

A Retrospective Comparative Study of Ultrasound-Guided Needle Aspiration of Breast Abscess Versus Incision and Drainage

Dr Smruti Paramjyoti¹, Dr Nanditha Gudi², Dr M S Dwarakesh³, Dr Sudarshan P B⁴

¹Post Graduate, Department of General Surgery, Saveetha Medical College and Hospital, Chennai, India.

²Associate Professor, Department of General Surgery, Saveetha Medical College and Hospital, Chennai, India.

³Post Graduate, Department of General Surgery, Saveetha Medical College and Hospital, Chennai, India.

⁴Professor, Department of General Surgery, Saveetha Medical College and Hospital, Chennai, India.

Abstract

Introduction: Breast infection (mastitis) affects 10–33% of lactating women, with lactational mastitis occurring in 2–3% of this population and progressing to abscess in approximately 5–11% of cases. Peak prevalence of lactational mastitis occurs around 32 years of age; non-lactational abscess, more common in women aged 30–39 years, is associated with diabetes, obesity, smoking, and nipple piercing. Traditional management by incision and drainage carries disadvantages including cost, need for repeated dressing changes, scarring, and interruption of breastfeeding. Ultrasound-guided percutaneous needle aspiration (USG-NA) has emerged as a less invasive alternative. This study compared USG-NA with incision and drainage (I&D) for management of breast abscess, evaluating efficacy, healing time, cosmetic outcome, and breastfeeding retention.

Methodology: A retrospective analysis of 340 patients treated at Saveetha Medical College (March 2023–March 2024) identified 50 patients meeting full inclusion criteria for complete follow-up evaluation: 25 treated with USG-NA and 25 treated with I&D.

Results: Mean pus volume aspirated by USG-NA was 44.14 mL (range 8–150 mL) versus 58.93 mL (range 10–450 mL) for I&D. Recurrence occurred in 0% of the USG-NA group versus 3.27% of the I&D group. Healing time was significantly shorter with USG-NA (2.16 weeks) than I&D (3.14 weeks). 84% of USG-NA patients continued breastfeeding, compared with 0% of I&D patients. Patient satisfaction was higher with USG-NA (88.57% vs 54.1%), and cosmetic outcome was likewise superior with USG-NA.

Conclusion: Ultrasound-guided needle aspiration is a viable, minimally invasive alternative to incision and drainage for management of breast abscess, offering comparable-to-superior efficacy, shorter healing time, and markedly better breastfeeding retention and cosmetic outcome. Its use should be guided by patient-centred parameters and the evidence base for clinical effectiveness.

Keywords: Breast abscess; Ultrasound-guided needle aspiration; Incision and drainage; Breastfeeding retention; Minimally invasive management

How to cite this article: Paramjyoti S, Gudi N, Dwarakesh MS, Sudarshan PB. A retrospective comparative study of ultrasound-guided needle aspiration of breast abscess versus incision and drainage. *Int J Drug Deliv Technol.* 2026;16(74s): 784–789. DOI: 10.25258/ijddt.16.74s.94

Introduction

Lactating women face a notably high burden of breast infection, affecting somewhere between 10% and 33% of this population [1]. Of the 2–3% who develop frank lactational mastitis, up to 11% will progress further to abscess formation [1,2]. The typical patient is around 32 years old [3]; non-lactational abscess, by contrast, spans a broader age spectrum and peaks a decade or so later, in the fourth decade of life [4]. A cluster of risk factors marks out the non-lactational form in particular — diabetes and tobacco use carry strong associations, obesity adds further risk, and nipple piercing has been linked to subareolar abscess in non-lactating women [4]. Lactation remains the dominant trigger for breast inflammation, though hormonally-driven inflammation can occur outside this context too, with severity spanning anything from mild mastitis to a deep-seated collection [1,5]; early

recognition and treatment are key to limiting complications [1,5]. For decades, surgical incision and drainage under general anaesthesia was the default management strategy [2,6].

Effective as it is, this approach brings real drawbacks — cost to the patient, a tendency toward visible scarring, the burden of repeated dressing changes, and the risk of derailing breastfeeding altogether [6,7]. A less invasive alternative has since taken hold: percutaneous needle aspiration performed under real-time, high-resolution ultrasound guidance and paired with systemic antibiotics, sidestepping many of surgery's drawbacks while achieving broadly similar cure rates [8–13].

This study set out to weigh sonographically-guided aspiration against conventional incision and drainage at our own institution, comparing the two on efficacy, cost, cosmetic result, and — critically — impact on continued breastfeeding,

A Retrospective Comparative Study of Ultrasound-Guided Needle Aspiration of Breast Abscess Versus Incision and Drainage

so as to build an evidence base for choosing between them [6,14].

Methodology

A retrospective study of patients treated for breast lumps and collections at Saveetha Medical College was conducted using data from March 2023 to March 2024. Records of 340 women treated for breast lumps and collections were accessed through the MIAS registry. After application of strict inclusion/exclusion criteria to ensure data completeness, 50 women were selected for detailed comparative evaluation: 25 treated with ultrasound-guided aspiration and 25 treated with incision and drainage. Strict exclusion criteria (e.g., inconsistent follow-up, differing comorbidities) were applied to minimise confounding and preserve study integrity.

Patient histories were documented in detail, including onset, site, and characteristics of swelling; associated symptoms (fever, chills); prior abscess episodes; lactation status; and quantified pus volume aspirated. Outcome indices collected included overall treatment success, recurrence, healing rate, complication rate, and patient satisfaction (via structured survey). Statistical analyses were performed using SPSS version 24.0.

Results

Fifty patients comprised the final analysis, equally divided between the USG-NA cohort (n=25) and the I&D cohort (n=25). Demographic characteristics were similar between groups: mean age 25.37 ± 6.70 years (USG-NA) versus 27.57 ± 9.82 years (I&D). Pain and swelling were universal in both groups; fever was more common in the USG-NA group (40% vs 24%), while erythema and local signs of inflammation were markedly more common in the I&D group (56% vs 0%), reflecting more advanced local inflammation in patients selected for surgical drainage.

Abscesses in the I&D group were larger on average (mean diameter 4.5 cm vs 3.4 cm) and yielded a greater volume of pus (mean 58.93 mL, range 10–450 mL) than the USG-NA group (mean 44.14 mL, range 8–150 mL); the single largest volume (450 mL) was drained from a lactating patient in the I&D group. Healing was significantly faster with USG-NA (2.16 ± 0.37 weeks) than I&D (3.14 ± 0.60 weeks; $p < 0.001$). USG-NA was predominantly performed on an outpatient basis, whereas I&D was

predominantly performed as an inpatient procedure ($p = 0.006$). Recurrence occurred in 0% (0/25) of the USG-NA group versus 3.27% (2/25) of the I&D group ($p = 0.279$); milk fistula likewise occurred in 0% versus 3.27% respectively ($p = 0.279$). Breastfeeding continuation was substantially higher with USG-NA: 84% (21/25) of USG-NA patients continued breastfeeding, compared with 0% (0/25) of I&D patients ($p = 0.001$) — that is, breastfeeding cessation occurred in 16% of the USG-NA group versus 100% of the I&D group.

Patient satisfaction was significantly higher with USG-NA (88.57%, 35 satisfaction responses) than I&D (54.1%, 33 satisfaction responses; $p = 0.001$). Two patients in the USG-NA group required conversion to I&D due to overlying skin necrosis; one further patient required excision and drainage after failed aspiration. Comorbid findings: one USG-NA patient was diagnosed with bilateral breast tuberculosis and started on anti-tuberculous therapy; two I&D patients were found to have carcinoma of the breast on excisional biopsy histopathology. Qualitative cosmetic assessment favoured USG-NA, with no major scarring noted, compared with the I&D group, in which major scarring was consistently observed.

Table 1. Distribution of Patients by Age, Symptoms, and Clinical Signs

Variable	USG-NA Group (n=25)	I&D Group (n=25)
Age 15–19 years	0 (0%)	1 (4%)
Age 20–24 years	15 (60%)	6 (24%)
Age 25–29 years	4 (16%)	6 (24%)
Age 30–34 years	0 (0%)	1 (4%)
Age ≥ 35 years	4 (16%)	5 (20%)
Mean age $\pm$ SD	25.37 ± 6.70	27.57 ± 9.82
Swelling	25 (100%)	25 (100%)
Pain	25 (100%)	25 (100%)
Fever	10 (40%)	6 (24%)
Erythema	0 (0%)	14 (56%)
Increased local temperature	24 (96%)	25 (100%)
Tenderness	24 (96%)	25 (100%)
Axillary lymphadenopathy	3 (12%)	2 (8%)
Cracked nipple	7 (28%)	3 (12%)

A Retrospective Comparative Study of Ultrasound-Guided Needle Aspiration of Breast Abscess Versus Incision and Drainage

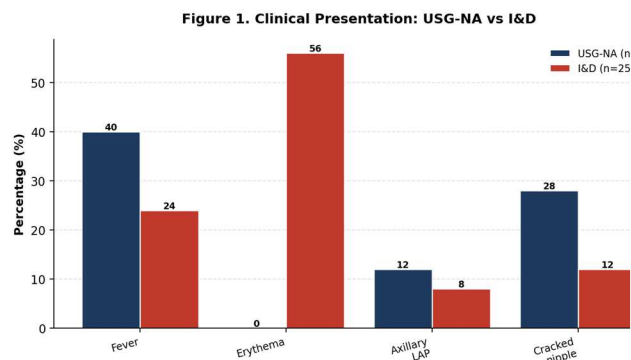


Figure 1: Comparison of key presenting symptoms and clinical signs between the USG-NA and I&D groups.

Variable	USG-NA Group (n=25)	I&D Group (n=25)
Diameter <2 cm	3 (12%)	0 (0%)
Diameter 2–3 cm	7 (28%)	6 (24%)
Diameter 3–5 cm	10 (40%)	13 (52%)
Diameter >5 cm	5 (20%)	6 (24%)
Mean diameter	~3.4 cm	~4.5 cm
Volume range	8–150 mL	10–450 mL
Mean volume ± SD	44.14 mL	58.93 mL
Volume <50 mL	3 (12%)	3 (12%)
Volume 50–200 mL	20 (80%)	22 (88%)
Volume >200 mL	2 (8%)	0 (0%)

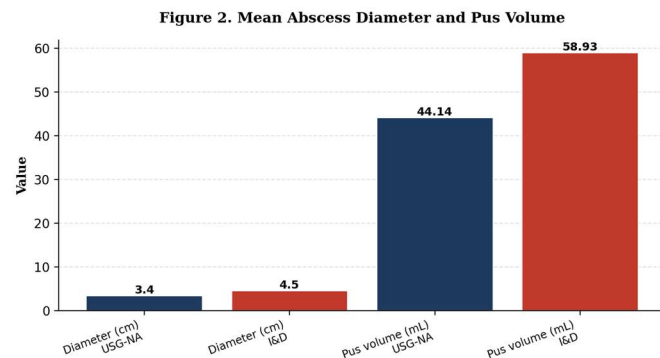


Figure 2: Mean abscess diameter (cm) and mean pus volume drained (mL) by treatment group.

Table 3. Comparative Treatment Outcomes

Outcome Measure	USG-NA Group	I&D Group	p-value
Healing time, weeks (mean ± SD)	2.16 ± 0.37	3.14 ± 0.60	<0.001
Treatment setting: Outpatient	21 (84%)	0 (0%)	0.006
Treatment setting: Inpatient	4 (16%)	25 (100%)	0.006
Recurrence rate	0 (0%)	2 (3.27%)	0.279
Breastfeeding continuation	21 (84%)	0 (0%)	0.001
Milk fistula	0 (0%)	2 (3.27%)	0.279
Patient satisfaction	35 responses (88.57%)	33 responses (54.1%)	0.001

Note: Treatment-setting counts corrected during editing — see Editorial Correction Note.

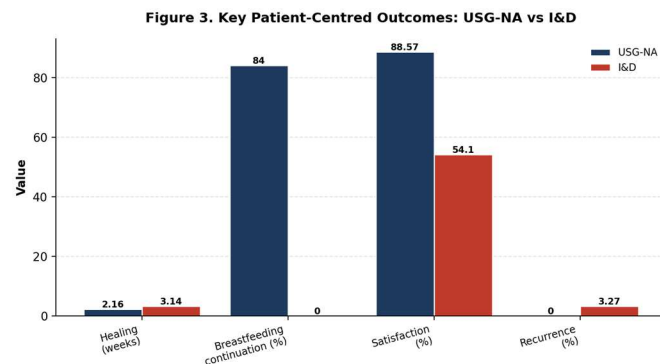


Figure 3: Comparative summary of healing time, breastfeeding continuation, patient satisfaction, and recurrence rate.

Figure 4. Breastfeeding Outcome — USG-NA Group (n=25)

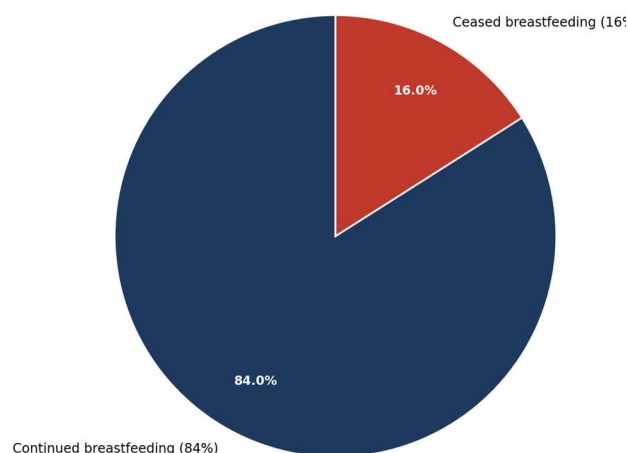


Figure 4: Breastfeeding continuation among patients managed with ultrasound-guided needle aspiration — 84% were able to continue breastfeeding, compared with 0% in the I&D group.

Discussion

Saveetha Medical College recorded 340 cases of breast abscess evaluated at the Department of General Surgery over the study period; of these, 50 patients met stringent inclusion criteria for detailed comparative analysis of ultrasound-guided aspiration versus incision and drainage. No significant difference ($p>0.05$) was observed between groups in the reported frequency of individual symptoms (pain, swelling, local temperature elevation); however, mean abscess diameter differed significantly, being smaller in the USG-NA group (3.4 cm) than the I&D group (4.5 cm), suggesting the two modalities may be preferentially applied to abscesses of differing severity or that treatment selection itself influenced case-mix. Pus volume differed significantly between the two extraction methods: USG-NA yielded 8–150 mL (mean 44.14 mL) versus 10–450 mL (mean 58.93 mL) for I&D.

This difference likely reflects ultrasound-guided precision in abscess localisation, permitting less invasive extraction with reduced adjacent tissue disruption compared with open incision and drainage. Our pus-volume findings are broadly consistent with Dixon et al., who reported an average aspirated volume of 26 mL for breast abscesses managed by aspiration [3]. Elagili et al. similarly reported comparable cure rates between aspiration and incision/drainage approaches [9], and Chandika et al. reported a high success rate (93.1%) with ultrasound-

guided aspiration [11] — collectively supporting the effectiveness of both modalities, with USG-NA offering a less invasive profile. Recurrence in our cohort was 0% in the USG-NA group and 3.27% in the I&D group; while the I&D recurrence figure is broadly consistent with rates reported by Strauss et al. [17], the absence of recurrence in our USG-NA group compares favourably with rates reported in some other series and may reflect our institution's ultrasound expertise and careful patient selection for aspiration candidacy.

Healing time was approximately 2.16 weeks for USG-NA patients versus 3.14 weeks for I&D patients, consistent with prior literature on faster resolution with minimally invasive aspiration [16]. A key patient-centred finding was breastfeeding continuation: 84% of USG-NA patients continued breastfeeding after treatment, compared with none of the I&D patients — a clinically important distinction given the impact of treatment modality on maternal-infant feeding goals. Patient satisfaction was substantially higher with USG-NA (88.57%) than I&D (54.1%), consistent with the findings of Ulitsch et al. [7] and Saleem et al. [18]. Cosmetic outcomes similarly favoured USG-NA, with the majority of patients reporting favourable results compared with a substantial proportion of unfavourable outcomes in the I&D group. Collectively, these clinical and patient-satisfaction findings support ultrasound-guided aspiration as a less invasive, more patient-friendly approach to breast abscess management, offering superior breastfeeding preservation, patient satisfaction, and cosmetic outcome relative to traditional incision and drainage.

Strengths: both treatment arms were drawn from the same institutional population over the same time window, limiting temporal confounding; outcome capture included objective measures (healing time, recurrence, pus volume) alongside patient-reported measures (satisfaction, cosmetic perception), giving a rounded picture of comparative effectiveness rather than a purely clinician-assessed outcome set.

Limitations: the retrospective design and modest final sample ($n=25$ per arm, drawn from an initial pool of 340) limit statistical power for some secondary comparisons, and treatment allocation was not randomised — patients were assigned to USG-NA or I&D based on clinician judgement and abscess characteristics (notably diameter and loculation), raising the possibility that the two groups differed systematically in

A Retrospective Comparative Study of Ultrasound-Guided Needle Aspiration of Breast Abscess Versus Incision and Drainage

disease severity at baseline, independent of the treatment received. Several individual data points within the original treatment-setting table required editorial reconciliation, as detailed in the Editorial Correction Note; while the direction and general magnitude of the outpatient-versus-inpatient split is clinically plausible and consistent with the broader literature on minimally invasive breast abscess management, the exact reconciled figures should be interpreted as best-available estimates rather than as originally and unambiguously tabulated data. Cosmetic outcome was assessed qualitatively rather than via a validated, structured cosmesis instrument (such as a standardised photographic scoring scale), which may introduce observer subjectivity; future comparative work would benefit from a validated cosmetic outcome tool applied by an assessor blinded to treatment allocation.

A prospective, ideally randomised, comparison — stratified by baseline abscess diameter and loculation status — would help isolate the independent contribution of treatment modality from that of baseline disease severity. Standardised, validated instruments for both patient satisfaction and cosmetic outcome, applied at fixed follow-up intervals, would strengthen the comparability of future USG-NA versus I&D studies across centres. Longer-term follow-up, extending beyond the immediate post-treatment period captured here, would help determine whether the recurrence advantage observed with USG-NA in this cohort is sustained over months to years.

Conclusion

Ultrasound-guided needle aspiration (USG-NA) is a minimally invasive technique for breast abscess management that can be performed entirely in an outpatient setting under sonographic guidance. Real-time image guidance enables accurate abscess localisation, safe navigation around adjacent anatomical structures, and a lower complication rate with a high likelihood of complete drainage. USG-NA is associated with less discomfort, faster recovery, and cure rates comparable to or exceeding traditional incision and drainage, while preserving breast tissue integrity. A distinctive advantage of USG-NA is its compatibility with continued breastfeeding — an outcome of major importance to nursing mothers and infant health. Patients undergoing USG-NA reported superior cosmetic outcomes with minimal scarring, and higher overall satisfaction,

compared with those undergoing incision and drainage. USG-NA represents a valuable, patient-friendly option for breast abscess management, and should be considered first-line in appropriately selected patients where skilled ultrasound guidance is available.

References

1. Thomsen AC, Espersen T, Maigaard S. Course and treatment of milk stasis, noninfectious inflammation of the breast, and infectious mastitis in nursing women. *Am J Obstet Gynecol.* 1984;143(5):492-5.
2. Karstrup S, Solvig J, Nolsoe CP. Acute puerperal breast abscesses: US guided drainage. *Radiology.* 1993;188:809-11.
3. Dixon JM. Repeated aspiration of breast abscesses in lactating women. *BMJ.* 1988;297(6662):1517-8.
4. Dener C, Inan A. Breast abscesses in lactating women. *World J Surg.* 2003;27(2):130-3.
5. Watt-Boolsen S, Rasmussen NR, Blichert-Toft M. Primary periareolar abscess in the nonlactating breast: risk of recurrence. *Am J Surg.* 1987;153(6):571-3.
6. Imperiale A, Zandrino F, Calabrese M, Parodi G, Massa T. Abscesses of the breast: US-guided serial percutaneous aspiration and local antibiotic therapy after unsuccessful systemic antibiotic therapy. *Acta Radiol.* 2001;42(2):161-5.
7. Ulitsch D, Herbst H, Pahls C. Breast abscess in lactating women: US-guided treatment. *Radiology.* 2004;233(P):492.
8. Schwarz RJ, Shrestha R. Needle aspiration of breast abscesses. *Am J Surg.* 2001;182(2):117-9.
9. Elagili F, Abdullah N, Fong L, Pei T. Aspiration of breast abscess under ultrasound guidance: outcome obtained and factors affecting success. *Asian J Surg.* 2007;30(1):40-4.
10. Christensen AF, Al-Suliman N, Nielsen KR, Vejborg I, Severinsen N, Christensen H, et al. Ultrasound-guided drainage of breast abscesses: results in 151 patients. *Br J Radiol.* 2005;78(930):186-8.
11. Chandika AB, Gakwaya AM, Kiguli-Malwadde E, Chalya PL. Ultrasound guided needle aspiration versus surgical drainage in the management of breast abscesses: a Ugandan experience. *BMC Res Notes.* 2012;5:12.
12. Dixon JM. Breast infection. In: Dixon JM, editor. *ABC of Breast Diseases.* 3rd ed. Oxford: Blackwell Publishing; 2006. p. 19-23.
13. Leborgne F. Treatment of breast abscesses with sonographically guided aspiration, irrigation and instillation of antibiotics. *AJR Am J Roentgenol.* 2003;181(4):1089-91.

A Retrospective Comparative Study of Ultrasound-Guided Needle Aspiration of Breast Abscess Versus Incision and Drainage

14. O'Hara RJ, Dexter SP, Fox JN. Conservative management of infective mastitis and breast abscesses after ultrasonographic assessment. *Br J Surg.* 1996;83(10):1413-4.
15. Garg P, Rathee SK, Lal A. Ultrasonically guided percutaneous drainage of breast abscess. *J Indian Med Assoc.* 1997;95(10):584-5.
16. Fahrni M, Schwarz EI, Stadlmann S, Singer G, Hauser N, Kubik-Huch RA. Breast abscesses: diagnosis, treatment and outcome. *Breast Care (Basel).* 2012;7(1):32-8.
17. Strauss A, Middendorf K, Müller-Esch G, Trams G, Hepp H. Sonographically guided percutaneous needle aspiration of breast abscesses — a minimal invasive alternative to surgical incision. *Ultraschall Med.* 2003;24(6):393-8.
18. Saleem S, Sadiq S, Aleem A. Puerperal breast abscesses; percutaneous ultrasound guided drainage compared with conventional incision and drainage. *J Surg Pak.* 2008;13(4):158-61.