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# **Comparison of conventional incision and drainage versus ultrasound guided minimally invasive techniques in management of the breast abscess: A prospective cohort study**

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**Abstract**---Background: The feasibility of ultrasound guided minimally invasive techniques in management of breast abscess has been a topic of concern from a long time thus, resulting in many studies. Objectives: To assess the feasibility and to compare ultrasound guided minimally invasive techniques with conventional incision and drainage in breast abscess management Materials and Methods: Patients admitted in Surgery Department / OPD with BREAST ABSCESS (total 60 patients) were divided into two random groups of 30 patients each using random number tables. Group 1 was treated by conventional incision and drainage, Group 2 was treated by ultrasound guided minimally invasive techniques. Chi-square test was used. Results: For group 2, the average pain(VAS) score was 4.7 with minimal bleeding during the procedure, no need of dressing, average duration of stay 0.47 days, average days required for complete recovery is 13 days and excellent cosmesis as compared to group 1 where average pain score was 7, mild bleeding occurred in all cases with requiring an average of 10 days of dressing, all healed leaving a scar, average days required for complete recovery is 28 days and thus only satisfactory cosmesis with average 3.1 days of hospital stay. Conclusion: Serial percutaneous needle aspiration/suction drain placement should be the first line of therapy (up to a maximum of three attempts of aspiration) whenever and wherever the facility of

ultrasound is available. If it fails to achieve the desired outcome the conventional treatment modality of incision and drainage can always be resorted to.

**Keywords**--breast abscess, usg guided needle aspiration, suction drain, minimally invasive techniques.

## **Introduction**

Breast abscess is the most common forms of abscess surgical emergencies usually seen in lactating woman <sup>1</sup>. The frequency of occurrence is highly related to breast feeding mainly due to nipple bite by a child during feeding and bacterial colonisation as a result of improper nursing technique and incomplete emptying of the breast <sup>2</sup>. The bacteriology of breast abscesses has been studied in the past, identifying Staphylococcus aureus as the predominant bacterial isolate.<sup>3,4</sup> The risk of infection with Methicillin Resistant Staphylococcus aureus (MRSA) is higher in hospitalized patients. <sup>5</sup> At an early stage, acute mastitis may be treated with appropriate antibiotics. Once an abscess is established, traditionally management involves incision and drainage under general anaesthesia which results in regular dressings, prolonged healing time, and difficulty in breast feeding, possibly unsatisfactory cosmetic Outcome, rupture and even recurrent breast abscess. <sup>6</sup> With the advent of surgical understanding with time, drainage of breast abscess has undergone a gradual change from invasive to minimally invasive procedures. The standard surgical approach (invasive) of painful incision and drainage (I and D), breaking loculi under general anaesthesia and daily gauze packing has yielded to minimally invasive almost painless approach of percutaneous placement of suction drain and aspiration/repeated aspiration of the abscess <sup>7,8</sup>. Ultrasound has been shown to be useful in the diagnosis of breast abscess, guiding needle during aspiration and also enables visualization of multiple abscess loculi, and is thus useful in needle guided aspiration of breast abscesses.<sup>9</sup> A recently highlighted approach is drainage of pus by percutaneous drain placement under antibiotic cover <sup>10</sup>. This approach has advantages of being almost painless, complete resolution without scar formation and mothers can continue breast feeding. Hence our aim was to assess the feasibility and to compare ultrasound guided minimally invasive techniques with conventional incision and drainage in breast abscess management.

## **Materials and Methods**

A prospective cohort study was conducted in patients coming to Department of Surgery, U. P.U.M.S, Saifai, Etawah from January 2018 to July 2019. Permission for the study was obtained from the College Institutional Ethics Committee prior to commencement (Ethical clearance no. 22/2018). In our study 60 patients of breast abscess were taken fulfilling inclusion criteria (All patients diagnosed as a case of breast abscess either clinically and/or via ultrasound) and exclusion criteria (Patients with chronic abscess, Abscess with skin changes, Patients not giving consent, Suspicious lesions/ malignancy/ tuberculosis). Who were divided into two random groups of 30 patients each using random number tables. Group 1 was treated by conventional incision and drainage, Group 2 was treated by

ultrasound guided minimally invasive techniques (If size was less than 5 cm, it was managed via ultrasound guided aspiration and if more than 5 cm, then managed by percutaneous suction drain placement). Group 1: Incision and Drainage, The usual incision was sited in a radial direction over the affected segment, although if a circumareolar incision will allow adequate access to the affected area this was preferred because it gives a better cosmetic result. The incision passed through the skin and superficial fascia. A long artery forceps was then inserted into the abscess cavity. Every part of the abscess was palpated against the point of the artery forceps and its jaws were opened. All loculi that could be felt were entered. Finally, the artery forceps having been withdrawn, a finger was introduced and any remaining septa disrupted. Initial pus that was aspirated was sent for culture and sensitivity. The pus was then evacuated and the loculi broken down digitally. The cavity was lavaged with hydrogen peroxide, povidone iodine solution and saline. The wound was then lightly packed with ribbon gauze or a drain inserted to allow dependent drainage Group 2: minimally invasive techniques done under ultrasound guidance maintaining all aseptic precautions and using a 16G needle and a 10 or 20 ml syringe (If size was less than 5 cm, it was managed via ultrasound guided aspiration) / 14-16 number suction drain (if more than 5 cm then by percutaneous suction drain placement). Post intervention all patients were given oral antibiotics Augmentin 625mg thrice in day. Patients were discharged when comfortable on tablet Diclofenac 50 mg orally 8 hourly and tablet Co-Amoxiclav 625 mg orally 8 hourly for a total of seven days. Follow up was done twice weekly until complete healing of abscess and after one month of complete healing.

Statistical analysis: All the data was compiled in Microsoft excel sheet and descriptive statistics were tabulated and analyzed. Chi square test was used for analysis. P value of <0.001 is taken as significant.

## Results

In our study mean age of occurrence of breast abscess in both study group was 26 year (table1).

Table 1: Age wise distribution

Age (yrs)	Group I		Group II	
	No.	%	No.	%
<20	6	20.00	4	13.33
21-30	17	56.67	20	66.67
31-40	4	13.33	5	16.67
41-50	2	6.67	1	3.33
>50	1	3.33	0	0.00
Total	30	100.00	30	100.00

chi-square = 2.09      p-value= 0.720 (>0.05) non significant

It was observed that majority of the patient almost 60% in group 1 and 53% in group 2 are primiparous (table 2).

Table 2: Parity of study Subject

Parity	Group I		Group II	
	No.	%	No.	%
0	4	13.33	3	10.00
1	18	60.00	16	53.33
2	5	16.67	6	20.00
3	3	10.00	4	13.33
4	0	0.00	1	3.33
Total	30	100.00	30	100.00

The superolateral quadrant was involved in the majority of the patients, thirty-three of the sixty (55%) (Table 3)

Table 3: Distribution on the basis of site

Site	Group I (N=30)		Group II(N=30)	
	No.	%	No.	%
Inferolateral	4	13.33	6	20.00
Inferomedial	2	6.67	1	3.33
Lateral	0	0.00	3	3.33
Superior	0	0.00	2	3.33
Supirolateral	18	60.00	15	50.00
Supiromedial	6	20.00	3	10.00

chi-square = 7.01 p-value= 0.220 (>0.05) non significant

Majority of patients in our study was lactating (in group one 66.67% and group two 63.33%). In our study almost 30 % of patients require single needle aspiration and 70% patients require two times needle aspiration for complete resolution, And no need for three times aspiration, as in our study complete resolution was occurred after single/two times aspiration( as we choose the patients for needle aspiration in which the greatest dimension of abscess cavity was < 5x5cm.) Table

Table 4: Average days of hospital stay

Days	Group I(N=30)	Group II(N=30)	t-value	p-value
Mean	3.10	0.47	-18.186	<0.0001 Significant
SD	0.55	0.57		

In both the groups 36 patients out of 60 patients, the culture was positive for *staphylococcus aureus*. In our study we noticed that out of sixty patients thirty-nine (65%) patients were lactating and twenty-nine (74%) lactating females having a staphylococcal infection. Table 5

Table 5: Average pain score (Average VA Score)

Pain	Group I(N=30)	Group II(N=30)
Day 3	7.00	4.70
Day 6	3.00	1.83
Day 10	0.8	0.17
Day 13	0.17	0
Day 17	0	0

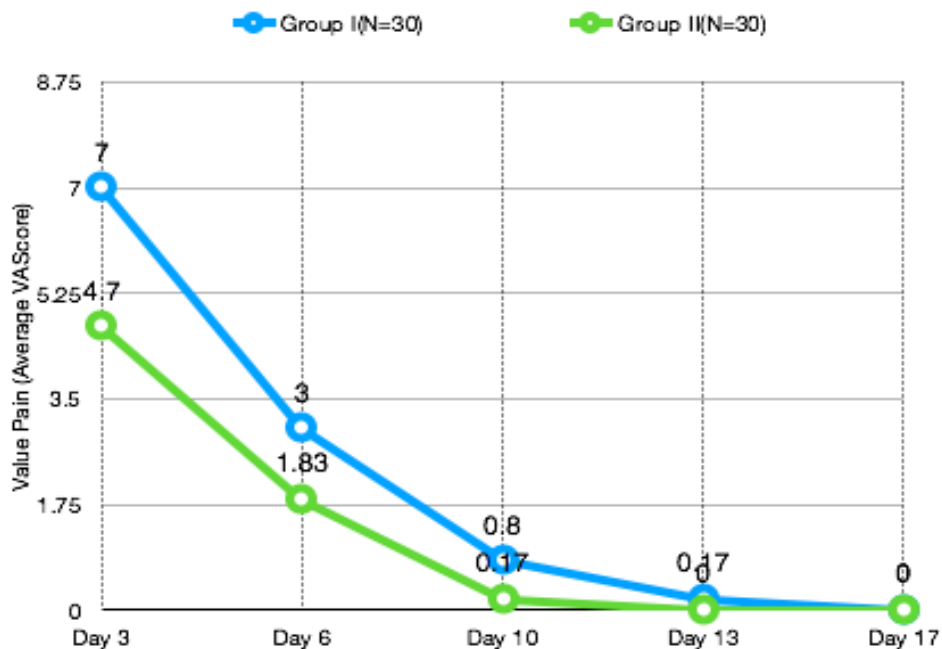


Figure.1: pain score in subsequent follow up visits in both groups

It was seen that patients in the ultrasound-guided minimally invasive techniques (group 2) had much less pain as compared to the patients of the incision and drainage group and hence had a lesser analgesic requirement (figure 3). The chi-square statistic is 19.7833. The p-value is .000051. The result is significant at  $p < .05$  (table/figure.2)

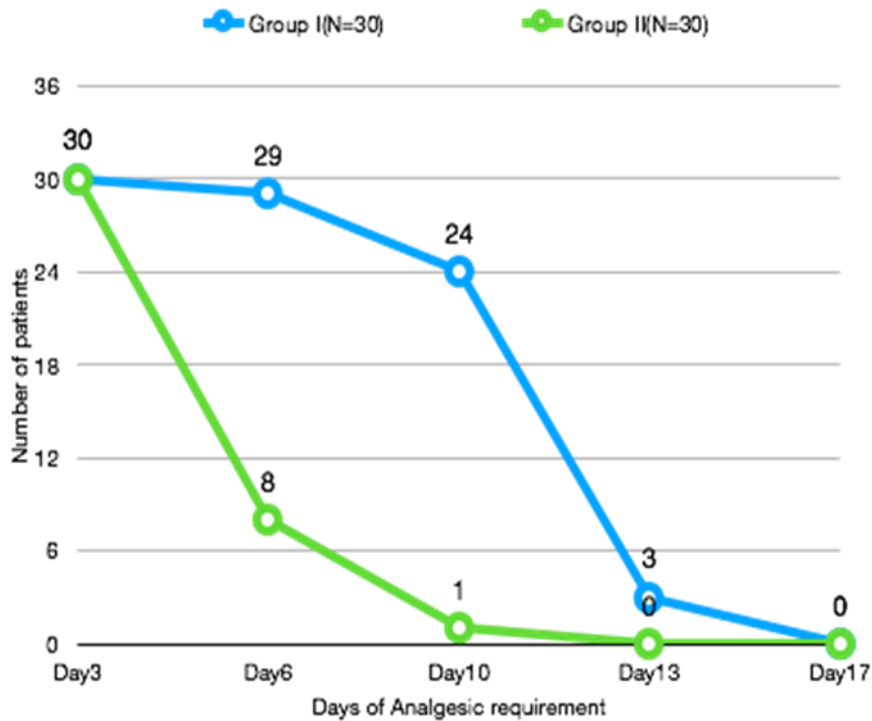


Figure2: days of analgesic requirement in both groups

In our study wound healing in I&D group occurred in minimum thirteen days to maximum thirty- three days with average being 21 days. This long period of healing required for I&D treated patient is limiting factor for the use of this procedure.

## Discussion

In our study Twelve patients (40%) underwent incision and drainage under local anesthesia, five (16.67%) needed general anaesthesia and remainder thirteen (43.33%) sedation. In contrast, all patients of other group were managed by local anaesthesia alone except one who required no anaesthesia. Besides general anaesthesia has its own long list of complications and may not be suitable for all patients like in those with cardiovascular problems. Odiya S et al perform Percutaneous suction drainage placement in 50 patients Lignocaine (with adrenaline 0.5% strength) local infiltration anesthesia was given 2cm above the upper palpable margin of abscess and 2cm below the lower palpable margin of abscess at 5 o'clock and 7 o'clock position for entry and exit of suction drain trocar, respectively. And for rest 50 patients Conventional incision and drainage was done under short GA <sup>11</sup>.

While incision and drainage was associated with minimal, mild and moderate bleeding in two (6.67%), twenty (66.67%) and eight (26.66%) patients respectively, there was no bleeding in seventeen (56.67%) patients managed by ultrasound-guided techniques and the rest thirteen (43.33%) patients had only minimal bleeding.

All patients included in the study were admitted in the hospital for a period ranging from 1-4 days for group 1 and 0-2 for group 2. In the study conducted by Chandika et al all patients that were treated by needle aspiration did not require admission whereas those treated by incision and drainage were admitted for a variable period of two to five days. None of the sixty patients in our study had any recurrence of an abscess within the follow-up period of 2 months. This can be attributed to the small period of follow up <sup>12</sup>.

In contrast to no dressing required by group II patients even for a single day, the range of days of dressing for the group I was from 7 to 17 days. Two (6.67%) patients required dressing for only a week, twenty-five (83.33%) patients for 8-14 days while three needed it for more than two weeks. The average number of dressing required by this group was thus, 11 days. So in our study ultrasound-guided minimally invasive techniques is a more convenient method for management of Breast abscess because of, there is no requirement of dressing. in a study conducted by Odiya S et al Most of the patients (47/51) complained of daily change of dressings, especially packing of the wound, as painful and cumbersome. whereas in case of percutaneous suction drain placement there was no need for repeated dressings which occurs in I and D <sup>11</sup>.

The bacteriological cultures that were sent revealed that 60% of the samples grew *Staphylococcus aureus* and the rest 40% were sterile. The high percentage of sterile cultures can be explained by the fact that most patients presenting to our hospital have already taken a course of antibiotics from local sources. Out of the 60% (36 samples) that showed staphylococcal growth, fourteen (38.8%) strains were methicillin-resistant (MRSA). Dabbas et al observed one hundred and ninety patients of breast abscess and reported *Staphylococcus aureus* as the causative organism in 51.3% cases. Of these, 86% were methicillin-resistant strains <sup>13</sup>. Ulitzsch et al reported *Staphylococcus aureus* in 89% of their patients <sup>14</sup>. In a study conducted by Berna-Serna et al with thirty-nine patients of breast abscess, fifteen (38.4%) cases had a sterile culture and eight (20.5%) were positive for *Staphylococcus aureus* <sup>15</sup>. Also, we noted that out of the thirty-nine lactating patients, twenty-nine (74.35%) had *staphylococcus aureus* as the bacterial growth. Whereas in the twenty-one non- lactating females fourteen (66.67%) had a sterile culture.

On comparing the analgesic requirement on day six, it was seen that only eight (26.67%) out of the thirty patients of the group 2 needed analgesics as compared to twenty-nine (96.67%) patients of incision and drainage group. Using the chi-square statistic is 19.7833, p-value is < 0.05. Hence it can be derived that incision and drainage is a more painful procedure as compared to needle aspiration. The delayed persistence of pain can be associated with the open wound in patients undergoing incision and drainage which is not there in cases of ultrasound-guided minimally invasive techniques (group 2).

Out of thirty-nine lactating patients enrolled in our study, fourteen patients were advised breast milk suppression and twenty-five patients were allowed to continue breastfeeding. Twelve out of the twenty-five (48%) patients treated with needle aspiration/suction drain did not report any problem with breastfeeding and were able to resume lactation immediately after the procedure. The rest thirteen patients treated with incision and drainage complained of inability to breastfeed their children and hence, we're encouraged to express the milk out of the breast till the wound healed. In another study carried out by Ulitzsch et al, seventeen out of twenty-nine patients continued breastfeeding after percutaneous management while the rest had to withhold breast-feeding <sup>14</sup>.

The Patient who had undergone incision and drainage were left with scars while the minimally invasive techniques were scarless. Surgical drainage frequently results in adhesions in the glandular tissue, breast disfigurement and scar formations. These complications are prevented by USG guided minimally invasive techniques which is the preferred modality now. In the study conducted by Tewari M et al and Odiya S et al told about A recent study has concluded that abscess smaller than 5cm can be treated effectively with repeated aspirations with good cosmetic results <sup>10,11</sup>.

### **Conclusion**

It was concluded that overall needle aspiration/suction drain placement group had a better cosmesis and satisfaction as compared with the incision and drainage group. Incision and drainage with secondary healing of the wound leaves behind a scar and needs prolonged dressing and may even cause cessation of breast-feeding. In contrast needle aspiration/ suction drain placement causes no scarring and breast feeding is not hindered thus giving the patient better satisfaction. Thus, whenever and wherever the facility of ultrasound is available, serial percutaneous needle aspiration/suction drain placement may be tried as the first line of therapy (up to a maximum of three attempts of aspiration). If it fails to achieve the desired outcome the conventional treatment modality of incision and drainage can always be resorted to.

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