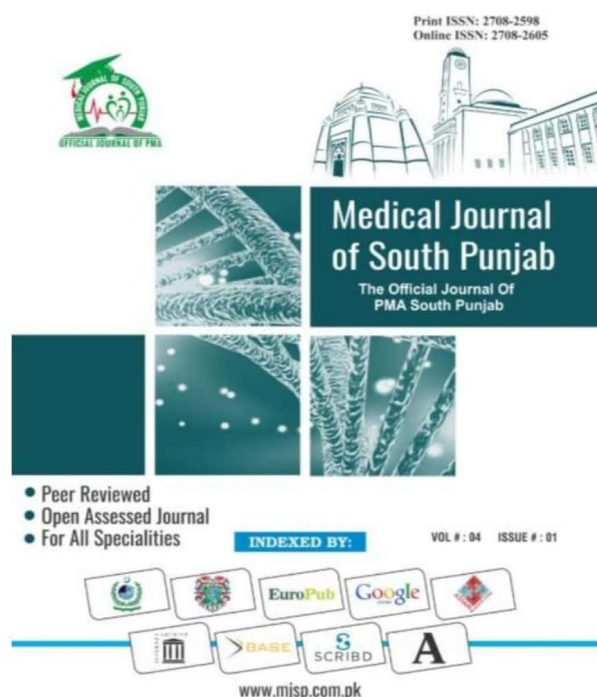


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Comparison Between Ultrasound Guided Aspiration and Incision and Drainage of Breast Abscess

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ABSTRACT

Objective: *is to compare the outcomes of ultrasound guided needle aspiration technique with traditional incision and drainage technique in breast abscess.*

Methods: *Study was randomized controlled trial conducted at general surgery department of Nishatr Hospital; Multan from 9th May 2023 to 8th November 2023 in 6 months' duration. A total of 228 patients were included and randomized in groups A and B. Group A include 143 patients aspirated with ultrasound guided needle aspiration and in group B 85 patients treated with incision and drainage method. Main outcomes were hospital stay, pain intensity, location and size of abscess, parity and demographics.*

Results: *The mean duration of pain in Group A and Group B was 5.79±2.18 days and 7.01±2.38 days, respectively, (p<0.001). Further, the mean duration of fever, volume of pus, size of USG was almost equal in both the groups, (p>0.050). The distribution of site of abscess of both the groups were shown in figure. I.*

Conclusion: *Ultrasound guided needle aspiration of a breast abscess combined with antibiotics is a commonly used and effective approach in the treatment of breast abscesses as compare to incision and drainage.*

Keywords: Ultrasound guided aspiration, Incision and drainage, Breast abscess, Pain, Hospital stay

1. INTRODUCTION

A localized accumulation of pus within the breast tissue named as breast abscess. It typically occurs as a result of an infection, often associated with breastfeeding (known as locational breast abscess) or due to other causes such as a blocked milk duct or injury¹. Most common symptoms include pain and tenderness in the affected breast, swelling and redness of the breast, palpable lump or mass in the breast, fever and chills (indicating infection), pus or thick discharge from the nipple, flu-like symptoms if the infection is severe^{2,3}.

Breast abscesses can indeed be a challenging clinical problem, and the management approach may vary depending on severity and stage of the abscess⁴. In the early stages of breast infection (acute mastitis), treatment with antibiotics may be effective, choice of antibiotics should be guided by culture and sensitivity testing to ensure that the prescribed medication is effective against the specific bacteria causing the infection⁵. When an abscess has formed, surgical drainage is often necessary⁶. This typically involves making an incision to allow the pus to drain out. The cosmetic outcome can be a concern, especially if the abscess was large or involved extensive tissue removal during drainage⁷.

Hence, ultrasound-guided needle

aspiration is gaining importance in the treatment of breast abscesses⁸. This procedure offers several advantages compared to traditional surgical approaches⁹. Ultrasound-guided needle aspiration has advantages of minimally invasive procedure, ensuring that the needle is inserted in the right spot, lead to better outcomes with reduced chances of recurrence, better cosmetic outcomes and faster recovery over traditional incision¹⁰.

The study aimed to provide evidence-based insights into which of the two treatment methods is preferable for managing breast abscesses, considering these various aspects. The findings could help surgeons to make informed decisions about the most appropriate treatment approach based on their patients' specific needs and circumstances.

2. METHODOLOGY

Study was conducted at general surgery department of Nishtar Hospital, Multan from 9th may 2023 to 8th November 2023 in 6 months' duration. Study was conducted after approval from hospital ethical board and Collage of Physician's and Surgeon's (CPSP) of Pakistan Ref No. [CPSP/REU/SGR-2019-099-10854]. Written consent was taken from patients before start of procedure. Non probability consecutive sampling technique was used. Sample size was calculated by using WHO

sample size calculator, 95% CI, 80% power of study, 0.2 ± 0.55 mean hospital stay in group ultrasound guided and 1.16 ± 0.37 in group incision drainage.

Female patients who attended the surgical outpatient department for breast pain and swelling, aged between 18 and 65 years who were diagnosed with a breast abscess size $< 10\text{cm}$ on confirmed ultrasound were included in the study. Patients with suspicious lesions/malignancy, especially inflammatory carcinoma of the breast, patients with compromised immune systems, possibly due to conditions such as HIV/AIDS or immunosuppressive medications, patients who had experienced recurrent breast abscesses, meaning they had multiple episodes of abscess formation in the breast, tuberculosis of the breast and gangrenous abscess were excluded for the study. Patients were divided into two groups A and B by simple randomization method. Patients in group A were aspirated with ultrasound guided aspiration technique and in group B were managed with traditional incision and drainage method.

The patients underwent clinical examination to determine the presence of abscesses. The diagnosis likely involved assessing factors such as the duration (how long the abscess has been present), the site (where in the body the abscess is located), the nature

(characteristics of the abscess), and the past medical history of the patient, which may provide insights into potential causes or risk factors.

A general physical examination was conducted, which includes assessing vital signs such as temperature, pulse and blood pressure. These measurements can help in evaluating the patient's overall health and potential complications related to the abscess. A detailed examination of the breasts was performed for various signs and symptoms related to breast abscesses, such as axillary lymphadenopathy, nipple discharge, tenderness and blood tests were conducted to measure the total leukocyte count. In group A patient's ultrasound-guided needle aspiration of a breast abscess is performed. The procedure is often performed with the patient lying on her back or in a slightly reclined position. Usually a radiologist or breast specialist, performed an ultrasound examination of the breast. Under proper sterilization using real-time ultrasound guidance, a thin, sterile needle is inserted directly into the abscess cavity. Once the needle is correctly positioned within the abscess, the surgeon aspirated the pus or infected fluid from the abscess using a syringe. This process may need to be repeated several times until the abscess is sufficiently drained.

In group B incision and drainage group after proper sterilization affected area was administered with local anesthetic and small incision was made over the area of the abscess. The location of the incision may vary depending on the abscess's size and location within the breast. Once the incision is made, area was gently squeezed or scalpel was used to open the abscess and allow the pus to drain out. This helps relieve pressure and pain and aids in the healing process. After completion of procedure a septic dressing was applied and post-operative care was advised as per protocol. SPSS version 27 was used for data analysis. Mean \pm SD was used for quantitative data age, duration of pain, duration of fever, volume of pus, size of tumor and procedure time, representation and frequency (percentages) for qualitative data like gender lactation status, parity, cracked of nipples, lymphadenopathy. Test of significance (t-test and chi square tests) were applied to see association among variables. P value ≤ 0.05 was taken as significant.

3. RESULTS

Overall, 228 patients were enrolled with mean age 26.15 ± 5.81 years (18-45 years). Breast abscess 143 (62.7%) (Group A) and incision & drainage of the breast abscess 85 (37.3%) (Group B). The mean age of Group A and Group B was 26.32 ± 5.99

years and 25.88 ± 5.48 years, respectively, ($p=0.581$). Majority of the patients were between 18-24 years in both the groups, ($p=0.572$). Lactating was observed in 131 (91.6%) of Group A and 72 (84.7%) in Group B, ($p=0.107$). As compare to the parity, 95 (66.4%) and 59 (69.4%) patients in Group A and Group B has primary, ($p=0.642$). The mean duration of pain in Group A and Group B was 5.79 ± 2.18 days and 7.01 ± 2.38 days, respectively, ($p < 0.001$). Further, the mean duration of fever, volume of pus, size of USG was almost equal in both the groups, ($p > 0.050$). (Table. I). The distribution of site of abscess of both the groups were shown in figure. I. The difference was statistically significant, ($p < 0.001$). Axillary lymphadenopathy was noted 53 (37.1%) in Group A and 23 (27.1%) in Group B, ($p=0.121$). According to culture sensitivity, *S. aureus* 104 (72.7%) was most common in Group A as compare to Group B 43 (50.6%). The mean procedure time and mean length of stay of hospital in Group A was less than the Group B, the difference was statistically significant, ($p < 0.001$). (Table. II).

Association of postoperative pain between both the groups were shown in table. III. As the days increased, the rating of pain tends to decreased, ($p < 0.001$). (Table. III).

Table. I
Demographic and baseline characteristics of both the groups

Variable	Group A 143 (62.7%)	Group B 85 (37.3%)	p-value
Age (years)	26.32±5.99	25.88±5.48	0.581
18-24	59 (41.3)	42 (49.4)	0.572
25-29	45 (31.5)	25 (29.4)	
30-34	27 (18.9)	11 (12.9)	
≥35	12 (8.4)	7 (8.2)	
Lactating	131 (91.6)	72 (84.7)	0.107
Parity			
Primary	95 (66.4)	59 (69.4)	0.642
Multiple	48 (33.6)	26 (30.6)	
Pain duration (days)	5.79±2.18	7.01±2.38	<0.001
Duration of fever (days)	4.16±1.61	4.42±1.54	0.228
Volume of Pus (cc)	67.87±4.86	69.84±7.98	0.021
Size of USG (cm)	5.94±2.87	4.21±2.47	0.214

Table. II
Clinical and outcome characteristics of both the groups

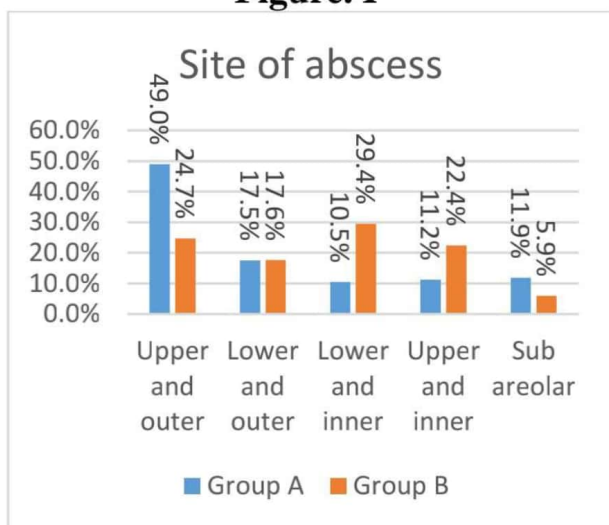
Variable	Group A 143 (62.7%)	Group B 85 (37.3%)	p-value
Axillary lymphadenopathy	53 (37.1)	23 (27.1)	0.121
Cracked nipples	55 (38.5)	15 (17.6)	0.001
Culture-sensitivity			
S. aureus	104	43 (50.6)	<0.00

	(72.7)		1
S. pyogenes	0 (0.0)	7 (8.2)	
No growth	39 (27.3)	35 (41.2)	
Procedure time (days)	7.72±1.96	22.22±3.07	<0.001
LOS (days)	1.36±0.49	2.01±0.39	<0.001

Table. III
Association of postoperative pain between the groups

p-value		<0.001			
Group B 85 (37.3%)	10 th day	76 (89.4)	9 (10.6)	-	-
	6 th day	42 (61.2)	25 (29.4)	8 (9.4)	-
	4 th day	-	38 (44.7)	28 (32.9)	19 (22.4)
	2 nd day	-	15 (17.6)	43 (50.6)	27 (31.8)
	0 day	-	11 (12.9)	54 (63.5)	20 (23.5)
Group A 143 (62.7%)	10 th day	120 (83.9)	23 (16.1)	-	-
	6 th day	81 (56.6)	49 (34.3)	13 (9.1)	-
	4 th day	-	56 (39.2)	43 (30.1)	44 (30.8)
	2 nd day	-	15 (10.5)	75 (52.4)	53 (37.1)
	0 day	-	-	82 (57.3)	61 (42.7)
Pain (rating)		No	Mild	Moderate	Severe

Figure. I



4. DISCUSSION

In this study with mean age of patients was 26.15 ± 5.81 years and age range 18-45 years. Mean size of abscess in group A was 5.94 ± 2.87 cm and in group B it was 4.21 ± 2.47 cm. similar findings were reported by Dixon et al¹¹ who observed age range of females 18-50 years. Another study was conducted by Karvande et al¹² and reported age range from 18-45 years and mean age 23.93 in group A, in group B mean age was 23.20 years and range 18-42 years. It was also reported that abscess size below 7cm can be aspirated successfully with needle aspiration. In a study conducted by Dener et al¹³ reported that in selected cases, when an abscess is accessible and appropriate for drainage, ultrasound guidance can be invaluable. The real-time imaging capability of ultrasound allows for

precise placement of a needle into the abscess cavity, minimizing the risk of damage to surrounding structures.

In this study most of women presented with abscess were lactating 91.6% in group A and in group B it was 84.7%, but it is also found in non-lactating females. This study was supported by research studies conducted by Crowe et al¹⁴ and Scholefield et al¹⁵, which have reported that breast abscesses are typically associated with mastitis, a condition that commonly occurs in lactating women due to infection or inflammation of the breast tissue but cases of breast abscesses in non-lactating women were also observed.

In this study mostly women were primiparous 66.4% in group A and 69.4% in group B. These findings were in line with study conducted by Kvist et al¹⁶, which reported that primiparous women (those giving birth for the first time) may be at a greater risk for developing breast abscess during lactation compared to multiparous women (those who have given birth multiple times). In this study most common location of abscess was upper and outer quadrant 49% in group A and 24.7% in group B. This is in line with two previous studies, one by Eryilmaz et al¹⁷ and another by Chandika et al¹⁸, both

reported a similar incidence of breast abscess that breast abscesses occurred with similar frequency on the left side and in the upper and outer quadrant of the breast.

At the end of study, when both groups were compared in terms of outcome like hospital stay and association of pain after post procedure it was observed that hospital stay in group A was shorter 1.36 ± 0.49 days as compare to group B 2.01 ± 0.39 days ($p < 0.001$). At 10th post procedure day's severe pain was not reported in both groups. In a study conducted by Somani et al¹⁹ in 2020 it was reported that hospital stay was shorter in ultrasound guided aspiration group as 6% of patients have 1 day hospital stay that was not in any patient in incision and drainage group. The average pain score for patients in needle aspiration group on day three was 4.25 on a visual analog scale, which were 5.75 in incision drainage group. Similarly, Fathy et al²⁰ also reported less pain incidence with needle aspiration as compare to incision drainage group.

5. CONCLUSION

Ultrasound guided needle aspiration of a breast abscess combined with antibiotics is a commonly used and effective approach in the treatment of breast abscesses as compare to incision and drainage. Needle aspiration with

ultrasound guidance is especially valuable when dealing with abscesses of small size.

Practical Implications: It can lead to improved patient outcomes, resource allocation, and the development of standardized guidelines for breast abscess management.

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