

Original Research Article

Comparison between aspiration and incision and drainage of breast abscess

Rajiv Karvande, Manoj Ahire, Makrand Bhole*, Chetan Rathod

Department of Surgery, Lokmanya Tilak Municipal Medical College and General Hospital, Sion, Mumbai, Maharashtra, India

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***Correspondence:**

Dr. Makrand Bhole,

E-mail: Mak_bhole@yahoo.com

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ABSTRACT

Background: Breast abscess is defined as an acute inflammatory lump which yields pus on incision/aspiration. The frequency of occurrence is highly related to pregnancy and caused due to nipple piercing by a child during feeding and bacterial colonization due to improper nursing technique and incomplete emptying of the breast. Non-lactational breast abscesses are entirely different from those occurring during breast feeding. They occur in the peri-areolar tissues, frequently recur, and infecting organisms are mixture of anaerobes. The present study compares the outcome and effectiveness of traditional treatment incision and drainage against needle aspiration in the treatment of breast abscess.

Methods: This is a comparative study carried out in department of general surgery in a tertiary health care center, LTMMH and GH, Mumbai for a period of 2 years (May 2012 - May 2014) after taking approval from institutional ethics committee. 60 female patients of age between 18-65 years and diagnosed breast abscess with abscess size of less than 10 cm in diameter on ultrasonography were included in the study after taking written consent form. Of these 30 had undergone aspiration of the breast abscess (group A) and 30 had undergone incision and drainage of the breast abscess (group B).

Results: The mean age of the female patients in the study were 18-42 years. 90% of the cases were lactating. *S. aureus* was the common organism isolated in both lactating and non-lactating cases, encountered in 34 patients (57.7%). Out of that 20 were in the aspirated group (66.7%). 14 patients were in the incised group (46.7%). The mean healing time and cosmetic outcome was significantly ($p = 0.001$) very good in patients treated with needle aspiration compared to incision and drainage. There was no recurrence of breast abscess observed in needle aspiration group during the study. There was 3.3% recurrence rate observed in the incision and drainage group.

Conclusions: Breast abscess in patients with diameter of less than 7 cm can be treated with needle aspiration successfully and with a good cosmetic outcome.

Keywords: Needle aspiration, Incision and drainage, Breast abscess

INTRODUCTION

Breast abscess is one of the commonest form of abscess surgical emergencies usually seen in lactating woman.^{1,2} The frequency of occurrence is highly related to pregnancy and mainly caused due to nipple piercing by a child during feeding and bacterial colonization due to

improper nursing technique and incomplete emptying of the breast.^{3,4} Immediate diagnosis and treatment is necessary if breast feeding is to be continued and for the prevention of further complications.⁵

Treatment of breast abscesses is a difficult clinical problem.⁶ At an early stage, acute mastitis may be treated

by the use of appropriate antibiotics. Once an abscess is established, management involves incision and drainage by providing general anesthesia however this is associated with regular dressing, prolonged healing time, difficulty in breast feeding, possible unsatisfactory cosmetic outcome, rupture and recurrent breast abscess.⁷ Hence now-a-days treatment of breast abscess by repeated needle aspiration with or without ultrasound guidance gained importance.^{8,9} This procedure has been used successful and is associated with less recurrence, excellent cosmetic result and has less costs.¹⁰

This study was aimed to compare the outcome and effectiveness of traditional treatment incision and drainage against needle aspiration in the treatment of breast abscess in terms of time required for the procedure, duration of hospital stay, healing time, cosmetic outcome and postoperative pain.

METHODS

A comparative study was carried out in department of general surgery in a tertiary health care center, LTMMH and GH, Mumbai for the period of 2 years (May 2012-May 2014) after taking approval from institutional ethics committee of the institution as well as the university ethics committee for the study. Data was collected from all patients attending the surgical outpatient department with pain and swelling over the breast/s within a defined study period. 60 female patients of age between 18-65 years and diagnosed breast abscess with abscess size of less than 10 cm in diameter on ultrasonography were included in the study after taking written consent form. Of these 30 had undergone aspiration of the breast abscess (group A) and 30 had undergone incision and drainage of the breast abscess (group B).

Exclusion criteria were patients of age <18 or >65 years, suspicious lesions/malignancy esp. inflammatory carcinoma of breast, immunocompromised, recurrent breast abscess, ruptured abscess, tuberculosis and complicated breast abscess presenting with skin changes, ulceration, necrosis and gangrenous abscess.

The patients were diagnosed clinically for duration, site, nature and past history of abscess. General examination including pulse rate, blood pressure and body temperature were recorded. Detailed examination of breasts was carried including increased temperature, tenderness, and discharge from the nipple, fluctuation and axillary lymphadenopathy. Blood investigation for total leucocyte count was made.

Needle aspiration

An 18 G needle and a 20 ml syringe were used in each case. The breast was stabilized with the index finger and the thumb. The abscess was localized and needle was inserted in to the abscess from the area of normal skin without using any anesthesia. Abscess was aspirated and

the syringe was detached, pus aspirated was sent for culture and antibiotic sensitivity. Another syringe or the same syringe was again attached to the needle, which was placed in the abscess. Similar procedure was carried out until no pus was aspirated. Aspiration was repeated every alternate day if required until the mass had completely resolved or until three 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. The time required for the procedure in aspiration was calculated as soon as the surgeon has started the procedure of aspiration by stabilizing the abscess till no pus is aspirated. The puncture site is sealed with tincture benzoin application.

Incision and drainage

The abscess was localized and incised near the areolar margin and along skin lines under general anesthesia. All pus was evacuated, and loculi were broken down digitally or by using the artery forceps. The pus drained was sent for culture sensitivity. The wounds were left open to drain and dressed on alternate day until the wound was clean and granulated. The healing time in this group was the time from incision and drainage to wound closure either by secondary intention or by secondary suturing if required. The time required for the procedure in incision and drainage is calculated when the surgeon stabilizes the breast for incision to be taken till the final dressing application.

After the procedure, the patients were treated with antibiotic amoxicillin (500 mg)-clavulanate (125 mg) orally and analgesic as diclofenac (50 mg) and tab. pantoprazole (40 mg) for 2 days. Analgesic was added as required. Follow up of the patient was done after every 2nd days. Clinical assessment of the patients about resolution of the abscess was then performed. For the incision and drainage group, dressing of the wound was done every alternate day till the wound healed. For the aspiration group, re-aspiration was performed if abscess had not subsided. Failure of aspiration in three episodes was regarded as failure of the procedure and abscess was incised.

The postoperative pain was graded according to the numeric rating scale on every alternate day as 0-no pain, 1-3 mild pain, 4-6 moderate pain and 7-10 severe pain. The healing time was calculated from the day of intervention till the day the abscess was completely healed. Complete healing was defined to be complete resolution of abscess on follow up ultrasonography scan in the aspirated group and that the incised group was from the day of intervention till the wound healed. The healing of wound was by secondary intention or by secondary closure on follow up days. The patients were assessed cosmetically on the basis of scar present or absent and the cosmetic acceptability of the scar was not studied.

Statistical analysis

Descriptive statistics were used in the study. Mean age of the patient, mean duration of pain and fever, volume of pus aspirated or drained, mean operation time, duration of stay, healing time between the groups were analyzed by using the Student’s t-test. Distribution of lactation and non-lactational women, mean parity among groups, presence of axillary lymphadenopathy and cracked nipple, USG size comparisons, culture sensitivity, postoperative pain and fever and cosmetic outcomes between the groups were analyzed by Chi square test. P value <0.05 were taken as significant.

RESULTS

A total of 60 patients were included in our study. All patients were age of the cases ranging from 18-42 years with average being 23.93 years among group A which was comparable to 23.20 years among group B and the difference was statistically not significant as shown in Figure1 (range 18-42 years).

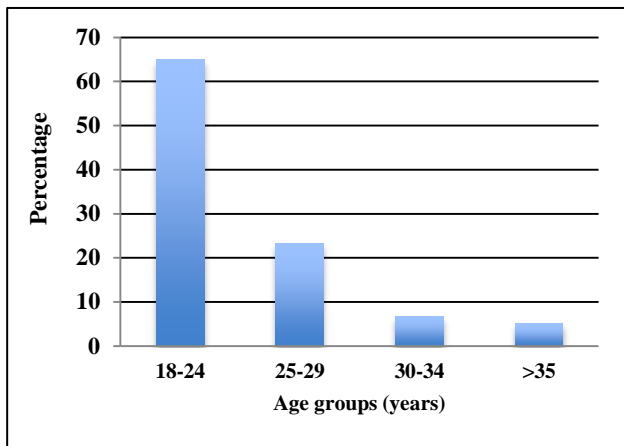


Figure 1: Age distribution of breast abscess.

By the time of treatment 90% of the cases were lactating and non-lactating are 10% in both the groups hence the difference was not significant as in Figure 2.

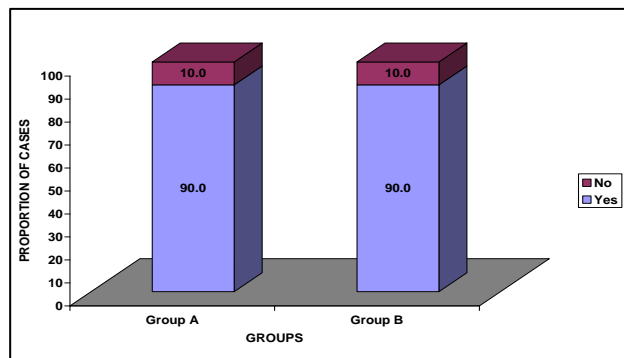


Figure 2: Association of lactating and non-lactating between two groups.

Mean parity distribution was compared between the two groups. 66.7% cases in group A were primipara, which was more as compared to 56.7% of the cases among group B, but difference was not statistically significant.

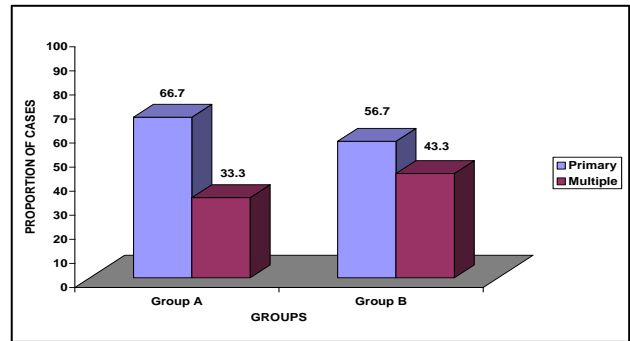


Figure 3: Comparison of mean parity distribution between two groups.

The breast abscess was divided in to four peripheral quadrants and sub areolar on either side. Table 1 reveals that the distribution of breast abscess was more on the left side 36 (60%) than on the right side 24 (40%) and also we observed that left upper and outer quadrant abscesses were most common amongst all the abscesses (40%).

Table 1: Distribution of breast abscess according to quadrants.

Site of abscess (quadrant)	left (n = 36)	Right (n = 24)
Upper and outer	24 (40%)	15 (25%)
Lower and outer	6 (10%)	4 (6.7%)
Lower and inner	2 (3.3%)	3 (5%)
Upper and inner	3 (5%)	2 (3.3%)
Sub areolar	1 (1.7%)	0 (0%)

From Figure 5 it was observed that mean duration of pain was 5.7 days among group A; which was less than group B (6.30 days), but the difference was not significant (p = 0.256).

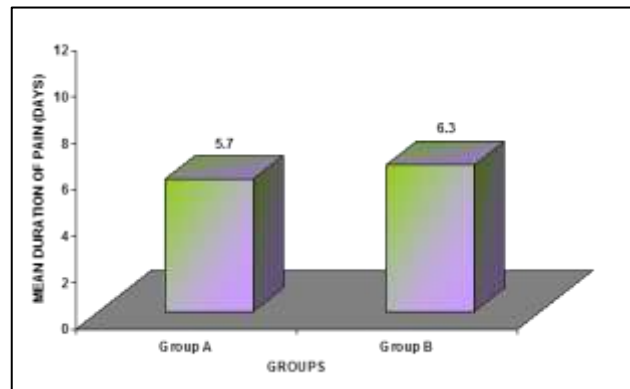


Figure 5: Mean duration of pain between the groups.

Fever was observed totally in 25 patients (41.7%). In aspirated group, fever was complained in 15 patients (50%). The mean duration of fever was 3.3 days. In the incised group, fever was complained in 10 patients (33.3%) i.e., 3.4 days and this difference between two groups was not significant ($p = 0.838$) as presented in Figure 6.

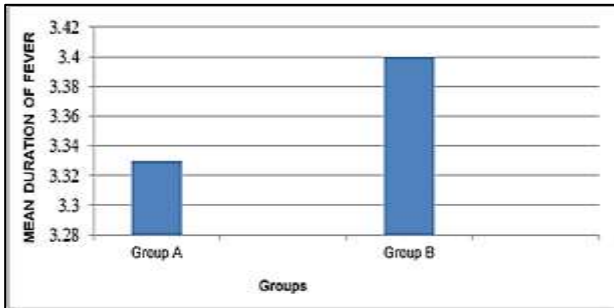


Figure 6: Mean duration of fever between two groups.

Table 2 presents the presence of clinical symptoms axillary lymphadenopathy and cracked nipples between the two groups. 23.3% of the cases among group A had lymphadenopathy which was more as compared to 16.7% of the cases among group B and the difference was not significant ($p = 0.518$) and 33.3% of the cases among group A had cracked nipples which were more as compared to 26.7% of the cases among group B and the difference was not significant ($p = 0.573$).

Table 2: Comparison of clinical symptoms between two groups.

Symptoms		Group A		Group B	
		No	%	No	%
Axillary lymphadenopathy	Yes	07	23.3	05	16.7
	No	23	76.7	25	83.3
Cracked nipples	Yes	10	33.3	08	26.7
	No	20	66.7	22	73.3

The mean volume of pus was 65.65 cc among group A which was less, as compared to 69.47 cc seen among group B but the difference was not significant ($p = 0.622$) as shown in Figure 7.

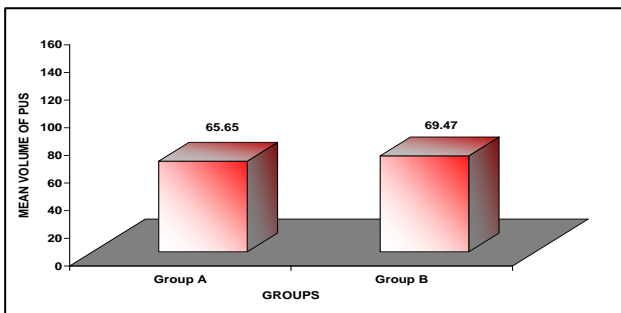


Figure 7: Comparison of mean volume of pus between two groups.

Ultrasonography was used to diagnose the breast abscess and to measure the accurate dimensions of the abscess and site. The mean USG size was 5.58 cm among group A which was significantly more as compared to 4.50 cm seen among group B patients ($p = 0.028$).

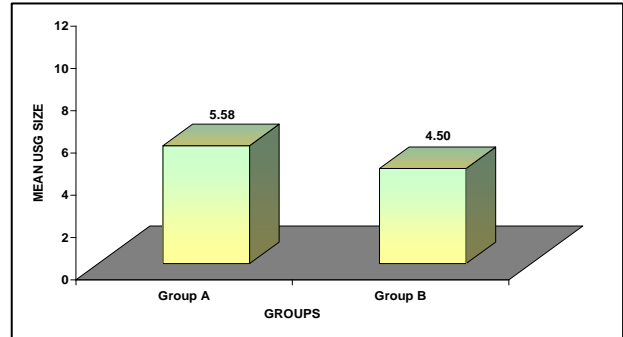


Figure 8: Comparison of mean USG size between two groups.

Pus for culture sensitivity showed growth in 36 patients (60%). *Staphylococcus aureus* was encountered in 34 patients (57.7%). Out of that 20 were in the aspirated group (66.7%). 14 patients were in the incised group (46.7%). 2 patients had growth of *Streptococcal pyogenes* (3.3%). Both the patients were in the incised group. Pus did not show any growth in the rest of the patients. The statistical difference between two groups were not significant ($p = 0.291$).

Table 3: Comparison of culture-sensitivity between two groups.

Culture-sensitivity	Group A		Group B	
	No	%	No	%
<i>S. aureus</i>	20	66.7	14	46.7
<i>S. pyogenes</i>	-	-	02	06.6
No growth	10	33.3	14	46.7

The mean duration of time taken for procedure and duration of stay was compared between the groups and the difference between them was statistically significant ($p = 0.001$).

Table 4: Comparison of mean duration time taken for procedure and duration of stay in hospital between groups.

Groups	Mean time taken for procedure	Mean duration of the stay in hospital (in days)
Group A	06.63±01.61*	0.2±0.55*
Group B	18.87±02.00	1.16±0.37

Post operatively pain was calculated according to numeric rating scale on the day of presentation taken as day 0 and every alternate day as day 2, day 4, day 6 till day 10 or abscess healed, whichever is earlier and

followed up later till 3 months and the difference between two groups were found significant (p <0.05) as in Table 5. Post operatively, fever was assessed as complaint by

the patients and compared between the two groups that were not significant statistically as in Figure 9.

Table 5: Comparison of proportion of cases with postoperative pain between two groups.

Pain (rating)	Group A (N = 30)					Group B (N = 30)				
	Day 0 No (%)	Day 2 No (%)	Day 4 No (%)	Day 6 No (%)	Day 10 No (%)	Day 0 No (%)	Day 2 No (%)	Day 4 No (%)	Day 6 No (%)	Day 10 No (%)
No	- (-)	- (-)	04 (13.3)	15 (50.0)	29 (96.7)	- (-)	- (-)	3 (10.0)	9 (30.0)	28 (93.3)
Mild	- (-)	09 (30.0)	14 (46.7)	10 (33.3)	01 (03.3)	06 (20.0)	12 (40.0)	16 (53.3)	13 (43.4)	2 (06.7)
Moderate	16 (53.3)	15* (50.0)	11* (36.7)	05* (16.7)	- (-)	12 (40.0)	11 (36.7)	9* (30.0)	7* (23.3)	- (-)
Severe	14 (46.7)	06 (20.0)	01 (03.3)	- (-)	- (-)	12 (40.0)	07 (23.3)	2 (06.7)	1 (03.3)	- (-)

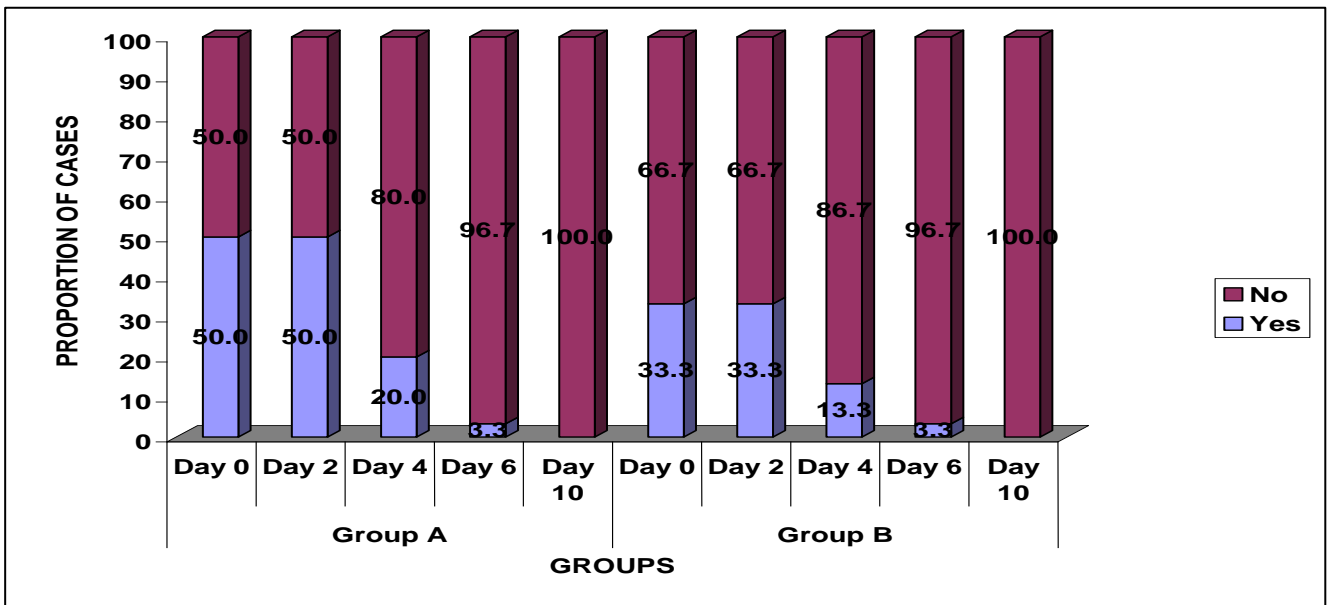


Figure 9: Comparison of proportion of cases with postoperative fever between two groups.

Table 6: Mean diameter of abscess and pus volume aspirated during treatment in group A.

No. of aspirations	No. of patients (N = 30)	% of total aspirated	Mean abscess diameter in cm	Mean pus volume in ml
Aspiration1	08	26.7	04.10±01.43	35.50±17.12
Aspiration2	15	50.0	05.30±01.62	70.37±28.19
Aspiration3	03	10.0	07.00±02.00	85.33±48.01
Failure	04	13.3	08.50±02.65	93.50±45.41

The abscess diameter, mean volume of pus aspirated and the number of aspirations required for the treatment in group A during surgery was as given below as in Table 6.

The mean healing time was 4.27 among group A that was significantly less as compared to 7.60 among group B (p =0.001) as in Figure 10.

Table 7: Comparison of cosmetic outcome between two groups.

Outcome	Group A		Group B	
	No	%	No	%
Scar	04	13.3	30	100.0
No scar	26	86.7	-	-

Cosmetic outcome was assessed at the time of follow up after the abscess was completely healed. The outcome was assessed as patients having scar over the breast or not and overall patients satisfaction as shown in Table 7 and difference between the groups were significant with each other ($p=0.001$).

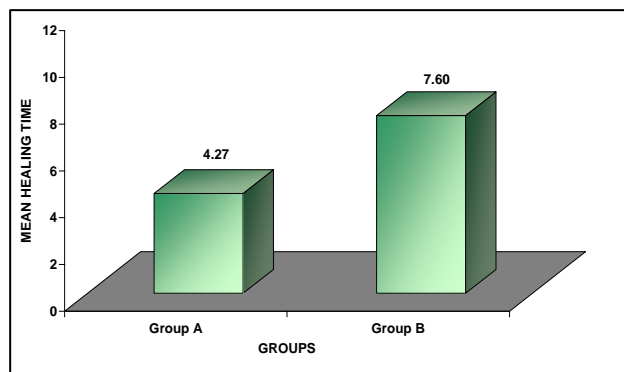


Figure 10: Comparison of mean healing time between two groups.

DISCUSSION

In our comparative study, we compared two groups, aspiration and incision and drainage of the breast abscess in the management of it without control group. In the current report, patients age range has some similarity with the result of Dixon et al and Dener et al, who demonstrated that breast abscesses most commonly affects women aged 18-50 years.^{2,8,11} Although breast abscess generally has been associated with mastitis and breast feeding, the results of our study and others indicate that abscess was also found in non-lactating women Crowe et al and Scholefield et al.^{12,13}

In our study 61.7% patients were primiparae and 38.3% were multiparae, a similar incidence has been described by Dener et al.⁸ This is similar to the literature, which describes primiparous women to be at a greater risk for the development of breast abscess during lactation than multiparous women.¹⁴

Breast abscess is frequently located in the upper and outer quadrant, which fits with the fact that most of the breast parenchyma is located in this quadrant.¹⁵ In our study, 65% of breast abscess was found in the upper and outer quadrant and 60% of breast abscess was located in the left breast. This is in agreement with Eryilmaz et al and Chandika et al reported a similar incidence of breast abscess over left side and abscess in the upper and outer quadrant.^{16,17} In our study finding of peripherally located abscess more than centrally locating was consistent with the results of Hamid et al.¹⁸

In this study all the patients in both groups presented with pain as a general feature. The mean duration of pain in our study was 6.3 days. However the incidence of fever was in 25 patients (41.7%), axillary lymphadenopathy

was present in 12 patients (20%) of the total and cracked nipple was present in 18 patients (30%) of the total patients. These observations are similar with the findings of Dener et al.⁸

In our study the culture-sensitivity reveals the presence of *S. aureus* and *S. pyogenes*. We have 34 (56.7%) patients who had *S. aureus* positive reports; of which 20 (66.7%) patients were in aspirated group and 14 (46.7%) patients in the incised group. *S. pyogenes* which was present in only 2 (6.7%) patients and those were in the incised group. Similar finding has been reported by Singh et al and Elagili et al.^{19,20} The findings of mixed flora with anaerobes in non-lactational breast abscess, similar to findings of Walker et al.²¹

The mean time required for both the procedures was assessed. From the results it was observed that patients undergoing aspiration required 6.63 minutes which was significantly less as compared to the mean time required for the procedure for patients undergoing incision and drainage, which was 18.87 minutes confirming that needle aspiration is very feasible, simple procedure and can be performed without any imaging guidance.

In the present study, the mean diameter of the abscess was 5.7 cm in total patients. The mean volume of pus aspirated in aspirated group was 65.65 ml and that in the incised group was 69.47 ml. There was no significant difference in the mean amount of pus aspirated or drained in these two groups. These results were in contrast with the studies of Schwartz et al and Hamid et al.^{9,18}

In our study of the 30 patients who underwent aspiration, 26 were treated successfully without any complication on follow up. The success rate achieved was 86.66%. This was comparable with the study conducted by O'Hara et al reported an 86% cure rate.²²

In this study aspiration failure was found in 13.3% (4 patients). Incidence similar to our study was reported by O'Hara et al.²³ In the incised group only one patient failed (3%). There was no recurrence of breast abscess observed in needle aspiration group during the study. However the recurrence rate was far less than 31% in the incision and drainage group, which has been reported by Strauss et al.²³ This small recurrence rate observed may have resulted from a short follow up period.

In our study all the patient's undergone ultrasonography to assess the size and location of breast abscess and to confirm the diagnosis of breast abscess, though it was diagnosed clinically. Ultrasonography was also useful tool in diagnosis of breast abscess as found in study done by Dener et al.⁸

Post operatively clinical symptoms like pain and fever were assessed in the patients of breast abscess treated with aspiration and with incision and drainage. At the end of day 10, we observed 96.7% of the patients in aspirated

group got relief from pain whereas in the incised group 93.3% of the cases had no pain and the difference was not found to be significant. Wound healing was significantly faster in the aspirated group than in the incised group (4.3 days versus 7.7 days), this finding was similar to the study done by Eryilmaz et al.¹⁶

In the present study the cosmetic outcome was evaluated according to patient's satisfaction and scar mark. Patients underwent with aspiration, were satisfied with the cosmetic outcome, as there were no scars present after the treatment as similar to the studies of Singh et al and Kastrup et al.^{19,24}

CONCLUSION

The observation of our study shows that needle aspiration of the abscess with ultrasonographic guidance combined with antibiotics has a great value in the treatment of breast abscess even in abscess with large volume; although repeated aspiration are needed to obtain complete resolution, this therapy is a well-accepted alternative to surgical treatment. Aspiration of the breast abscess through a wide bore cannula is thus a feasible and easy procedure, but may require multiple aspirations for cure. It does not require any mode of anesthesia and can be done on out-patient department basis. Breast abscess in selected group of patients with diameter of less than 7 cm can be treated by aspiration successfully and with a good cosmetic outcome. Aspiration of the breast abscess can be successfully done as initial mode of management in the treatment, but incision and drainage remains the final resort for cure.

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REFERENCES

- Martin JG. Breast abscess in lactation. Journal of midwifery and women's health. 2009;54(2):150-1.
- Ulitzsch D, Nyman MK, Carlson RA. Breast abscess in lactating women: US-guided treatment. Radiology. 2004;232(3):904-9.
- Leibman AJ, Misra M, Castaldi M. Breast abscess after nipple piercing: sonographic findings with clinical correlation. Journal of ultrasound in medicine. Official journal of the American Institute of Ultrasound in Medicine. 2011;30(9):1303-8.
- Kaufmann R, Foxman B. Mastitis among lactating women: occurrence and risk factors. Social sciences in medicine. 1991;33(6):701-5.
- Cignacco E, Zbinden A, Surbek D. Ongoing breastfeeding with breast abscess. Pflege. 2006;19(2):70-8.
- Rasmussen NR, Bilchet-Toft M. Primary periareolar abscess in the Non-lactating breast risk of recurrence. AMJ Surg. 1987;153:571-3.
- Benson EA. Management of breast abscesses. World J Surg. 1989;13:753-6.
- Dener C, Inan A. Breast abscesses in lactating women. World J Surg. 2003;27:130-3.
- Schwarz RJ, Shrestha R. Needle aspiration of breast abscesses. AMJ Surg. 2001;182:117-9.
- Strauss A, Middendorf K, Müller-Egloff S, Heer IM, Untch M, Bauerfeind I. Sonographically guided percutaneous needle aspiration of breast abscesses-a minimal invasive alternative to surgical incision. Ultraschall Med. 2003;24(6):393-8.
- Dixon JM. Repeated aspiration of breast abscesses in lactating women. BMJ (Clinical research ed). 1988;297(6662):1517-8.
- Crowe DJ, Helvie MA, Wilson TE. Breast infection. Mammographic and sonographic findings with clinical correlation. Investigative radiology. 1995;30(10):582-7.
- Scholefield JH, Duncan JL, Rogers K. Review of a hospital experience of breast abscesses. The British journal of surgery. 1987;74(6):469-70.
- Kvist LJ, Rydhstroem H. Factors related to breast abscess after delivery: a population-based study. BJOG: An International Journal of Obstetrics and Gynaecology. 2005;112(8):1070-4.
- Inch S. Mastitis: a literature review. World Health Organization Division of Child Health and Development, Geneva. 1997.
- Eryilmaz R, Sahin M, Hakan Tekelioglu M, Daldal E. Management of lactational breast abscesses. Breast (Edinburgh, Scotland). 2005;14(5):375-9.
- Chandika AB, Gakwaya AM, Kiguli-Malwade E, Chalya PL. Ultrasound guided needle aspiration versus surgical drainage in the management of breast abscesses: a Ugandan experience. BMC research notes. 2012;5:12.
- Hamid HS, Osama MI. Percutaneous Needle Aspiration Is A Minimally Invasive Method For A Breast Abscess. Arch Clin Exp Surg. 2012;1(2):105-9.
- Singh G, Singh G, Singh LR, Singh R, Singh S, Sharma KL. Management of breast abscess by repeated aspiration and antibiotics. Journal of Medical Society. 2012;26(3):189.
- Elagili F, Abdullah N, Fong L, Pei T. Aspiration of breast abscess under ultrasound guidance: outcome obtained and factors affecting success. Asian journal of surgery/Asian Surgical Association. 2007;30(1):40-4.
- Walker AP, Edmiston CE Jr, Krepel CJ, Condon RE. A prospective study of the microflora of nonpuerperal breast abscess. Archives of surgery. 1988;123(7):908-11.
- O'Hara RJ, Dexter SP, Fox JN. Conservative management of infective mastitis and breast abscesses after ultrasonographic assessment. The British journal of surgery. 1996;83(10):1413-4.
- Strauss A, Middendorf K, Muller-Egloff S, Heer IM, Untch M, Bauerfeind I. Sonographically guided percutaneous needle aspiration of breast abscesses -

a minimal-invasive alternative to surgical incision.
Ultraschall in der Medizin. 2003;24(6):393-8.

24. Karstrup S, Solvig J, Nolsoe CP, Nilsson P, Khattar S, Loren I, et al. Acute puerperal breast abscesses: US-guided drainage. Radiology. 1993;188(3):807-9.

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