

Comparative Effectiveness and Complications of Surgical and Conservative Management in Breast Abscess Patients: A Prospective Analytical Study

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ABSTRACT

Background: Mammary abscesses are infections that are enclosed without involving the surrounding tissues they are common with breast cancer patients through uncontrolled or poorly controlled mastitis. Hence, this work seeks to assess the management of surgical and conservative approaches for treating breast abscesses.

Objective: The objective of the study was to ascertain the treatment methods used in management of breast abscesses and to determine the results and adverse outcomes of those that are applied.

Methodology: A prospective analytical study was conducted in the Department of Surgery at Ghurki Trust & Teaching Hospital, Lahore, Pakistan, from February 2023 to March 2024. A total of 270 patients were initially enrolled, with 200 completing the 3-month follow-up. Patients were divided into two groups based on the treatment modality. Group I (Surgical Treatment) and Group II (Conservative/Minimally Invasive Treatment). SPSS version-20 was used to analyse results Patient groups were compared using the chi-squared test for categorical variables, for continuous variables, such as age, an independent samples t-test was utilized to compare the means between the two groups ($p \leq 0.05$) was considered.

Results: Surgical treatment (Group I) demonstrated a significant reduction in reoperations and respiration compared to conservative treatments (Group II), where a notable percentage of patients (41.7%) needed further intervention. Notably, the rate of deformity due to scarring and contracture was higher in the conservative/minimally invasive group, affecting 30% of these patients, compared to 14.3% in the surgical group. Moreover, there was no carcinoma reported in group II in contrast with group I of the surgically operated patients 5% of them were found to have carcinoma.

Conclusion: Surgical treatment for breast abscesses, particularly larger ones, offers more definitive resolution with fewer long-term complications compared to conservative management. Personalized treatment planning is essential to optimize patient outcomes and reduce morbidity.

Keywords: Breast abscess, Surgical treatment, Conservative treatment, Ultrasound-guided aspiration, Incision and drainage



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INTRODUCTION

Breast abscesses are localized infections characterized by the accumulation of pus within the breast tissue, commonly resulting from untreated or inadequately treated mastitis. These abscesses can be broadly categorized into puerperal (lactational) and non-puerperal (non-lactational) types. Puerperal abscesses typically occur in lactating women, with an incidence ranging from 2.5% to 33%, often presenting with severe pain and erythematous swelling [1]. The primary causative organism is usually *Staphylococcus aureus*. As stated earlier, non-puerperal abscesses are less frequent but might be observed in postmenopausal females and are due to factors like duct ectasia, congenital disorders, nipple retraction, or malignancies. However, non-PUA are characterized by smoking, diabetes, and obesity, and causative pathogens include streptococcus, staphylococcus, and anaerobes [2, 3].

For many years the only treatment for breast abscesses was simple surgical drainage, which has varying degrees of success in clearing the infection while posing threats such as scarring, structural damage, and worst of all contraction which will lead to poor cosmetic outcome [4]. The non-surgical options include ultrasound-guided needle aspiration which provides less invasive ways for treating PFC but often necessitates multiple procedures and higher reoccurrence rates. Other forms of treatment may include the use of medicines and expressing the breast often; this may only work for minor abscesses that are not so malignant, large abscesses may necessitate more complicated treatments [5]. It is not easy to choose whether to operate or not and other residual treatment procedures are also

important such as size of the abscess, wishes of the patient, and presence of other illnesses [6]. Deficiencies in previous treatment algorithms have demonstrated moderate success rates for various treatment methods, it is thus pertinent to adopt a patient specific approach in treatment planning. Also essential for care was social and economic status and accessibility to the medical facilities which can also impact on the treatment results. Depending on the type of healthcare context, studies have pointed to various results [7, 8].

Although a number of publications exist regarding breast abscess interventions, more extensive and comparative analyses of several treatment modalities are still required to assess long-term outcomes in terms of recurrence and general cosmetic prognosis. [9]

And thus, the present study has been planned to address this important gap in the current literature while evaluating the outcomes and the consequences related to surgical and conservative management approaches during a long-term follow-up period. In present study we aimed to compare their demographical characteristic, clinical manifestation, and outcomes after management in order to know the best approach in managing breast abscesses. However, the long-term goals were to increase the quality of care needed in the management of this condition, narrowing the morbidity level. There are certain limitations that should be mentioned regarding this study which will also contribute its findings to the existing body of knowledge and help to establish practice guidelines for clinical practice that can be utilized in many different healthcare environments to improve patient outcomes.

MATERIALS AND METHODS

This prospective analytical study was conducted in the Department of Surgery at Ghurki Trust & Teaching Hospital, Lahore, Pakistan, from February 2023 to March 2024. The aim was to evaluate the outcomes of different treatment modalities for breast abscesses. Ethical approval was obtained from the Ethical Review Board of Lahore University of Biological & Applied Sciences (UBAS), Lahore Medical & Dental College, Lahore, Pakistan (certificate ref. no. ERC/2024/11B).

All patients presenting with a diagnosis of breast abscess were included in the study, regardless of age, abscess size, or co-morbid conditions. Patients who refused admission or were treated as outpatients were excluded from the study. A total of 270 patients were initially enrolled, with 200 completing the 3-month follow-up. Patients were divided into two groups based on the treatment modality. Group I (Surgical Treatment) included patients with abscesses larger than 3 cm in diameter or those showing fluctuation on clinical examination.

These patients underwent surgical incision and drainage under general anesthesia. The procedure involved making an incision to fully open the abscess cavity, collecting pus for culture and sensitivity testing, resecting tissue from the abscess wall, performing extensive irrigation, removing necrotic tissue, and leaving the wound open for drainage. Daily dressings were applied post-operatively until healing by secondary intention was achieved. Group II (Conservative/Minimally Invasive Treatment) included patients with abscesses smaller than 3 cm in diameter or those with signs of inflammation without fluctuation. These patients were treated with ultrasound-guided aspiration or managed conservatively.

Conservative management involved prescribing antibiotics (a combination of broad-spectrum penicillin, amoxicillin, and clavulanic acid) and hot fomentation. Success in this patient group was said to be the failure of an abscess to progress to surgery after fine-needle aspiration, and failure as the need for surgery after aspiration. The patients were followed up each to assess for any complications that may have arisen, and to determine the outcome of the treatment for a period of three months. Participants who could not attend the follow up were thus excluded in the study. The study excluded participants who could not attend the study follow-up. Applying this methodology will provide comprehensive feedback on the overall treatment efficacy of breast abscesses, including assessment of both surgical and conservative treatments and their probable complications. Inclusion criteria were identified and detailed information about the patients' demographic characteristics, clinical features at presentation, treatment, and response to treatment was objectively documented on a prepared pro forma. In considering potential variables, age, lactation status, and diabetes were tested; previous experience in handling abscess, culture and sensitivity of the pus, and biopsy of the abscess wall were also taken into consideration. Other issues recorded were breast malposition, scar enlargement, lactostasis, scar erythema, requirement for secondary surgery and/or re-acoustic drainage; breast cancer, seroma development, ecchymosis, abscess organization, sloughing, and spontaneous cannula leakage. Data analysis was carried out using the statistical model (SPSS) version 22. Continuous variables such as age were summarized using mean and standard

deviation, while categorical variables, including treatment type and complication rates, were expressed as counts and percentages. Patient groups were compared using the chi-squared test for categorical variables to assess the differences in complication rates between surgical and conservative treatment groups. For continuous variables, such as age, an independent samples t-test was utilized to compare the means between the two groups.

RESULTS

In this study, we enrolled 270 patients diagnosed with breast abscesses at Allama Iqbal Memorial Teaching Hospital, from which 200 completed a 3-month follow-up. The patients ranged in age from 18 to 45 years, with a mean age of 32 years and a standard deviation of 6 years. The cohort was predominantly lactating women (172), while 28 were non-lactating. Additionally, 70 patients had a history of diabetes. Table-1 provides a comprehensive overview of the general demographics and distribution of treatment modalities across the two groups:

Table-1: General Demographics and Treatment Distribution (n=200)

Description	Total	Group I (Surgical)	Group II (Conservative/Minimally Invasive)
Total Patients	200	140	60
Age Range (Years)	18 - 45		
Average Age (Years)	32 ± 6		
Lactating Patients	172	122	50
Non-Lactating Patients	28	18	10
Diabetic Patients	70	50	20
Pus Culture and Sensitivity	190	130	60
Biopsy of Abscess Wall	160	110	50

The Fig-1 The bar plot presents a detailed view of the distribution of patients across different treatments and conditions within a clinical study. Notable observations include a higher number of lactating patients in both treatment groups and significant involvement in both surgical and conservative treatments among diabetic patients.

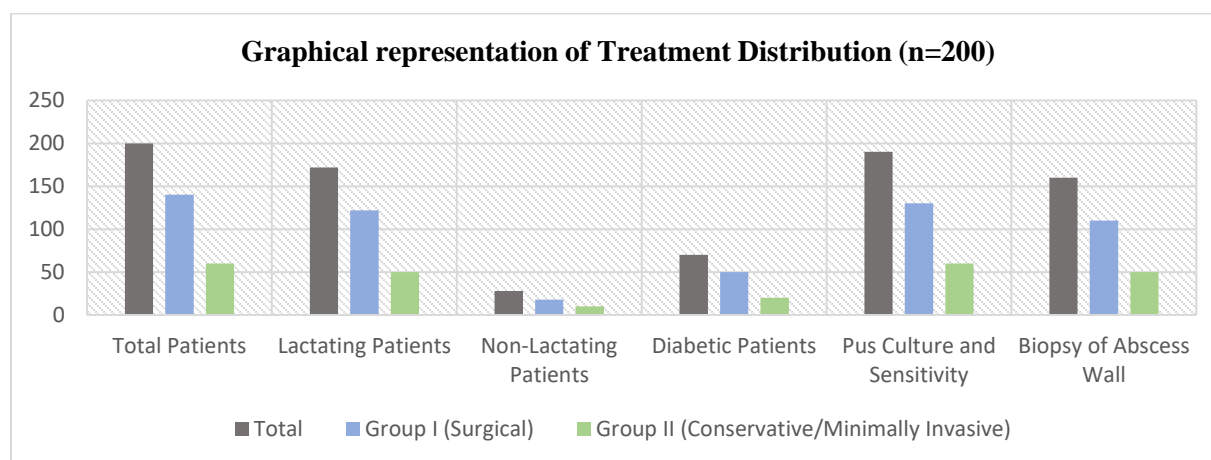


Fig-1: Treatment Distribution (n=200)

The study also monitored complications and outcomes, with Table 2 highlighting the difference in complication rates between surgically treated patients (Group I) and those managed conservatively or with minimal invasive procedures (Group II):

Table-2: Complications and Outcomes

Complications	Group I (n=140)	Group II (n=60)
Deformity of Breast (Scarring and Contracture)	20 (14.3%)	18 (30%)
Hypertrophic Scar	15 (10.7%)	-
Persistent Discharge	20 (14.3%)	-
Reoperation or Respiration	20 (14.3%)	25 (41.7%)
Diagnosed Carcinoma	7 (5%)	0
Seroma Formation and Hematoma	10 (7.1%)	3 (5%)
Organized Abscess	2 (1.4%)	6 (10%)
Ulceration/Spontaneous Rupture	-	5 (8.3%)
Required Surgical Drainage after Conservative Management	-	12 (20%)

Fig-2 shows that bar plot emphasizes the prevalence of specific complications associated with two distinct treatment modalities, providing insights into their respective risks and outcomes. Significant findings include a higher incidence of reoperation or respiration in Group II and notable cases of organized abscess in patients undergoing conservative treatments, which may influence treatment planning and patient counselling.

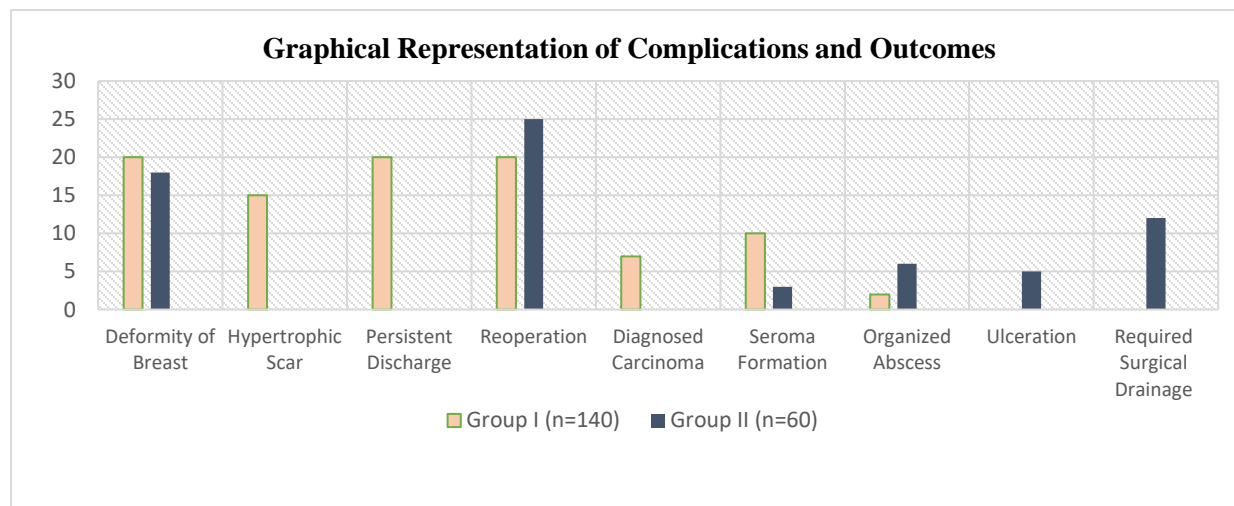


Fig-2: Comparative analysis of complications following surgical (Group I) and conservative/minimally invasive (Group II) treatments.

Surgical treatment (Group I) demonstrated a significant reduction in reoperations and respiration compared to conservative treatments (Group II), where a notable percentage of patients (41.7%) needed further intervention. Notably, the rate of deformity due

to scarring and contracture was higher in the conservative/minimally invasive group, affecting 30% of these patients, compared to 14.3% in the surgical group. Moreover, there was no carcinoma reported in group II in contrast with group I of the surgically operated

patients 5% of them were found to have carcinoma. Other modularity associated with the surgical treatment like formation of seroma and hematoma was also found to be slightly higher in the group that received the surgery. These complications included ulceration or spontaneous rupture that were only evident in the conservative group and took a 8%. 3% of those patients. These findings imply that though, non-operative and less effective interventions can save a lot of surgeries in the short-run, the odds of having extra surgical procedures in comparison to surgery only are higher and the final satisfaction with appearance could be worst.

DISCUSSION

The outcome of our study provides useful information pertaining to the intervention of breast abscesses and benefits and challenges of each possible approach stated [11]. There are various surgical and conservative management options available for breast abscesses which include the size of the abscess, preference, or other medical conditions. During the study period, 21 patients underwent surgical treatment (Group I) while 60 patients received conservative management (Group II); the former was characterized by a significantly lower reoperation/reaspiration rate than the latter, the majority of which might have needed further procedures[12]. From this, we can deduce that, while patients with conservative management for minimally sized abscesses or those who wish to avoid surgery seem appealing, conservative management may not be enough to heal the abscess completely, thereby leading to more frequency of repetitions of the procedure. It is, nevertheless, alarming that the conservative treatments or minimal invasive surgeries, which have very few complications, resulted in more deformity,

scarring, or contracture [13]. This could be attributed to the less definite clearance of the infection and the active inflammatory processes that are perhaps not cleared as comprehensively without the advantage of surgery. Such outcomes indicate to the need to review with the patient different potential cosmetic and functional long-term consequence as patient contemplates whether to undertake the treatment or not [14]. The management of complications also tends to show significant differences between the two groupings. There were statistically significant differences of seroma and hematoma in surgical group because surgical operations are more invasive [15,16]. Nonetheless, patients in the conservative treatment group experienced ulceration or spontaneous rupture, which are adverse conditions that cause substantial alterations in the patient's quality of life or necessitate further surgical intervention. This is a very important recommendation especially given the fact that a subset of these patients in the surgical group developed carcinoma which was diagnosed in 5% of them, thus the need for careful histopathological analysis after abscess drainage [17, 18]. This aspect of surgical intervention not only goes ahead and addresses the problem of the abscess but also helps in the assessment of the cause of the problem particularly when it is not obvious under conservative management procedures. The findings of this study are consistent with other research finding out that while needle aspiration and antibiotics may be helpful in the treatment of small breast abscesses, the treatment of larger and complex breast abscesses requires more elaborate approaches [19]. Surgical drainage has been shown to be more definitive in treating abscesses, particularly when they are over 3 cm in size by eliminating recurring abscesses and further interventions. This study

has some limitations such as, the present study is a retrospective study where randomization of the treatment was not performed, and thus, the selection bias can influence the results. The follow up duration of three months might also lack data on late recurrences or any long-term consequences. However, future studies should consider undertaking randomized controlled trials with a long-term perspective of patients, with tendencies towards comparison of results while also developing guidelines for treatment [20]. Indeed, while being conservative and less invasive than mastectomy, the management of breast abscesses with needle aspiration, antibiotics and/ or draining sinuses is associated with some merits such as avoiding general anesthesia and reduced initial morbidity, they also come with a greater risk of requiring successive surgeries, and in this case may cause higher morbidity and disfigurement. Surgical intervention is also important especially in cases with large boils and results in a definitive treatment that may have lesser side-effects in the long run. Our research provides meticulous selection of patients and mapping out a tailored management plan to serve each patient's needs concerning their breast abscesses are critical [21].

CONCLUSION

This study demonstrates that while conservative and minimally invasive treatments for breast abscesses offer benefits such as avoiding anesthesia and reducing initial morbidity, they are associated with higher rates

of subsequent interventions and complications such as breast deformity and persistent infection. Although antibiotics are effective in treating a significant portion of skin abscesses, particularly the smaller ones, surgical intervention tends to offer a long-term cure with a relatively low chance of recurrence and long-term side effects. Thus, surgical drainage continues to consider as fundamental way in the management of breast abscesses. This approach entails devotion of time to think through patient-compliant, evidence-based therapy decisions, recognizing that adherence by clinicians to routinely published algorithms without individual assessment of the patient rarely produces optimal results and, most often, increases morbidity. Future research should aim to further refine these treatment protocols through randomized controlled trials and extended follow-up periods to establish more robust guidelines.

Conflict of interest:

No conflict of interest was faced during present study

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Authors contribution:

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