anticipated population proportion 3% vs 29%.⁶ All patients presenting to General Surgery OPD and Accident & Emergency Department with a lactational Breast Abscess < 5 cm in the greatest dimension and consenting to participate in the study were included after randomization. Patients with a recurrent abscess or presenting with skin thinning or necrosis were excluded. Ultrasound was used to confirm the clinical diagnosis of an abscess. An abscess was categorized as lactational, if the patient was breast feeding or presented in immediate post-partum period.

A specially designed performa was used to record the data. Patients were randomly allotted into Group 'A' (Needle Aspiration) and Group 'B' (I & D). Group 'A' patients not responding to therapy were allotted Group 'B' during the course of management. Follow up visits were scheduled on 7th, 14th, 21st and 28th Days. All aspiration procedures were performed under ultrasound guidance with all possible aseptic measures and under local anesthesia using injection 2% lidocaine. A straight needle (14 gauge) attached to a syringe was used to aspirate the abscess. The pus obtained at first aspiration was tested for aerobic and anaerobic culture and sensitivity. Aspiration was done on every third day till the resolution of lump. Failure of resolution in three episodes was regarded as failure of this technique and patient was allocated group 'B' and I & D was carried out. Every patient was followed for a total of 4 weeks in the clinic for temperature, size of lump and local tenderness. Subsequently all patients had ultrasound breast at 4 weeks' time to confirm the complete resolution of the abscess.

The abscess was localized and incised with 11 number surgical blade at the peri-areolar margin under local or general anesthesia or at the site of maximum fluctuation along the skin lines, under aseptic measures. All the loculi were broken down with artery

forceps or digitally and all pus was drained. Pus sample was sent for culture and sensitivity. The wounds were left open and dressed daily to allow drainage until they were clean and granulating. Healing time was calculated from the day of intervention till the day the abscess was completely healed. This was marked by the patient's last visit without symptoms. The complete resolution of the abscess on follow up ultrasonography scan for the aspiration group marked healing time. For the incised group, wound healing period was the interval from the day of intervention till the wound completely healed.

The patients were assessed cosmetically on the basis of scar excluding the cosmetic acceptability. Manual expression of milk or emptying by breast pump was also advised and encouraged. Amoxicillin-clavulanate was used empirically without culture and sensitivity after intervention. Mean age of the patient, healing time and comparison of ultrasonogram size among both the groups was analyzed by using student t –test for each group using IBM SPSS v 24. Chi Square test was used to analyze healing rate, continued breast-feeding rate, recurrence rate and cosmetic outcomes between the groups. P value ≤ 0.05 was significant.

Results

A total of 211 patients presented to the General surgery OPD and Accident and Emergency Department of PIMS with a Breast Abscess. 103 patients were excluded. Sample size was 108. Mean age of patients included was 25.48 ± 4.33 years and the mean size of the abscess was 3.87 ± 0.74 cm. Right Breast involvement was seen in 64% (n=69) patients while in 36% (n= 39), left breast was the site of abscess. Patients were randomly assorted into groups with Group 'A' n= 52 and Group 'B' n= 56. The pus culture depicted *Staphylococcus aureus* as the most common pathogen and was isolated in 78.8 % (n=85) patients. *Staphylococcus epidermidis* was reported in 3.7 % (n=4), Beta-hemolytic Streptococcus in 0.93 % (n=1), *Pseudomona sp.* in 1.85 % (n=2) pus samples. 13.89 % (n=16) specimens, however, yielded no growth.(Figure 1)

03 patients were re-allocated Group B; 01 after first follow up, 02 after second follow up, in both cases due to failure of consenting to further aspiration sessions. The mean healing time, healing rate and cosmetic outcome was significantly better in needle aspiration group as compared to I & D group(P = 0.001).

Recurrence was recorded in one patient of I & D in subsequent follow up visits

Table I: Characteristics of Breast Abscess patients according to treatment group

Characteristics	Needle Aspiration (n=52)	Incision and Drainage (n=56)	P value
Age (years) Mean ± SD	24.63 ± 4.80	26.33 ± 3.85	0.044*
Size of abscess (cm) Mean ± SD	3.84 ± 0.73	3.90 ± 0.68	0.659**
Staphylococcus in Pus Culture (%)	43 (82.7 %)	42 (75 %)	0.329**
Right Breast Abscess (%)	38 (73 %)	31 (55.3 %)	0.554**
Left Breast Abscess (%)	14 (27 %)	25 (44.6 %)	

* Highly Significant, ** Not Significant

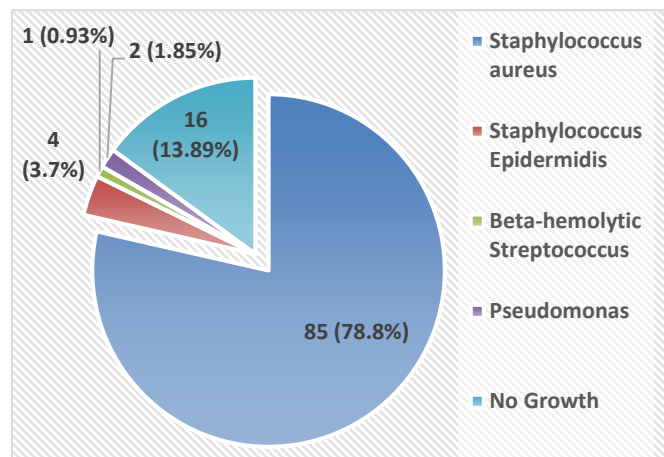


Figure 1. Patient Distribution according to Culture and Sensitivity Reports

Daily dressings were done for patients belonging to Group A regularly for up to 3 weeks and most of the patients discarded the milk after pumping and were unable to breast feed. Whereas, group B patients continued to feed the child, procedure was carried out as outpatient without any need for general anesthesia.

Discussion

Lactating women commonly present with breast abscess and it carries significant morbidity.¹ The painful condition frequently leads the way for mothers to stop breast feeding. Conventionally pus collections in breast were drained like other abscesses by making an incision over the abscess but evolution in medicine has transformed the management strategy. Now, the

options include needle aspiration and catheter placements under ultrasound guidance.¹⁰ The aim of breast abscess management is early and effective healing and restoration of breast feeding.

Table II: Treatment results of Breast Abscess patients according to treatment group

Variable	Needle Aspiration (n=52)	Incision & Drainage (n=56)	P value
Healing Time (Days) Mean \pm SD	8.59 \pm 1.89	18.16 \pm 5.00	<0.001
Healing Rate (%)			
Follow Up Visit I	37 (71.15%)	22 (39.28%)	0.001
Follow Up Visit II	46 (88.46%)	31 (55.35%)	<0.001
Follow Up Visit III	52 (100%)	45 (80.35%)	0.001
Follow Up Visit IV	52 (100%)	56 (100%)	-
Continued Breast Feeding Rate (%)	50 (96%)	39 (69.6%)	<0.001
Recurrence Rate	0	1	-
Cosmetic Outcome/Scar (%)	3 (5.76%)	56 (100%)	<0.001

A total of 108 patients were included in this study with mean age of 25.48 \pm 4.33 years. Mean age of Group 'A' (24.63 \pm 4.80) was comparable to the mean age of Group 'B' (26.33 \pm 3.85) and the difference was statistically insignificant. The mean age of participants in various other studies ranged from 23.93 to 32 years.^{1,6,10} The mean size of the abscess in our patients was 3.87 \pm 0.74 cm. The mean sizes of breast abscesses in patients of Groups 'A' (3.84 \pm 0.73) and 'B' (3.90 \pm 0.74) were statistically similar. In a study by Cusack and Brennan, the mean abscess size was 4.2 cm and had a range from 2 to 9 cm.¹ The mean size of the abscess in a report by Chandika et al.⁶ was 3.49 cm and by Javed et al.¹¹ was 0.86 \pm 0.43 cm. A 4 cm median value of palpable mass was observed by Elagili et al.¹⁶ Right breast was more commonly involved in the current study (Table I). Afridi et al.² also discovered that right breast was affected in 34 (61.8%) while left breast was affected in 21 (38.2%) patients. Various studies depicted left laterality being common in patients

presenting with breast abscesses and other breast lesions.^{7,9,13}

Staphylococcus aureus is the most commonly reported pathogenic organism for breast abscesses. Many studies have related mixed bacterial infection with recurrences. The pus culture in our results depicted *Staphylococcus aureus* to be the most common culprit and was isolated in 78.7% (n=85) patients in our study. Karvande et al.¹⁰ encountered *Staphylococcus aureus* in 34 patients (57.7%). A Korean study³ with a sample size of 109 has reported *Staphylococcus sp.* in 24 patients with 14 having *Sataph aureus*, six coagulase negative, four multi-drug-resistant, three beta-hemolytic *Streptococcus* and 02 *Pseudomonas aeruginosa* in the pus cultures. The most common pathogen isolated has been *Staphylococcus aureus* in both lactating and non-lactating women.³ In another study on lactational Breast abscesses, pus for culture sensitivity showed growth in 36 (60%) patients. *Staphylococcus aureus* was encountered in 34 (57.7%) patients and 02 (3.3%) patients had growth of *Streptococcus pyogenes*. Pus did not show any growth in the rest of the patients.⁷

Healing time of needle aspiration in our study was 8.59 \pm 1.89 whereas the healing time of I & D group was 18.16 \pm 5.00. The mean healing time, healing rate, continued breast-feeding rate and cosmetic outcome was significantly better for patients undergoing needle aspiration as compared to those with I & D (P = 0.001).

The results of a study by Kang and Kim³, regarding cure rate (88%) and healing time (09 days) when lactational breast abscesses were subjected to needle aspiration, is comparable to our study. In research carried out by Elagili et al., fifteen (50%) patients needed a single aspiration and ten required multiple aspirations while five required I & D.¹⁶ In a study by Shawarez et al. 18 patients had a single aspiration, 09 patients had multiple aspirations and 06 patients required I & D with an overall cure rate of 82%.¹³ A study carried out at Karachi reported the mean healing time was 4.27 among aspiration group and 7.60 among I & D group (p = 0.001).² Breast abscess in 31 (56.4%) patients resolved on single aspiration, second aspiration was required in 24 (43.6%) when it resolved in 16 (29%) patients.² In a study at Karachi, Aspiration Vs Open Drainage, healing times were similar to our results.¹⁵ In a study by Ulitzsch et al. All patients of I & D group were treated successfully but 01 patient (4%) had recurrence 02 months after complete healing and

16 patients (70%) in this group were not pleased with the cosmetic outcome. In the needle aspiration group 03 patients were treated with a single aspiration and 10 patients (45%) with multiple aspirations, but 09 patients (41%) did not heal following needle aspiration and subsequently required I & D.¹⁶

From a Ugandan experience of I & D versus needle aspiration, for both lactational and non-lactational breast abscesses, equal healing rates were noted, but needle aspiration was labeled economically more feasible.⁶ A conversion rate of 11% was associated with a study by Fahrni et al.¹⁷ Recurrence was recorded in 1 patient of I & D in subsequent follow up visits, while no recurrence was observed in the Needle aspiration group. Javed et al.¹¹ reported less recurrence in 07 (23.33%) patients in I & D group than 21 (70.0%) patients in multiple needle aspirations with a statistically significant P value of 0.000. In another study recurrence of breast abscess was not observed in needle aspiration group **while** here was 3.3% recurrence rate observed in the I & D group.⁹ Naeem et al.¹⁵ showed how recurrent mastitis developed in 10.2% patients within a median time of 24 weeks of follow-up 2.73% patients from the needle aspiration group and 0.9% patient from the I & D group had recurrence of the breast abscess.¹⁷ A conversion rate of 11% was associated with this study.¹⁹ In a study at Karachi, recurrence was noticed in 14.5% patients after second aspiration and only one patient was managed by third aspiration whereas 12.7% patients were managed by I & D because of the painful lump, same size of the abscess and fever.² No recurrences were observed in the needle aspiration group during the follow-up period.

Needle Aspiration clearly surpasses I & D in context of cosmetic outcome. Cosmetic outcome was significantly ($P = 0.001$) better in patients treated with needle aspiration as compared to I & D in our study. The cosmetic outcome was significantly good in patients treated with needle aspiration compared to I & D in a study by Karvande et al ($P = 0.001$).¹⁰ Cosmetic outcome was assessed at the follow up visits, and was found to be significantly different among the groups.⁷ Many studies highlighted **excellent cosmesis** and cosmetic approval by the patients when aspiration was done.^{15,16} A Ugandan study showed that I & D is costlier than ultrasonography guided aspiration (cost effective ratio of 2.85).⁶ Similar to other studies, our results have also validated needle aspiration as an effective and superior management plan for small breast abscesses which do not ulcerate the skin.

Conclusion

Needle Aspiration is a better management option with good healing time, healing rate, and continued breast feeding rate with better cosmetic outcome in patients with small lactational breast abscess.

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