

# Efficacy of Single Time Ultrasound Guided Needle Aspiration in Treating Breast Abscess

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## ABSTRACT

**Objective:** Antibiotics administration, incision and drainage, and ultrasound-guided needle aspiration are the most commonly used treatment options for breast abscesses. Ultrasound guided needle aspiration has the advantage of early healing and fewer complications. The objective of the current study was to find out the efficacy of single time ultrasound guided needle aspiration in treating breast abscess.

**Material and Methods:** A case series study was carried out at Surgery Department, DHQ Hospital Gujranwala from 05/08/2017 to 04/02/2018. This research included 90 female patients aged between 18-45 years presenting in surgical outdoor with breast abscess. Ultrasound guided aspiration of the abscess was performed using aseptic technique and 14 gauge needle and broad spectrum antibiotics were given for 1 week after the procedure. Follow-up of patients was done after 30 days and ultrasound (showing total absence or presence of less than 5ml collection) was performed to confirm the efficacy of the procedure.

**Results:** Mean age of the study participants was 31.16±6.64 years. The size of abscess ranged from 0.5 cm to 4.9 cm with a mean of 3.34±1.09 cm. Majority (64.4%) of the abscesses were larger than 3 cm. 46.7% patients were lactating while 53.3% patients were non-lactating. The volume of pus aspirated ranged from 5 ml to 111 ml with a mean of 62.20±29.42 ml. Majority (57.8%) of the abscesses had pus in the range of 50-100 ml followed by less than 50 ml (33.3%) and more than 100 ml (8.9%). A single ultrasound guided needle aspiration of breast abscess resulted in resolution of abscess in 82.2% patients. There was no significant variation in the efficacy of single time ultrasound guided needle aspiration of breast abscess across various groups based on age, size, lactation status and volume of pus.

**Conclusion:** A single time ultrasound guided needle aspiration of breast abscess resulted in abscess resolution in 82.2% patients regardless of age of patients, lactation status, size of abscess and volume of pus aspirated which advocate its regular utilization in daily practice.

**Keywords:** Breast Abscess, Ultrasound Guidance, Needle Aspiration, Efficacy

## INTRODUCTION

Breast abscess is one of the most commonly occurring conditions reported in female patients attending surgical outpatient departments<sup>1</sup>. It is termed as a constrained infection with fluid collection in the breast tissue<sup>2</sup>. The quantum of this condition can be gauged by the fact that 4.6% to 11% of female population in both developing and developed countries have been afflicted by this condition at certain point of time in their lives<sup>3</sup>.

Antibiotics, incision and drainage, and ultrasound-guided needle aspiration are the most commonly used treatment options for abscesses<sup>4</sup>. The frequency of abscess recurrence after incision and drainage and needle aspiration is similar, but needle aspiration under ultrasound guided has additional advantage of early healing and lesser complications<sup>5</sup>. Ultrasound guided needle aspiration is now generally considered as a first-line treatment of breast abscesses<sup>6,7</sup>.

There is conflicting evidence regarding the efficacy of ultrasound guide needle aspiration. Singh et al. in 2012 conducted a study on the efficacy of single needle aspiration in treating breast abscess and found it to be 78%<sup>8</sup>. Shaikh et al. conducted a similar study in 2014 and found it to be 25%<sup>9</sup>, whereas Afridi et al. found it to be 56.4%<sup>10</sup>. Naeem et al. found that to be 100%<sup>5</sup>. This conflict can be due to the difference in the expertise performing procedures, the host response and the culture and sensitivity of drugs.

Owing to this conflict, there is a need to repeat this clinical trial in the local population which can help in resolving the conflict and can enable to use this procedure routinely with confidence in terms of efficacy of the treatment. Therefore, the rationale of the study was to determine the efficacy of single time ultrasound guided needle aspiration in treating breast abscess.

## MATERIAL AND METHODS

A case series study was carried out at day case/ OPD, Department of Surgery, DHQ Hospital, Gujranwala from 05/08/2017 to 04/02/2018. Sample size of 90 cases was calculated with 95% confidence level and 9% margin of error while taking efficacy of

single fine needle aspiration of breast abscess to be 25%<sup>9</sup>. The research comprised of 90 consecutive female cases aged between 18-45 years, lactating and non-lactating, suffering from breast abscess. Patients with multiple discharging sinuses, ulceration or necrosis of the skin above the abscess on clinical examination, patients who previously had breast abscess and took at least 2 dosage of antibiotics in the past 6 months for it or had undergone either incision and drainage or needle aspiration of the abscess as per history or clinical record, Patients with co-morbidities like Diabetes Mellitus, Tuberculosis, and valvular heart disease, Patients having carcinoma breast on histological findings as per clinical record, and Patients with more than one lesion were not included in this descriptive case series study.

Following the approval from the institutional ethical review committee and written informed consent from patients, detailed history was taken from each patient meeting the above mentioned criteria. Ultrasound guided aspiration of the abscesses was done using aseptic technique and 14 gauge needle and broad spectrum antibiotics for 1 week were given.

Follow-up of patients was done after 30days and ultrasound was performed to confirm the efficacy of the procedure. Efficacy of ultrasound guided needle aspiration was termed as a total absence or presence of less than 5ml collection. To eliminate bias, all the aspirations of the abscesses were done by the same consultant of the surgery department using the same ultrasound machine and same technique. Confounding variables were also modulated at the same time by following the exclusion criteria.

SPSS version 20 was utilized to enter and analyze all the collected data. Quantitative variables; e.g. age, size (on ultrasound) and quantity of abscess have been exhibited by mean and standard deviation. While frequency and percentage was utilized to demonstrate categorical data such as lactating and non-lactating breast abscess and efficacy of the aspiration. Stratification of the data was performed for age, size (on ultrasound), the quantity of abscess and lactating and non-lactating types to tackle the confounders and modifiers. Chi-square test was employed after stratification, taking p value ≤0.05 as significant.

## RESULTS

The patients' ages ranged from 18 to 45 years with a mean of  $31.16 \pm 6.64$  years. Majority (58.9%) of the patients were aged between 31-45 years. Size of the abscess ranged from 0.5 cm to 4.9 cm with a mean of  $3.34 \pm 1.09$  cm. Majority ( $n=58$ , 64.4%) of the abscesses were larger than 3 cm. 42 (46.7%) patients were lactating while 48 (53.3%) patients were non-lactating. The volume of pus aspirated ranged from 5 ml to 111 ml with a mean of  $62.20 \pm 29.42$  ml. Majority (57.8%) of the abscess had pus in the range of 50-100 ml followed by less than 50 ml (33.3%) and more than 100 ml (8.9%), as exhibited in table 1.

Table 1: Baseline characteristics of the study participants (N=90)

Parameters	Frequency	Percentage
Age of patients* (years)	31.16±6.64	
Age groups (years)	18-30	37
	31-45	53
Lactation status	Lactating	42
	Non-lactating	48
Size of abscess* (cm)	3.34±1.09	
	<3 cm	32
	≥3 cm	58
Volume of pus aspirated* (ml)	62.20±29.42	
Ranges of Volume of Pus (ml)	<50	30
	50-100	52
	>100	8
		33.3
		57.8
		8.9

N = number of study participants; cm = centimeter; ml = milliliter; \* = continuous data is presented as mean ± standard deviation

A single ultrasound guided needle aspiration of breast abscess resulted in resolution of abscess in 74 (82.2%) patients, as demonstrated in table 2

Table 2: Frequency of Efficacy after Single Time Ultrasound Guided Needle Aspiration of Breast Abscess (n=90)

Efficacy	Frequency	Percentage
Yes	74	82.2%
No	16	17.8%
Total	90	100%

N= number of study participants

Table 3: Frequency of Efficacy after Single Time Ultrasound Guided Needle Aspiration of Breast Abscess with respect to Age Groups, size of abscess, lactation status, and volume of pus.

Parameters	Efficacy N (%)	Efficacy		p-value
		Yes (n=74)	No (n=16)	
Age groups (years)	18-30 (n=37)	31 (83.3)	6 (16.2)	0.746
	31-45 (n=53)	43 (81.1)	10 (18.9)	
	Total	74 (82.2)	16 (17.8)	
Size of abscess (cm)	<3 (n=32)	27 (84.4)	5 (15.6)	0.692
	≥3 (n=58)	47 (81.0)	11 (19.0)	
	Total	74 (82.2)	16 (17.8)	
Lactation status	Lactating	35 (83.3)	7 (16.7)	0.796
	Non-lactating	39 (81.3)	9 (18.8)	
	Total	74 (82.2)	16 (17.8)	
Volume of pus (ml)	<50 (n=30)	25 (83.3)	5 (16.7)	0.853
	50-100 (n=52)	43 (82.7)	9 (17.3)	
	>100 (n=8)	6 (75.0)	2 (25.0)	
	Total	74 (82.2)	16 (17.8)	

N = number of study participants; % = percentage of study participants; cm = centimeter; ml = milliliter; \* = chi-square test was employed to find out the p-value and  $\leq 0.05$  is considered significant

No statistically significant difference ( $p \geq 0.05$ ) was found in the efficacy of single time ultrasound guided needle aspiration of breast abscess across various groups based on age, size, lactation status and volume of pus as shown in table 3.

## DISCUSSION

Breast abscess is more common among women belonging from the developing countries as compared to the developed countries because there is poor maternal hygiene, malnutrition, low living standards, and delayed provision of antibiotics<sup>9</sup>. Antibiotics administration, incision and drainage, and ultrasound-guided needle aspiration are the most commonly used treatment options for abscesses<sup>3</sup>. Management of breast abscess using ultrasound-guided aspiration is a rational course of action, even if there are large-sized abscesses<sup>7</sup>. Early healing and lesser complications are encountered in Ultrasound guided needle aspiration<sup>8, 10</sup>.

In the present study, the mean age of the patients was  $31.16 \pm 6.64$  years. A similar mean age of  $31.23 \pm 5.72$  years has been described by Javed et al. of women showing up with breast abscess at Bahawal Victoria Hospital, Bahawalpur<sup>11</sup>. Rigourd et al. reported the similar mean age of  $33.7 \pm 4.5$  years among such patients<sup>7</sup> while Afridi et al observed it to be  $29 \pm 5.58$  years among such patients<sup>10</sup>. A similar mean age of 32.0 years has been reported by Singh et al. in 2012 in a study carried out on Indian women<sup>8</sup>. It was observed in the present study that the majority (58.9%) of the patients were aged between 31-45 years. Javed et al. also observed similar higher proportion (58.3%) of 31-45 years age group among such women at Bahawal Victoria Hospital, Bahawalpur<sup>11</sup>.

In the present study, the size of abscess ranged from 0.5 cm to 4.9 cm with a mean of  $3.34 \pm 1.09$  cm. Majority (64.4%) of the abscesses were larger than 3 cm. Dahiphale et al. observed the similar mean abscess size of 3.5 cm<sup>12</sup>. Christensen et al. and Chandika et al. also reported similar mean abscess size as 3.5 cm and 3.49cm, respectively<sup>6, 13</sup>. Chandika et al. also reported similar higher proportion (63.8%) of women with abscess size of 3 cm or more<sup>13</sup> while Dahiphale et al. observed this frequency to be 83.3%<sup>12</sup>.

It was observed in the current study that 46.7% patients were lactating while 53.3% patients were non-lactating. A comparable frequency of Lactational breast abscess has been revealed by Javed et al., who reported it to be 46.3%<sup>11</sup>, while Afridi et al. reported Lactational breast abscess in 40.0% of such women at Civil Hospital and Bantva Hospital, Karachi<sup>10</sup>. Elagili et al. observed this frequency to be 46.7% in Malaysian such women<sup>14</sup>. In another study conducted by Dayal and Lal, 56% patients undergoing needle aspiration were lactating while 44% were not lactating<sup>1</sup>.

In the present study, the volume of pus aspirated ranged from 5 ml to 111 ml with a mean of  $62.20 \pm 29.42$  ml. Majority (57.8%) of the abscess had pus in the range of 50-100 ml followed by less than 50 ml (33.3%) and more than 100 ml (8.9%). Dahiphale et al. in a similar case series involving Indian women reported that volume of pus aspirated ranged from 10 ml to 130 ml with a mean of 40 ml. They reported frequency of various groups based on volume of pus aspirated; <40 ml (46.6%), 40-100 ml (46.7%) and >100 ml (6.7%)<sup>12</sup>. In another case series in Nepal, Schwarz and Shrestha reported that the volume of pus aspirated ranged from 0.2 ml to 120 ml with a mean of 11.7 ml<sup>15</sup> while Singh et al. reported mean volume of aspirate to be 17.1 ml (range 0.2-100 ml)<sup>8</sup>.

Recent studies claimed single time ultrasound guided needle aspiration to be as effective as surgical incision and drainage<sup>2</sup>, 5-10, 13-20. However, the existing researches contained controversy regarding efficacy of ultrasound guide needle aspiration (Table 4) which necessitated the present study. In the present study, a single time ultrasound-guided needle aspiration of breast abscess resulted in resolution of abscess in 82.2% patients.

Table 4: Review of Existing Research Evidence on Efficacy of Single Time Needle Aspiration of Breast Abscess

Author	Year	Population	Efficacy (%)
O'Hara et al. 16	1996	British	86.0
Schwartz et al. 15	2001	Nepali	82.0
Leborgne et al. 17	2003	Uruguayans	57.0
Jalali et al. 18	2004	Pakistani	81.0
Christensen et al. 6	2005	Dane	87.0
Elagili et al. 14	2007	Malaysian	50.0
Ozseker et al. 19	2008	Turkish	91.0
Chandika et al. 13	2012	Indian	93.1
Naeem et al. 5	2012	Pakistani	100.0
Singh et al. 8	2012	Indian	78.0
Shaikh et al. 9	2014	Pakistani	25.0
Afridi et al. 10	2014	Pakistani	56.4
Dahiphale et al. 12	2016	Indian	33.3
Kang and Kim 2	2016	South Korean	88.0
Ghoneim et al. 20	2020	Egyptian	76.0
Rigourd et al. 7	2021	French	64.3
Bhatti et al. 21	2021	Pakistani	47.4
Saeed et al. 22	2021	Pakistani	80.0
Noaman et al. 23	2021	Indian	86.0
Durrani et al. 24	2021	Pakistani	55.0
Present study		Pakistani	82.2

The outcomes of the current study are comparable to the previous researches and prove that a single time ultrasound-guided needle aspiration of breast abscess is an effective substitute to conventional incision and drainage regardless of the age of patient, lactational status, size of abscess and volume of pus aspirated which advocate its regular utilization in daily practice. A strong limitation of this study was that the frequency of recurrence and efficacy in multiloculated cysts was not considered which is also very important and should be taken into account before choosing it in regular practice. Such a study is highly recommended for future research.

## CONCLUSION

A single time ultrasound guided needle aspiration of breast abscess resulted in abscess resolution in 82.2% patients regardless of age of patients, lactation status, size of abscess and volume of pus aspirated which advocate its regular utilization in daily practice).

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