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Comprehensive trial comparing the implantation of a suction drain percutaneously to conventional incision and drainage in case of breast abscess

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Abstract
Background and Objectives: The objective of this study is to conduct a comparative analysis of post-operative pain, residual abscess, and percutaneous suction drainage techniques in the treatment of breast abscesses. The duration of hospitalization. Duration required for complete recuperation, manifestation of a scar. The conventional method of incision and drainage for breast abscess has undergone a steady transition from invasive to minimally invasive techniques, with the inclusion of percutaneous placement of a suction drain as a viable alternative.
Material and Methods: In the context of a prospective trial A total of 70 patients were admitted to the Department of General Surgery, Madha Medical College and Research Institute, Chennai, Tamil Nadu, India, over the period spanning from September 2014 to August 2015. A total of 70 individuals diagnosed with puerperal breast abscess were included in the study. 60 patients underwent intravenous (I&D) procedures, while an additional 40 patients underwent percutaneous suction drain insertion.
Results: All patients who underwent percutaneous drain implantation (VAS G1 and G2) reported minimal post-operative pain (G4 and G5) in comparison to the I and D groups. Residual abscesses were observed in two cases within the PDP group, as well as in one instance each within the I and D groups. These abscesses were managed by the methods of incision and drainage. The mean duration of hospitalization in the I and D cohorts was 4-6 days, but in the PDP cohort, it was 4-6 days. The duration of complete healing was found to be 4.2+1.2 weeks for patients I and D, and 1.7+0.5 weeks for patients with PDP. Unlike individuals who received the standard treatment, patients who underwent PDP exhibited a diminutive and unattractive scar at the points of entry and exit.
Conclusion: When compared to the conventional method, the percutaneous insertion of a suction drain in a puerperal breast abscess exhibits reduced invasiveness, increased likelihood of rapid resolution, diminished scarring after healing, and a decreased risk of sequelae.

Keywords: Puerperal breast abscess, incision and drainage, percutaneous placement of suction drain

Introduction
The treatment of breast abscess is a complex clinical challenge that may require a combination of conservative treatments and surgical intervention. Historically, breast abscesses have been managed with surgical incision and drainage [1, 2]. The drainage of breast abscess has seen a steady shift from an invasive to a minimally invasive method, aligning with the prevailing surgical paradigm. Lactational mastitis problems are responsible for the majority of breast abscesses. The incidence of breast abscess among nursing women ranges from 0.4% to 11%. Obese people and smokers have a higher likelihood of developing breast abscesses compared to the general population [2, 3]. The conventional approach to managing breast abscess involves making an incision, removing pus, and administering anti-staphylococcal drugs. Nevertheless, this therapeutic regimen is accompanied with the need for regular dressings, an extended period of recovery, challenges in nursing, the possibility of developing a milk fistula, and an unfavorable cosmetic outcome. Based on recent research, the treatment of breast abscesses can involve the utilization of vacuum drainage and repeated needle aspirations [3, 4].
Cellulitis, a condition characterized by the absence of pus production or abscesses, may arise as a consequence of clinical difficulties. It is crucial to do a precise evaluation of the situation. Performing surgery during the initial phases of the cellulitic process is superfluous and detrimental, while persisting with antibiotic treatment while an abscess is present heightens the likelihood of the disease progression leading to tissue harm. Prior to doing an ultrasonography examination, it is advisable to carry out test-needle aspiration of the cellulitic zone. If ultrasonography reveals the presence of an abscess, the needle can be inserted into the cavity.

Delaying draining until the occurrence of fluctuation and pointing is erroneous as it would result in further harm to the breast tissue. Even in the absence of pus, it is advisable to do a bacteriological investigation on the aspirated material [4, 5]. This approach enables the detection of the rare occurrence of inflammatory carcinoma on the smear, so circumventing the need for surgical intervention in this complex scenario. Therapy Taylor and Way succinctly articulated the core principles of treatment, which involve halting the infection and removing the breast. During the cellulitic and abscess stages, many methodologies are employed to achieve this objective. The objective of this study is to analyze the existing information and offer suggestions for managing breast abscesses and lactational mastitis [5]. The conventional surgical method of incision and drainage (I and D), breaking loculi, and inserting a drain under general anesthesia or daily gauze packing has been replaced by the minimally invasive technique of percutaneous placement of a suction drain and aspiration/repeated aspiration of the abscess. The incision and drainage technique entails certain morbidity and the impairment of breast functionality. The drainage of pus can be achieved with the insertion of a percutaneous drain while ensuring antimicrobial protection, a technique that has garnered significant interest in recent times. The patient has the ability to sustain breastfeeding using this approach, and there are no lingering complications or scarring observed [5, 6].

Material and Methods

A total of 70 patients were admitted to the Department of General Surgery, Madha Medical College and Research Institute, Chennai, Tamil Nadu, India, over the period spanning from September 2014 to August 2015. This analysis selected a cohort of 70 patients who were admitted with a primary diagnosis of breast abscess. The diagnosis of breast abscess was established by a comprehensive clinical examination and a meticulous review of the patient's medical history. The individuals in question underwent the requisite preoperative assessments.

One side of the patients had incision drainage, while the other side got percutaneous suction drain placement. Percutaneous suction technique the drainage procedure entailed the insertion of an 18F perforated catheter using a curved needle from one side of the abscess. The needle was then rotated 2-3 times in both directions to rupture the loculi. Finally, the catheter was removed from the other side of the abscess, ensuring that the perforated end remained in position. The administration of antibiotics, such as Ampiclox TM 500mg intravenously every hour for a duration of two days, followed by a cap of Ampiclox TM 500mg every hour for a period of five days, and an analgesic, such as Diclofenac intramuscularly for one day, followed by a tab, is contingent upon the severity of the pain. It is recommended to utilize diclofenac [6, 7]. An ultrasound evaluation of the surgically treated breast was conducted on postoperative days 3 and 7 in order to exclude the presence of any residual abscess. The evaluation of each case encompassed an assessment of post-operative complications, such as post-operative pain (Quantified using a visual analog scale), residual abscess (Quantified using an ultrasound), duration of hospitalization, time required for complete recuperation, and visibility of scars.

After being released, every patient underwent follow-up examinations in the outpatient department to assess the progress of their wound healing at one, two, four, six, and eight weeks intervals. The two groups will be compared using Fisher's exact test and the Z test for proportions. The cases for the research were selected and randomly allocated to each group for the purpose of conducting a comparative analysis, following the specified inclusion and exclusion criteria outlined below.

Inclusion Criteria

1. Patients who have been clinically diagnosed with breast abscess and have positive variation.
2. Individuals who have had surgical procedures, such as incision and drainage or percutaneous insertion of a suction drain.

Exclusion Criteria

1. Breast abscess resulting from alternative etiologies such as TB.
2. Patients exhibiting reluctance towards undergoing surgical intervention.

Results

Table 1: Analysis of the distribution of cases according on age

	Group	
	I and D	**PDP**
No.of cases	35	35
Age (Yrs): Mean ± SD	32.3±5.6	33.5±5.8
Range	20 - 30 Yrs	19- 30 Yrs

Only puerperal breast abscess cases were included in the current study, and those between the ages of 24 and 30 were the most frequently affected, with 35 cases (50%) followed by those between 19 and 24 with 35 cases (50%). The youngest and oldest patients in our study were both 19 years old.

Table 2: Comparison of post-operative pain

Post OP Pain (VAS)	**Group**				**Total**
	I and D		**PDP**		
	No.	**%**	**No.**	**%**	
G1	0	-	23	65	25
G2	0	-	12	35	15
G3	0	-	0	-	-
G4	16	46	0	-	16
G5	19	54	0	-	19
Total	35	100	35	100	70

In the current investigation, the median VAS grade for individuals with I and D was G5, followed by G4 (46%). In the PDP group, the VAS median grade was G1, which was followed by G2 (35%).

Table 3: Comparison of residual abscess cases

Residual Abscess	**Group**			
	I and D		**PDP**	
	No.	**%**	**No.**	**%**
Yes	2	5	5	14
No	33	95	30	86
Total	35	100	35	100

In the current study, 5(14%) patients in the PDP group and 2(5%) patient in the I and D group both had residual abscesses.

Table 4: Comparison of duration of hospital stay (Days)

Duration of HOSP stay (Days)	Group	
	I and D	PDP
Mean ± SD	8.9±0.5	3.9±0.2
Range	7 - 10 days	3 - 7 days

The mean hospital stay in the current study was 8.9±0.5 days for I and D patients and 3.9±0.2 days for PDP patients. Significant differences between the two groups were observed.

Table 5: Comparison of duration of complete healing (Weeks)

Dur of Complete Healing (WKS)	Group	
	I and D	PDP
Mean ± SD	5.6±1.7	2.5±0.8
Range	3 - 6 Wks	1.4 - 3.3 Wks

The mean time for full healing in the current study was 5.6±1.7 weeks for I and D patients and 2.5±0.8 weeks for PDP patients. Significant differences between the two groups were observed.

Table 6: Comparison of size of the scar

Size of the Scar (cm)	Group			
	I and D		PDP	
	No.	%	No.	%
0.5x1, 0.5x1	0	-	31	88
4x2	15	42	4	12
5x2	11	31	0	-
6x2	5	14	0	-
7x2	4	11	0	-
Total	35	100	35	100

There was no occurrence of drain dislodgement in any patient. Prior to its removal, there was no need for drain replacement. On the third day following the surgical procedure, a significant proportion of our patients underwent drain removal. A pus sample was collected from each patient for the purpose of conducting culture and sensitivity tests. The data indicate that Staphylococcus aureus was present in 45 individuals, pseudomonas in 5, and sterile in 10 patients.

An anaerobic pus culture was not conducted. The sensitivity of the problem was found to be modulated by cefixime, augumentin, and ampiclox.

Discussion

While open surgical drainage is commonly used as the primary treatment for puerperal breast abscess, the implantation of percutaneous suction drains has emerged as a feasible alternative and has shown promising results. In the present investigation, the median Visual Analog Scale (VAS) grade for individuals classified as I and D was G5, with G4 (47%) ranking second [7, 8]. The median VAS grade in the PDP group was G1, with 33% of participants falling into the G2 category. The patients belonging to groups I and D exhibited a higher level of distress compared to those in group PDP. In contrast to our research findings, it is evident that a number of comparative studies examining the therapy of breast abscesses have failed to consider pain as a significant determinant of clinical outcomes. In the present investigation, a total of 1 patient (4% of the sample) in the PDP group and 2 patients (6% of the sample) in both the I and D groups exhibited the development of residual abscesses. None of the patients in the PDP group in the Tewari *et al*. trial had a persistent abscess [8, 9].

In line with the present investigation, a residual abscess was observed in 1 patient (4% of the total) among groups I and D in the study conducted by Saleem *et al*. in 2008.The study found that the mean duration of hospitalization after surgery for the I and D groups was 7.8 (0.9) days, however for the PDP group it was 3.8 days (1.1). The procedure was conducted in a state of short general anesthesia. To shatter the loculi, the trochar of the suction drain is crossed and rotated throughout the whole length of the abscess chamber [9, 10]. The study conducted by Tewari *et al*. involved the performance of PDP in the outpatient department (OPD) setting, as the treatment was conducted under local anesthesia. The Saleem *et al*. experiment found that the mean duration of hospitalization after surgery for both the I and D groups was 4 days. A study conducted by Kaushal *et al*. demonstrated that both the I and D groups exhibited extended durations of hospitalization following surgery. The present study found that the mean duration of hospitalization was 7.8 + 0.9 days for patients categorized as I and D, and 3.8 + 1.1 days for patients classified as PDP. The observed differences between the two groups were found to be statistically significant [10, 11]. The study conducted by Tewari *et al* does not provide information regarding the duration required for complete recovery. I's The study conducted by Saleem *et al*. found that the average duration for complete healing in both the I and D groups was 3 weeks. Kaushal *et al*. conducted a study that demonstrated a longer duration for complete healing in the I and D groups.

In the present investigation, it was observed that 10 patients (33%) in the I group and 14 patients (47%) in the D group exhibited scars measuring 4x2 cm and 5x2 cm, respectively. Among the 28 patients (93%) in the PDP group, the average size of the two scars was 0.5 x 1 cm [12, 13]. In the PDP group, a total of 10 people (33%) exhibited two scars, specifically entry and exit wounds, with an average size of 0.5 x 2 cm. Among the patients treated by I and D, 14 individuals (47%) had residual abscesses with a scar size measuring 4x2 cm. Tewari *et al*. noted similar little scars in individuals who received PDP [13, 14].

The existing approach to percutaneous suction drainage for breast abscess offers a multitude of advantages: During the procedure, all 30 patients maintained breastfeeding as the suction drain trochar was systematically manipulated along the whole abscess chamber, puncturing each loculus in the course of the procedure. The negative pressure exerted by the suction drain also contributed to the premature collapse of the abscess cavity. Based on the existing body of data, it is recommended to maintain breastfeeding during the course of therapy for puerperal breast abscess. There was an absence of breast parenchyma deformation or scarring. The introduction of the suction drain connection resulted in little morbidity, eliminated the need for USG localization of the abscess cavity, reduced costs associated with PBA therapy, and maintained the breast's structural integrity and functionality [14].

However, this method is only effective for the removal of highly variable PBA. The point of entry and departure of the suction drain trochar must vary according on the location of the PBA in the breast.

Conclusion

Percutaneous implantation of a suction drain is the preferred treatment choice for a puerperal breast abscess, as opposed to the usual alternatives (I and D). is less invasive (painful), necessitates a shorter duration of hospitalization, exhibits faster healing, and results in less scarring. Hence, PDP surpasses traditional approaches in terms of post-operative pain, duration of hospitalization, duration of full recovery, and scar dimensions.

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