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Original Research Paper

General Surgery

# USG GUIDED ASPIRATION OF BREAST ABSCESS TURNING OUT INTO INCISION AND DRAINAGE

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**ABSTRACT** Breast abscesses, particularly in lactating women, remain a significant clinical concern due to their morbidity and potential to interfere with breastfeeding. While incision and drainage (I&D) have traditionally been the standard of care, ultrasound-guided (USG) needle aspiration is increasingly recognized as a minimally invasive alternative. This study investigates the effectiveness of USG-guided aspiration and the circumstances under which conversion to I&D becomes necessary.

**KEYWORDS :** Breast abscesses, needle aspiration, Incision and drainage, Ultratrasound-guided

## INTRODUCTION

One of the most prevalent abscess in surgical practices is breast abscess. Though more common in lactating women but do occur in nonlactating women as well. The incidence of breast abscesses ranges from 0.4 to 11 percent of developing nations because of poor maternal cleanliness, inadequate nutrition, disregard for breastfeeding mothers, and delayed treatment.1-2 The prevalence of mastitis globally was reported as 1–10% with the highest incidence in the first few weeks postpartum, while LBA occurs in 3–11% of those with mastitis with a reported incidence of 0.1–3% in breastfeeding women. NLBA is a rare clinical entity accounting for less than 5% of breast abscess cases. The underlying predisposing condition: periductal mastitis is said to be responsible for 1–2% of all symptomatic breast conditions.3-4

The likelihood of occurrence is greatly influenced by pregnancy and is primarily brought on by a child's nipple piercing during feeding and bacterial colonisation as a result of incorrect nursing technique and insufficient breast emptying. 7,8 The major risk factors reported for lactational breast abscess LBA are milk stasis and infection and it is likely that bacteria (often originating from the mouth of the infant) gain entry via cracks or fissures in the nipple surface.

Non-lactational breast abscess (NLBA) is categorized according to the location into central (sub-areolar) and peripheral. Central or sub-areolar non- lactational breast abscess has a known association with squamous metaplasia of the lactiferous duct epithelium, duct obstruction, duct ectasia, and periductal mastitis .Smoking and diabetes mellitus are significant risk factors for periductal mastitis and non-lactational abscesses.3-5 On the other hand, peripheral nonpuerperal breast abscesses are less common and are often associated with an underlying condition such as diabetes, rheumatoid arthritis, steroid treatment, or trauma.

Breast abscess can lead to discomfort, high fever, breast fistula, sepsis, septic shock, breast damage, disease persistence and frequent hospitalization. Breast abscesses may also lead the mother to discontinue breastfeeding, thereby harming the infant's health.12

The predominant pathogenic bacteria are Staphylococcus aureus, Staphylococcus epidermidis and Streptococcus.

Primipara, gestational age >40 weeks, and a history of mastitis are risk factors for lactational breast abscess. Additional non-puerperal breast abscesses, such as tubercular breast abscess, granulomatous mastitis, and fungal mastitis, are also conceivable. If breastfeeding is to be maintained and complications avoided, quick diagnosis and treatment are necessary.5

Traditionally managed with incision and drainage (I&D), recent advancements in imaging techniques have enabled ultrasound-guided (USG) aspiration to emerge as a minimally invasive alternative. This approach, which involves percutaneous needle aspiration under real-time ultrasound guidance, offers the potential for reduced morbidity, quicker recovery, and better cosmetic outcomes compared to conventional surgical drainage. However, in certain cases, despite initial USG-guided aspiration, the abscess may persist or progress, necessitating conversion to incision and drainage for definitive management.6

The rationale for exploring this transition from USG-guided aspiration to surgical intervention lies in understanding the limitations of percutaneous drainage and identifying predictive factors for treatment failure. Studies suggest that while small, uniloculated abscesses often resolve with aspiration and antibiotic therapy alone, larger, multiloculated, or thick-walled abscesses may require surgical intervention. Furthermore, patient-related factors such as immune status, comorbid conditions (e.g., diabetes mellitus), and the presence of resistant bacterial strains can influence treatment outcomes. Given these complexities, it is crucial to analyze the effectiveness, safety, and indications for both techniques to guide clinical decision-making and optimize patient care.7

The use of ultrasound in the diagnosis and management of breast abscesses has revolutionized the approach to treatment. It not only aids in accurate localization of the abscess cavity but also allows for real-time visualization of needle placement during aspiration.8-9 Despite its

advantages, the success of USG-guided aspiration depends on various factors, including the nature of the abscess, the experience of the operator, and the patient's response to initial treatment. Cases that fail to resolve with aspiration often present with persistent symptoms, worsening inflammation, or reaccumulation of pus, necessitating a shift to incision and drainage. This transition raises important clinical questions about the optimal treatment strategy, patient selection criteria, and factors contributing to treatment failure.

This thesis aims to systematically analyze the outcomes of USG-guided aspiration and evaluate the circumstances under which conversion to incision and drainage becomes necessary.

Understanding the nuances of breast abscess management is essential for improving treatment protocols and ensuring patient satisfaction. As minimally invasive procedures gain prominence in surgical practice, it is imperative to establish clear guidelines for when conservative measures should be abandoned in favour of surgical intervention. By shedding light on the transition from USG-guided aspiration to incision and drainage, this research aims to enhance the overall effectiveness of breast abscess management and improve patient outcomes.

### Aims And Objectives

The study is aimed to compare the outcome of effectiveness of traditional treatment I&D against needle aspiration in treatment of breast abscess in terms of:

1) Healing time
2) Residual abscess after 3 aspiration referred as failure of needle aspiration
3) Incision and drainage implementation in failed cases
4) Postoperative pain
5) Cosmetic scar
6) Recurrence { Pt to be followed up for 2 weeks starting from time of first aspiration)

### Methodology

### MATERIAL AND METHODS

**Place Of Study:** Maharishi Markandeshwar institute of medical Sciences and Research (MMIMSR), Mullana, Ambala

**Type Of Study:** Prospective observational study

**Sample Size-** Total 50 patients were recruited for the study who presented with Breast abscess

**Study Duration-** 1 year from date of ethical committee approval.

**Study Subjects:** Patients coming to General Surgery Outpatient Department, MMIMSR, Mullana with pain and swelling over the breast within a defined study period.

### Selection Criteria Of Study Subjects Inclusion Criteria

- Female patients of age between 18-65 years
- Diagnosed breast abscess with abscess size of less than 10 cm in diameter on ultrasonography.
- Liquefied abscess

### Exclusion Criteria

- Female patients of age <18 or >65 years
- Immunocompromised status
- Recurrent breast abscess
- Ruptured, tubercular and complicated breast abscess presenting with skin changes, ulceration, necrosis, and gangrenous abscess.
- Diagnosed breast abscess with abscess size of more than 10 cm in diameter on ultrasonography.

### Material:

The subjects were examined,

**Clinical History Was Recorded:** Demograpghy (Age) History(Lactating ,gravida) Presentation as pain, swelling, redness of skin, duration of symptoms Parity of patient, Clinical examination : Side of breast ,quadrants of breast, size of lump, tenderness on palpations associated cutaneous changes findings were recorded with the help of standard, semi-structured, pre-validated case record proforma (Annexure). Ultrasonography to determine size, volume and the echogenicity of the abscess

### RESULT

This prospective observational study was conducted on 50 female patients aged 18–65 years presenting with liquefied breast abscesses (<10 cm) at MMIMSR, Mullana. All patients initially underwent ultrasound-guided needle aspiration. Those with residual or recurrent abscesses after three aspirations underwent incision and drainage (I&D). The patients were followed up for two weeks post-procedure.

### Treatment Outcomes

- Successful aspiration was achieved in 34 patients (68%).
- Conversion to I&D was required in 16 patients (32%) due to:
- Residual abscess after three aspirations
- Recurrence on follow-up ultrasound

**Table 1: Age**

| Age | <=20 | 7 | 14.0% |
|---|---|---|---|
| % of patients | 21-30 | 16 | 32.0% |
| | 31-40 | 10 | 20.0% |
| | 41-50 | 15 | 30.0% |
| | >50 | 2 | 4.0% |
| | Total | 50 | 100.0% |
| | Mean | 33.80 | |
| | Standard Deviation | 11.44 | |
| | Minimum | 16.00 | |
| | Maximum | 59.00 | |

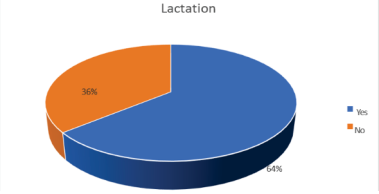
In this study, patient ages ranged from 16 to 59 years, with a mean age of 33.8 ± 11.44 years. The most affected age group was 21–30 years (32%), followed by 41–50 years (30%), reflecting the reproductive and lactational age bracket where breast abscesses are more commonly observed.

Interestingly, among the patients requiring incision and drainage (I&D), the highest proportion also fell within the 21–30-year group (50%), while patients who were successfully managed with USG-guided aspiration were more commonly in the 41–50-year group (32.4%). However, the association between age and the need for I&D was not statistically significant (p = 0.377).

**Table 2: Lactation**

| | | Frequency | Percent |
|---|---|---|---|
| Lactation | Yes | 32 | 64.0% |
| | No | 18 | 36.0% |
| | Total | 50 | 100.0% |

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| Lactation | Yes | 12 | 75.0% | 20 | 58.8% | 1.236 | .266 |
| | No | 4 | 25.0% | 14 | 41.2% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |



**Graph 1:** Lactation

In the present study, 64% (n = 32) of the patients with breast abscesses were lactating, while 36% (n = 18) were non-lactating. This aligns with the well- established observation that lactational breast abscesses are more prevalent, particularly in the early postpartum period due to factors such as milk stasis, improper latching, and nipple trauma.

When assessing the treatment modality, 75% (n = 12) of the patients who required incision and drainage (I&D) were lactating, whereas 58.8% (n = 20) of those successfully treated with USG-guided aspiration were also lactating. Despite this difference, the association between lactation status and the need for I&D was not statistically significant (p = 0.266).

This suggests that while lactation remains a key risk factor in the development of breast abscesses, it may not be a decisive factor in predicting treatment outcomes. Other clinical variables—such as abscess volume, bacterial resistance, and patient compliance—likely play a more substantial role in determining whether minimally invasive treatment will succeed or fail.

**Table 3: Parity**

| | | Frequency | Percent |
|---|---|---|---|
| Parity | Primigravida | 23 | 46.0% |
| | Multigravida | 27 | 54.0% |
| | Total | 50 | 100.0% |

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| Parity | Primigravida | 10 | 62.5% | 13 | 38.2% | 2.579 | .108 |
| | Multigravida | 6 | 37.5% | 21 | 61.8% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |

In this study, 54% of patients were multigravida, while 46% were primigravida, indicating a relatively even distribution of parity among women presenting with breast abscesses.

When analyzed in relation to treatment outcomes, it was found that 62.5% of patients requiring incision and drainage (I&D) were primigravida, compared to only 38.2% in the aspiration group. Conversely, 61.8% of the patients successfully treated with USG-guided aspiration were multigravida. Despite this trend, the association between parity and the need for I&D was not statistically significant (p = 0.108).

These findings suggest that primigravida women may be more prone to complicated or persistent abscesses requiring surgical intervention. This could be attributed to lack of breastfeeding experience, inadequate nipple care, or delayed presentation, which are more common in first-time mothers. However, given the lack of statistical significance, further research with a larger sample size may be needed to conclusively determine parity's role in treatment outcomes.

**Table 4: Quadrants**

| | | Frequency | Percent |
|---|---|---|---|
| Quadrant involved | Lower inner | 9 | 18.0% |
| | Lower outer | 8 | 16.0% |
| | Subareolar | 4 | 8.0% |
| | Upper inner | 14 | 28.0% |
| | Upper outer | 15 | 30.0% |
| | Total | 50 | 100.0% |

In this study, the distribution of breast abscesses by quadrant revealed that the upper outer quadrant was the most commonly affected site, accounting for 30% of all cases, followed by the upper inner quadrant (28%), and lower inner quadrant (18%). The subareolar region was the least commonly involved, with only 4 cases (8%).

**Among Patients Who Required Incision And Drainage (I&D):**

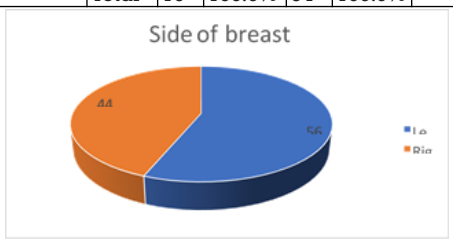
- 43.8% had abscesses in the upper outer quadrant
- 18.8% each had involvement of the lower inner, lower outer, and upper inner quadrants
- Notably, no I&D cases involved the subareolar regionIn contrast, patients managed successfully with aspiration showed a more even distribution across quadrants, with a slightly higher incidence in the upper inner quadrant (32.4%) and upper outer quadrant (23.5%).

Despite these anatomical trends, statistical analysis showed that quadrant involvement was not significantly associated with the need for I&D (p = 0.379).

This pattern aligns with anatomical and physiological expectations, as the upper outer quadrant contains the greatest volume of glandular tissue, making it more prone to infections and abscess formation. However, since quadrant location did not correlate with treatment outcome, it may serve more as a descriptive feature rather than a prognostic factor.

**Table 5: Side Of Breast**

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| Side of breast involved | Left | 8 | 50.0% | 20 | 58.8% | .344 | .558 |
| | Right | 8 | 50.0% | 14 | 41.2% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |




**Graph 2:** Side of breast

In this study, breast abscesses were almost equally distributed between the two sides, with 56% (n = 28) involving the left breast and 44% (n = 22) the right breast. Among patients who underwent incision and drainage (I&D), 50% had left-sided abscesses, while 50% had right-sided involvement. In contrast, 58.8% of those successfully treated with aspiration had abscesses on the left side, and 41.2% on the right.

Statistical analysis revealed that the side of breast involvement had no significant association with the type of treatment required (p = 0.558).

These findings indicate that laterality (right vs. left breast) does not influence the severity or management outcome of breast abscesses. The nearly equal distribution also aligns with prior studies, suggesting no anatomical predisposition toward abscess formation on either side.

Thus, while important to document during clinical evaluation, the side of breast involved is not a predictive factor for treatment modality or prognosis in breast abscess management.

**Table 6: Changes In Nipple**

| | | Frequency | Percent |
|---|---|---|---|
| Changes in nipple (+ or -) | Cracks Present | 10 | 20.0% |
| | Retraction of niiple | 14 | 28.0% |
| | No | 26 | 52.0% |
| | Total | 50 | 100.0% |

Among the 50 patients included in this study, nipple-related changes were noted in nearly half the cases. Specifically, 20% of patients presented with cracks, 28% with nipple retraction,

and 52% had no observable changes.

When stratified by treatment outcome, 18.8% of patients in the I&D group had nipple cracks, 25% had retraction, and 56.3% had no changes. Similarly, in the aspiration group, 20.6% had cracks, 29.4% had retraction, and 50% had no nipple changes. The statistical analysis revealed no significant association between nipple condition and treatment outcome (p = 0.916).

These findings suggest that although nipple trauma (especially cracks) is a known predisposing factor for lactational breast infections, it does not appear to significantly influence the success or failure of USG-guided aspiration versus incision and drainage. It is likely that other factors—such as the volume and complexity of the abscess or patient immune status—play a more critical role in determining the appropriate intervention.

**Table 7: Duration Of Symptoms**

| | | Frequency | Percent |
|---|---|---|---|
| Duration of symptoms (days) | 4-5 days | 23 | 46.0% |
| | >5 days | 27 | 54.0% |
| | Total | 50 | 100.0% |
| | Mean | 5.90 | |
| | Standard Deviation | 1.28 | |
| | Minimum | 4.00 | |
| | Maximum | 10.00 | |

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| Duration of symptoms (days) | 4-5 days | 10 | 62.5% | 13 | 38.2% | 2.579 | .108 |
| | >5 days | 6 | 37.5% | 21 | 61.8% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |

In the present study, the duration of symptoms prior to presentation ranged from 4 to 10 days, with a mean duration of 5.90 ± 1.28 days. The majority of patients (54%) presented after more than 5 days, while 46% sought medical attention within 4–5 days of symptom onset.

When analyzing the relationship between symptom duration and treatment outcome, it was observed that a greater proportion of patients requiring incision and drainage (I&D) had presented within 4–5 days (62.5%) compared to those who were successfully treated with aspiration (38.2%). Despite this trend, the association was not statistically significant (p = 0.108), suggesting that symptom duration alone may not be a strong independent predictor of aspiration failure or the need for surgical intervention.

This finding underscores the multifactorial nature of breast abscess progression, where other factors—such as abscess volume, loculation, bacterial resistance, and patient comorbidities—may play a more critical role in determining treatment response.

**Table 8: Pus Culture And Drugs Sensitivity.**

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| PUS Culture | Cornybaterium growth | 1 | 6.3% | 0 | 0.0% | 10.126 | 0.256 |
| | Staph aureus growth | 6 | 37.5% | 19 | 55.9% | | |
| | Staph epidermitis growth | 1 | 6.3% | 3 | 8.8% | | |
| | Streptococci growth | 2 | 12.5% | 3 | 8.8% | | |
| | Multi bacteria and fungal growth | 3 | 18.8% | 1 | 2.9% | | |
| | Staph aureus and cornybaterium growth | 2 | 12.5% | 1 | 2.9% | | |
| | Staph aureus, staph epidermitis growth | 0 | 0.0% | 3 | 8.8% | | |
| | Staph aureus, staph epidermitis, cornybacterium growth | 0 | 0.0% | 1 | 2.9% | | |
| | No growth | 1 | 6.3% | 3 | 8.8% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |

| | | I&D implemented | | | | Chi-Square | p-value |
|---|---|---|---|---|---|---|---|
| | | Yes | | No | | | |
| | | N | % | N | % | | |
| PUS Sensitivity | Resisitant to ceftriaxone | 1 | 6.3% | 0 | 0.0% | 18.090 | .003** |
| | Resistant to amoxycillin | 3 | 18.8% | 2 | 5.9% | | |
| | Resistant to amoxycillin and ceftriaxone | 1 | 6.3% | 0 | 0.0% | | |
| | Resistant to cephalosporins | 3 | 18.8% | 0 | 0.0% | | |
| | Sensitive to all drugs | 7 | 43.8% | 32 | 94.1% | | |
| | Sensitive to imipenem | 1 | 6.3% | 0 | 0.0% | | |
| | Total | 16 | 100.0% | 34 | 100.0% | | |

The microbiological profile of breast abscesses is essential for guiding effective antibiotic therapy and understanding potential causes of treatment failure. In this study, the pus culture and sensitivity data provided key insights into the microbial landscape and resistance trends among patients undergoing treatment for breast abscesses.

**Pus Culture Findings:**

The most frequently isolated organism was Staphylococcus aureus (observed in 50% of total isolates), consistent with global literature indicating its dominance in both lactational and non-lactational abscesses.

- Other isolates included Staphylococcus epidermidis, Streptococci, Corynebacterium, and multi-organismal (bacterial and fungal) growths.
- Importantly, polymicrobial infections and rare pathogens were more common in the I&D group (e.g., multi-bacteria and fungal growth in 18.8% vs. 2.9% in aspiration group), which may explain the resistance to conservative management.

**Drug Sensitivity Patterns:**

- **Antibiotic Resistance Was Significantly Higher In The I&D Group:**
- Resistance to ceftriaxone, amoxicillin, cephalosporins, and multi-drug resistance was observed in this group, with a statistically significant association (p = 0.003).
- In contrast, 94.1% of patients in the aspiration group had pus that was sensitive to all drugs, supporting better outcomes with conservative treatment when susceptibility is favorable.
- One isolate showed sensitivity only to imipenem, indicating the presence of resistant strains possibly related to prior antibiotic exposure or hospital-acquired infections.

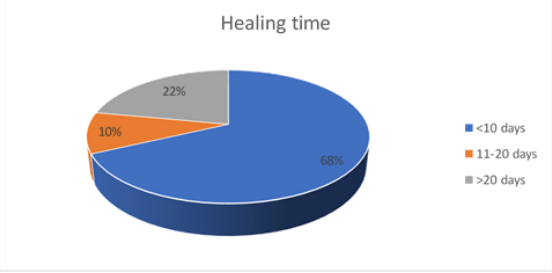
**Clinical Implications:**

- These findings highlight the importance of routine culture and sensitivity testing, especially in cases of recurrence or treatment failure.
- The presence of drug-resistant organisms significantly increases the likelihood of needing surgical intervention.
- Empirical antibiotic therapy should consider local resistance trends, with adjustments based on culture reports.
- Early identification of resistant strains may prevent delay in appropriate surgical management, reduce

complications, and improve outcomes.

**Table 9: Healing Time**

| | | Frequency | Percent |
|---|---|---|---|
| Healing time | <10 days | 34 | 68.0% |
| | 11-20 days | 5 | 10.0% |
| | >20 days | 11 | 22.0% |
| | Total | 50 | 100.0% |
| | Mean | 9.22 | |
| | Standard Deviation | 8.42 | |
| | Minimum | 1.00 | |
| | Maximum | 28.00 | |




**Graph 3:** Healing time

Healing time is a critical clinical parameter that directly reflects the effectiveness and efficiency of a therapeutic intervention.

In your study comparing ultrasound-guided (USG) needle aspiration versus incision and drainage (I&D) for breast abscess treatment, significant differences in healing time were observed between the two groups.

**Key Findings:**

- All patients treated with USG-guided aspiration healed within 10 days.
- In contrast, none of the patients who underwent I&D healed within 10 days.
- 68.8% of I&D patients required more than 20 days to heal.
- The remaining 31.3% healed between 11–20 days.
- This difference in healing time was highly statistically significant (p= 0.0001).

The faster recovery seen in the aspiration group can be attributed to its minimally invasive nature, absence of surgical wounds, and the outpatient- based treatment protocol, which avoids the trauma and tissue disruption associated with surgery.

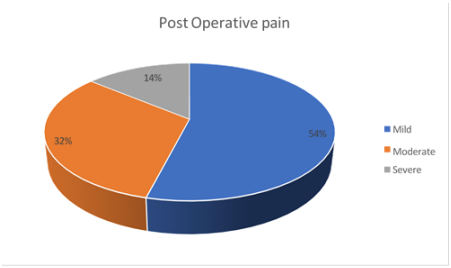
**Clinical Implications:**

- Shorter healing time not only improves patient comfort and satisfaction but also reduces time off work, healthcare costs, and the burden on hospital resources.
- USG-guided aspiration should be considered the first-line treatment for eligible patients, especially those with smaller abscesses and no signs of systemic infection.
- I&D, although effective, should be reserved for cases where aspiration fails, due to its association with prolonged recovery and higher morbidity.

These findings strongly advocate for a patient-centric approach that considers healing time as a major criterion in the choice of treatment modality for breast abscesses.

**Table 12: Post Operative Pain**

| | | Frequency | Percent |
|---|---|---|---|
| Post Operative pain | Mild | 27 | 54.0% |
| | Moderate | 16 | 32.0% |
| | Severe | 7 | 14.0% |
| | Total | 50 | 100.0% |




**Graph 12:** Post operative pain

Postoperative pain is a crucial factor influencing patient satisfaction, recovery time, and overall treatment acceptability. In this study, a significant difference in pain levels was observed between patients treated with ultrasound-guided (USG) aspiration and those who underwent incision and drainage (I&D).

**Key Findings:**

- Severe pain (VAS 7–10) was reported in 43.8% of patients in the I&D group, while none in the aspiration group experienced severe pain.
- Moderate pain (VAS 4–6) was present in 50% of the I&D group compared to only 23.5% in the aspiration group.
- Mild pain (VAS 0–3) was predominant in the aspiration group (76.5%) but was observed in only 6.3% of the I&D group.
- The association between type of treatment and postoperative pain was statistically significant (p = 0.0001), highlighting a marked increase in pain severity following surgical intervention.

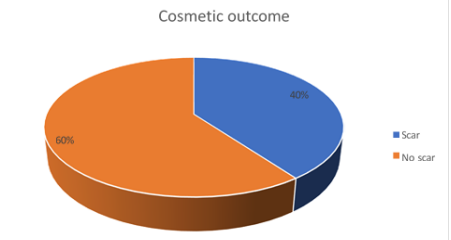
These results clearly demonstrate that USG-guided aspiration is associated with significantly less postoperative pain, likely due to its minimally invasive nature, outpatient feasibility, and avoidance of incisions, general anesthesia, and wound packing.

**Clinical Implications:**

- Minimizing postoperative pain is critical for enhancing patient compliance, preserving lactation, and reducing the need for analgesics.
- These findings support the use of USG aspiration as a first-line intervention, particularly in patients with low pain tolerance or those wishing to maintain breastfeeding.

**Table 13: Cosmetic Outcome**

| | | Frequency | Percent |
|---|---|---|---|
| Cosmetic outcome | Scar | 20 | 40.0% |
| | No scar | 30 | 60.0% |
| | Total | 50 | 100.0% |




**Graph 13:** Cosmetic outcome

Cosmetic outcome is a crucial determinant of patient satisfaction, especially in breast surgery, where aesthetic considerations are significant for psychological and emotional well-being. This study demonstrated a marked difference in cosmetic outcomes between the two treatment modalities for breast abscesses: ultrasound-guided (USG) needle aspiration and incision and drainage (I&D).

**Key Findings:**

- All patients who underwent I&D (100%) developed visible scarring.
- In contrast, 88.2% of patients treated with USG aspiration had no residual scarring, and only a minority (11.8%) had minor cosmetic changes.
- The difference in cosmetic outcomes between the two groups was highly statistically significant (p = 0.0001).

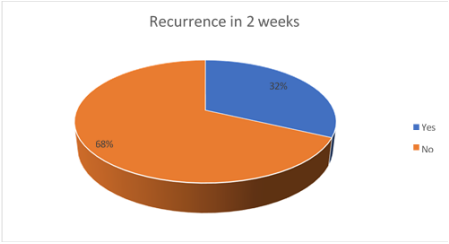
These findings strongly support the cosmetic superiority of USG-guided needle aspiration, which avoids surgical incisions, minimizes tissue trauma, and facilitates healing without disfigurement. Conversely, I&D often necessitates larger incisions, prolonged wound care, and carries a higher risk of hypertrophic scarring or disfigurement, particularly in subareolar or cosmetically sensitive areas.

**Clinical Implications:**

- For women of reproductive age and lactating mothers, preservation of breast aesthetics is a key priority. USG aspiration offers a valuable, minimally invasive approach with excellent cosmetic outcomes.
- Cosmetic considerations should be factored into treatment decisions, especially when both options are clinically viable.
- I&D should be reserved for cases where aspiration fails or is contraindicated, and patients should be counseled preoperatively about the risk of permanent scarring.

**Table 14: Recurrence Of Aspiration**

| | | Frequency | Percent |
|---|---|---|---|
| Recurrence in 2 weeks | Yes | 16 | 32.0% |
| | No | 34 | 68.0% |
| | Total | 50 | 100.0% |




**Graph 14:** Recurrence of aspiration

The recurrence rate observed in this study following ultrasound-guided (USG) needle aspiration was 32% (16 out of 50 patients) within the two-week follow-up period. This recurrence directly correlated with the necessity of conversion to incision and drainage (I&D), making recurrence a significant predictor of aspiration failure.

The statistical analysis showed a highly significant association between recurrence and I&D implementation (p = 0.0001), reinforcing that persistent or recurrent abscesses are not adequately managed by aspiration alone in a subset of patients. Notably, none of the patients in the successful aspiration group experienced recurrence, further emphasizing the dichotomy in treatment outcomes.

**Additionally:**

- 68.8% (11/16) of the recurrences occurred within the first week, indicating the need for early and close follow-up after initial aspiration.
- The remaining 31.3% (5/16) manifested in the second week, underscoring the importance of a minimum two-week surveillance to detect delayed treatment failures.

This recurrence rate aligns with published literature reporting recurrence rates of 10–38% post-I&D, suggesting that even minimally invasive methods like USG-guided aspiration, while cosmetically and symptomatically favorable, still carry a non-negligible risk of failure.

The higher recurrence in patients with larger initial abscess volumes (mean 198.5 mL in I&D group vs. 104.8 mL in aspiration success group) may suggest a volume threshold beyond which needle aspiration becomes less effective. This aligns with previous studies suggesting abscess size >5–7 cm may predict failure of conservative management.

**Implications**

- Early recurrence should prompt consideration for transition to I&D to prevent prolonged morbidity.
- Stratifying patients by initial abscess volume and clinical features may optimize selection for aspiration versus surgical intervention.
- Continuous monitoring during the critical two-week window post- aspiration is crucial for outcome success.

**Table 15: Volume Of The Abscess**

| I&D implemented | | N | Mean | Std. Deviation | t-value | p-value |
|---|---|---|---|---|---|---|
| Initial volume | Yes | 16 | 198.500 | 151.772 | 2.892 | .006** |
| | No | 34 | 104.794 | 78.399 | | |
| Volume aspirated in 2nd attemopt | Yes | 13 | 125.308 | 101.607 | 3.839 | .0001** |
| | No | 31 | 47.484 | 33.753 | | |
| Volume aspirated in 3rd attempt | Yes | 12 | 103.333 | 109.572 | 3.012 | .006** |
| | No | 17 | 23.529 | 8.797 | | |

In the present study, Incision and Drainage (I&D) was implemented in 32% of the patients (16 out of 50), primarily due to treatment failure following three attempts of ultrasound-guided (USG) needle aspiration. This transition highlights the clinical boundaries of aspiration-based management and underlines the importance of recognizing early predictors of failure.

**The decision to implement I&D was strongly associated with several clinical parameters:**

- **Recurrence:** All 16 patients who underwent I&D experienced recurrence within the two-week follow-up (p = 0.0001), marking recurrence as the most significant indicator for escalation of care.
- **Healing Time:** All patients in the aspiration group healed within 10 days, while 68.8% of I&D patients required >20 days, confirming that surgical drainage leads to prolonged recovery (p = 0.0001).
- **Postoperative Pain:** Severe pain was exclusive to the I&D group (43.8%), with statistically significant differences in pain scores compared to aspiration (p = 0.0001), indicating greater morbidity.
- **Cosmetic Outcome:** Scarring was universally reported in the I&D group (100%), while 88.2% of aspiration cases reported no scarring (p = 0.0001), emphasizing the inferior cosmetic results of surgical drainage.
- **Pus Volume:** Patients requiring I&D had significantly larger initial abscess volumes (mean 198.5 mL vs. 104.8 mL; p = 0.006), supporting existing evidence that larger abscess size is a predictor of aspiration failure.

Interestingly, comorbid diabetes mellitus and primigravidity showed a higher trend toward I&D, although statistical significance was not reached in this cohort. Additionally, drug resistance was more prevalent in the I&D group, with resistance to multiple antibiotics noted (p = 0.003), suggesting that microbiological factors may contribute to treatment resistance and necessitate surgical management.

## DISCUSSION

The clinical entity known as breast abscess, both lactational and non- lactational, is one that is frequently encountered in daily practise. Acute mastitis can be treated conservatively

with antibiotics when it is first diagnosed and at an early stage. Incision and drainage are the traditional methods for treating breast abscesses, but they are also associated with the need for general anaesthesia, extended healing times, regular dressing, difficulty breast-feeding, and potentially disappointing cosmetic results. Breast abscess recurrence rates are reported to be between 10 to 38%, despite the aggressive method of incision and drainage along with the administration of antibiotics. Therefore, it has been discovered throughout time through additional analysis, research, and clinical trials that minimally invasive treatments produce superior results and are a more tolerable means of therapy. Due to its simplicity and success, ultrasound guided needle aspiration under antimicrobial treatment has evolved into the most recent management protocol in many institutions. The current study was carried out at a tertiary healthcare centre to compare the outcome and effectiveness of traditional treatment incision and drainage versus needle aspiration in the treatment of breast abscess in terms of

1) Healing time
2) Residual abscess after 3 trial of aspiration referred as failure of needle aspiration
3) Incision and drainage implementation in failed cases
4) Postoperative pain
5) Cosmetic scar
6) Recurrence of aspiration { Pt to be followed up for 2 weeks starting from day of first aspiration to look up for recurrence of aspiration }

Demographic characteristics
In the present study we assessed
Age distribution among the study subjects.

We observed that the mean age of the study was 33.8 years while maximum age was 59 years and minimum age was 16 years. Patient in whom I&D were implemented the major proportion of age group was 21-30 years while the patients who were cured with aspiration major proportion of age group were 41-50 years.

### Co-morbidities

In the present study we assessed co-morbidities among the study subjects. We observed that in maximum patient 27 out of 50 patients (54 %) there were no co-morbidity involved while 23 out of 50 patients (46 %) it was associated with DM .In the present study we assessed that 10 out 16 patient (62.5 %) in whom I&D were implemented were diabetic. The reason might be due to decreased immune response in diabetes and higher risk of infection to diabetic.

### Smoking

In the present study we assessed smoking as a risk factor for breast abscess. We observed that 39 out of 50 patients (78 %) were non-smoker. In the present study we assessed that 11 out of 16 patients in whom I&D were implemented was non-smoker

### Lactating Vs Non Lactating Patients

In the present study we assessed Lactating Vs non lactating patients among the study subjects. We observed that majority of the subjects 32 out of 50 patient that constitute 64% of the study subjects) were lactating whereas rest were non lactating i.e. 18 out of 50 patients that constitute 36% of the study subjects. Although breast abscess has traditionally been linked with mastitis and breast feeding.In the present study we assessed that subjects in which I&D were implemented 12 out of 16 patients were lactating (75 %) while patient who were cured with aspiration 20 out of 34 patients were lactating (58.8 %). Our study as well as those of Crowe et al74 and Scholefield et al75, show that abscess may occur in non-lactating women.

### Gravida

In the present study we assessed Gravida among the study subjects. We observed that majority of the subjects were multigravida (27 out of 50 patients that constitute 54% of the total patient) while other category were primigravida (23 out of 50 patient that constitute 46 % of the total patient. We assessed that 10 out of 16 patients (62.5 %) who underwent I&D were primigravida while only 13 out of 34 patients (38.2 %) were primigravida who were cured with aspiration .The risk factors for the formation of breast abscess were first pregnancy, mastitis, pregnancy more than 41 weeks. The reason might be lack of experience regarding the positioning of the baby, nipple areola care and poor hygiene predisposes for the formation of breast abscesses in the primpara mothers . This was collaborated from the data around the world.

### Quadrants

In the present study we assessed Quadrants among the study subjects. We observed that upper and outer quadrant was most commonly involved (15 out of 50 patients that constitute 30 % of the study), followed by upper and inner (14 out of 50 patients that constitute 28 % of the study population). In the present study we assessed that patient who underwent I&D most common location was upper and outer 7 out of 16 patients (43.8 %) and patient who were cured with aspiration most common location was upper and inner 11 out of 34 patients (32.4 %).

Breast abscess is frequently located in the upper and outer quadrant, which fits with the fact that most of the breast parenchyma and TDLU is located in this quadrant.

### Side Involved

In the present study we assessed Side involved among the study subjects. We observed that in majority of the subjects left side was comparatively more involved (28 out of 50 patients that constitue 56 % of the study population). In the present study we assessed that left side of breast was most commonly involved in 8 out 16 patients (50 %) in whom I&D were implemented.

### Changes In Nipple

In the present study we assessed changes in nipple among the study subjects. We observed that in majority of the subjects no changes in nipple were present 26 out of 50 (52%) followed by retraction in nipple in 14 out of 50 patients(28 %) followed by cracks present in nipple 10 out of 50 patients (20 %).In the present study we assessed that majority of patients in whom I&D were implemented there was no changes in nipple 9 out of 16 patients (56.3 %).

### Duration Of Symptoms In Days

In this study all the patients presented with pain and swelling over breast as a general feature. In the present study we assessed Duration of symptoms(in days) . We observed that duration of symptoms in majority were more than 5 days (27 out of 50 patient (54%) mean day was 5.9. However the difference was not statistically significant. Standard deviation of the study 1.28.

### Pus Culture And Sensitivity

In the present study we assessed that patient had growth of isolated staphylococcus bacteria 25 out of 50 patients (50 %) and 7 out of 50 patients (14%) had growth of staph aureus in association with other bacteria. The reason might be possible that most common organism causing breast abscess is Staph aureus.

We assessed that 39 out of 50 patients (78 %) were sensitive to all drugs against Gram positive bacteria and MRSA .

### Healing Time (In Days)

In the present study we assessed Healing time (in days)

among the study subjects. We observed that healing time was significantly lesser in needle aspiration of breast abscess. Max healing time 28 days and minimum healing time 1 day and mean 9.22 The result was found to be statistically significant. (The t-value is -7.76384. The p-value is <.00001.

### Post Opertive Pain

In the present study we assessed Post operative pain amongst the study subjects. We observed that post-operative pain in patients who were treated with aspiration group was significantly lesser than who underwent I&D .

### Cosmetic Outcomes

In the present study we assessed Cosmetic outcomes among the study subjects. We observed that scar was observed among all subjects in I& D group whereas aspiration group subjects had significantly lesser (4 out of 34 patients constituting 11 % of the study subjects ) had evidence of scar.
Residual abscess and Recurrence of aspiration

In the present study we assessed residual abscess and recurrence of aspiration which was parameters of treatment failure of USG guided aspiration of breast abscess . Follow up was analysed upto 2 weeks. We observed that 16 out of 50 patients (32%) had recurrence within 2 weeks of aspiration and they eventually underwent I&D. We analysed amongst those 16 patients 11 out of 16 patients (68 %) had residue collection on USG after 1st week of aspiration termed as residual abscess while 5 out of 16 (32 %) recurrence were reported after 2nd week of aspiration termed as recurrence of aspiration.

### Volume Of The Abscess

In the present study we assessed Initial volume of the abscess calculated using ultrasound . Mean volume was 134.7 ml, Max volume was 450 ml and min value was 9ml.

On Day 3 (ultrasonographically) 44 out of 50 patient had collection on USG with Mean volume 70.48 ml, Max vol 350 ml and Min vol 5 ml.

On Day 5 (ultrasonographically),29 out of 50 patient had collection on USG with Mean volume 56.55 ml, Max vol 400 ml and min vol 10 ml.

| Treatment accomplished with | Day 1 (Mean volume) | Day 3 (Mean volume) | Day 5 (Mean volume) |
|---|---|---|---|
| Aspiration (68 %) | 104.7 ml | 47.8 ml | 23.5 ml |
| I&D (32 %) | 198.5 ml | 125.3 ml | 103.3 ml |

We analysed that patient who were treated with aspiration (68 %) residual collection on Day 3 and Day 5 was significantly lesser than those patients who needed I%D (32 %).

Hence, It is consistent with our findings that larger collection of residual pus even after aspiration eventually needs I&D.

## CONCLUSION

### The Present Study Concluded That

This prospective observational study demonstrates that ultrasound-guided needle aspiration is a safe, effective, and minimally invasive alternative to traditional incision and drainage (I&D) for the treatment of breast abscesses, particularly in cases with smaller abscess volumes and uniloculated collections. The procedure not only offers shorter healing times, less post- procedure pain, and superior cosmetic outcomes, but also allows management on an outpatient basis, thereby reducing hospital stay and healthcare burden.

However, in patients presenting with larger abscess volumes, persistent collections after multiple aspirations, or comorbidities like diabetes mellitus, there was a higher likelihood of treatment failure with aspiration, necessitating conversion to I&D.

The findings suggest that patient selection and abscess characteristics, particularly initial volume and loculation status, are critical factors in determining the success of aspiration. Thus, USG-guided aspiration should be considered the first-line approach in suitable candidates, reserving I&D for refractory or complicated cases.

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