

## Research Article

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# Comparative study of conventional incision and drainage versus percutaneous placement of suction drain: changing trend of breast abscess management

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## ABSTRACT

**Background:** We present a comparative study of conventional incision and drainage vs minimally invasive percutaneously placed suction catheter in patients of puerperal breast abscess. The aim was to develop an effective technique for management of breast abscess giving less morbidity and its efficacy over conventional method.

**Methods:** Sample size was 100 patients of age ranged from 18 to 34 years and duration July 2013 to July 2015, which was divided in two groups of 50 patients each. First group was treated by incision and drainage and second by percutaneous suction drainage, selection of patients was on alternate basis. Informed consent was taken from each patient before procedure. In suction drain placement procedure under local, 0.5% lignocaine with adrenaline, infiltration anesthesia 16F suction catheter was placed percutaneously in abscess cavity for 3-5 days.

**Results:** There was complete resolution of symptoms in all patients however healing time was significantly less in aspiration group (5 to 10 days) as compared with surgical drainage (9-19 days). There was 1 (2%) patient in drain group who required conversion to open surgical drainage. There were 2 cases presented with fistula out of 50 Incision and drainage patients. Breast feeding/ emptying was not interrupted in any patient of this minimally invasive method.

**Conclusions:** This technique is technically safer, effective, very less painful, cosmetically more promising and healing is quicker in this technique compare to conventional incision and drainage.

**Keywords:** Breast abscess, Puerperal breast abscess, Drain placement, Catheter placement

## INTRODUCTION

The treatment of breast abscess is a clinical dilemma which ranges from conservative treatment to surgical intervention. The conventional treatment of breast abscess has been surgical incision and drainage.<sup>1</sup> Drainage of breast abscess has undergone a gradual change from invasive to minimally invasive procedure in keeping with the current philosophy of surgery. The standard surgical approach (invasive) of incision and drainage (I and D), breaking loculi and insertion of a drain under general anesthesia or daily gauze packing has yielded to minimally invasive approach of percutaneous

placement of suction drain and aspiration/repeated aspiration of the abscess.<sup>1,2</sup> The Incision and Drainage method entails certain morbidity and cessation of breast function. A recently highlighted approach is drainage of pus by percutaneous drain placement under antibiotic cover.<sup>13</sup> This approach has advantages of complete resolution without scar formation and patient can continue breast feeding.

## METHODS

Study was done after proper clearance from institutional scientific and ethical committee. This study was carried

out in the Department of Surgery, tertiary care center over period of July 2013 to July 2015 in prospective manner and included patients of clinically diagnosed breast abscess. Sample size was 100 patients of age ranged from 18 to 34 years, which was divided in two groups of 50 patients each. First group was treated by incision and drainage and second by percutaneous suction drainage, selection of patients was on alternate basis. Informed consent was taken from each patient before procedure. Among them 78 were primi - para, 16 para - 2, 6 para-3.

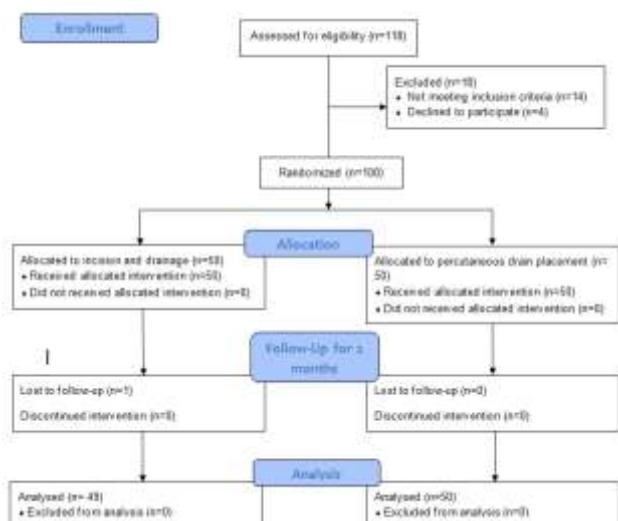
Patients generally presented with history of fever and pain in either of breast and had been on analgesics and sometimes on antibiotics which were prescribed at local hospital. On examination there was bulge in breast which was tender and fluctuant. Diagnosis of puerperal breast abscess was made. These patients were admitted and subjected to the required preoperative investigations like blood sugar, complete blood count. Patient was explained the procedure and informed consent was taken before procedure. Patients were alternately undergone incision and drainage and percutaneous placement of suction drain.

#### Inclusion criteria

- Patients with clinical diagnosis of breast abscess where fluctuation is positive.
- Patients undergoing surgical intervention i.e., Incision and drainage or Percutaneous placement of suction drain.
- Abscess size >5 cm.

#### Exclusion criteria

- Patients who are not willing for the surgical intervention.
- Non puerperal breast abscess.
- Abscess which are about to burst or with skin changes (for drain placement)



**Figure 1: Percutaneous suction drainage.**

Taking all aseptic precautions procedure was done as following:

1. **Conventional incision and drainage:** drainage under short GA with placement of small corrugated drain and repeated dressings in post op period.
2. **Percutaneous suction drainage:** Patient shown (Figure 1) had large fluctuant PBA involving whole breast. Lignocaine (with adrenaline 0.5% strength) local infiltration anesthesia was given 2cm above the upper palpable margin of abscess and 2cm below the lower palpable margin of abscess at 5 o' clock and 7 o'clock position for entry and exit of suction drain trocar, respectively. 16F trocar of suction drain was inserted through insertion site and brought out through abscess cavity at 5 o' clock or 7 o' clock position. The perforated portion of drainage tube was shortened to fit in abscess cavity. The drain was fixed to skin with the help of silk 2-0 and suction applied. Insertion site was closed by taking percutaneous sutures by vicryl 3-0. Pus was sent for culture and sensitivity. Patient was rested in out patients for 1 hour and sent home on oral antibiotic Augmentin (amoxicillin and clavulanic acid) 625mg BID for 5 days and analgesic Ibuprofen 400mg QID on first day and sos thereafter. Patient was encouraged to breast feed the baby. She was again seen on day 3 and day 5. When pus discharge was diminished to less than 10 ml drain was removed. Further examinations were made at 1 week, 2<sup>nd</sup> week and 4<sup>th</sup> week.

Both groups were compared on the basis of following outcomes:

1. Post-operative pain
2. Duration of hospital stay
3. Resolution time (drainage time)
4. Appearance of scar
5. Recurrence/fistula
6. Continuation of breast feeding/emptying/milk suppression

## RESULTS

Both methods were applied to 100 patients during time period from July 2013 to July 2015. Patients were followed for 2 months. Data was analysed using SPSS software. Means and standard deviation of resolution time and wound healing time of both groups were calculated. Results of two treatment groups were compared using test to access the hypothesis and a p value of <0.05 was taken as statistically significant.

Sample of pus was sent in each patient for culture and sensitivity. Of 100 specimens only 88 showed bacterial yield (88%). Of these, 18 (20.5%) were polymicrobial. The most common organism was *S. aureus*, present in 52 of 68 (74.2%) aerobic cultures, with *MRS*A in 32 (61.4%). The remaining organisms included coagulase-

negative *Staphylococcus*, *Pseudomonas aeruginosa*, *Proteus mirabilis*, and other isolates.

Patients were followed up to 2 months. The drain was removed in most of patients on 3<sup>rd</sup>-5<sup>th</sup> day; otherwise further visits to hospital were required on 7<sup>th</sup> or 8<sup>th</sup> day. Patients who underwent incision and drainage were advised admission for daily dressings. Maximum patients discharged after 3 days of hospitalization.

**Table 1: Cross tabulation between treatment groups and post op pain.**

Visual analogue scale	No. of patients			
	Incision and drainage		Drain placement	
	N	%	N	%
0	0	0	0	0
2	0	0	43	86
4	16	32	7	14
6	33	66	0	0
8	1	2	0	0
10	0	0	0	0

**Table 2: Cross tabulation between treatment groups and resolution time.**

Resolution time (days)	Procedure			
	Incision and drainage		Drain placement	
	N	%	N	%
1 - 5	-		7	14
6 - 10	6	12	39	78
11 - 15	26	52	4	8
16 - 20	17	36	-	
Total	49	100	50	100

We analysed post op pain (Table 1) with the help of visual analogue scale and maximum patients, 33 (66%) complained grade 6 i. e. significant post op pain in I and D group while maximum patients 43 (86%) which were treated by drain placement complained minimal discomfort (score 2) that is because of drains only. Mean pain score of incision and drainage was 6.56 while drain placement was well tolerated with mean pain score of 2.28.

Mean resolution time (Table 2) for drain placement was 7.76+/-2.137SD days. It ranged from 05 days for small abscesses to 12 days for larger abscesses. Failure rate of drain placement was (2%) with 01 patient requiring surgical drainage after drain placement. Mean resolution for incision and drainage was 14.22+/- 2.88SD days with range of 9 days to 19 days. Small abscesses (Up to 5cm) resolved within 2 weeks while larger abscesses required up to 4 weeks for complete resolution (p<0.0001).

Patients required counselling for breast feeding. As drain percutaneous drainage of breast abscess is minimal

invasive with minimal post op pain so maximum patients i. e. 41 (80.2%) continued breast feeding (table 3) while rest were adopted emptying and milk suppression due to fear of risk to baby. While in incision and drainage due to significant post op pain and pain associated with daily dressings only 27 patients (54%) continued breast feeding.

**Table 3: Cross tabulation between treatment groups and continuation of breast feeding/emptying.**

Category	No. of patients			
	Incision and drainage		Drain placement	
	N	%	N	%
Continued	27	54%	41	82%
Did not continued feeding (Due to fear) but breast emptying	8	16%	6	12%
Milk suppression	9	18%	1	2%
Nothing (No feeding, no emptying, no suppression)	5	10%	2	4%
Total	49	98%	50	100%

There were 2 cases reported of fistula in patients treated by I and D. Pre op and post op picture of abscess treated by percutaneous drain placement.



**Figure 1: Percutaneous drain placement procedure.**

#### Comparison of groups

The resolution time was less in drain group (p<0.0001) (Table-2). Main complication faced by patients in group A (drain placement) was pain. 86% patients rated this pain as a tolerable. Recurrence was observed in 01 patient in drain group. Mean pain score of incision and drainage was 6.56 while drain placement was well tolerated with

mean pain score of 2.28. Major complication in group B (I and D) was ugly scar and pain. All 51 patients treated by surgical drainage including those who were in group C or had failure of drain placement had this. Most of the patients (47/51) complained of daily change of dressings, especially packing of wound, as painful and cumbersome. There were 2 cases reported of fistula in patients treated by I and D.



**Figure 2: Pre-op and post-op pictures of percutaneous drain placement.**

## DISCUSSION

According to Haagensen "The conventional treatment of breast abscess has been surgical incision and drainage under general anaesthesia, a curved incision in the skin line is used and a penrose drain is left in a place for 72 hours".<sup>1</sup> The gold standard of puerperal breast abscess drainage described by Haagensen is supported by Webster with addition of gauze packing.<sup>2</sup> Patient requires hospitalization, breast feeding discontinued and lactation suppressed with tab bromocriptine 2.5 mg twice daily for 14 days.<sup>2</sup> Breast distortion due to scarring and persistent fistula or sinus developed in some patients.<sup>4</sup> By placing the incision over inflammatory part of breast scarring can be avoided in visible part of breast.<sup>5</sup>

Karstrup et al reported their experience that 18 out of 19 patients were treated successfully with ultrasound guided percutaneous drainage of breast abscess.<sup>3</sup> USG guided aspiration, antibiotic therapy and repeated USG guided

aspiration residual loculi underlines the importance of US imaging in modern management of PBA. It is an outpatient procedure in 53%, scar less in 100%, complete healing in 95% and breast feeding not interrupted in 42%.<sup>3</sup> A recent study has concluded that abscess smaller than 5cm can be treated effectively with repeated aspirations with good cosmetic results. Incision and drainage should be reserved for the larger abscess.<sup>6</sup> Women who underwent surgical incision and drainage experienced significantly longer healing times than the needle aspiration group (mean of 12.43 vs. 6.36 days) Garg et al. reported a success rate of 84% in 25 patients of PBA.<sup>6,7</sup>

In 1995 Berna JD et al described about the success of percutaneous catheter drainage of breast abscess in twelve patients.<sup>8</sup> Harish K evaluated the treatment of puerperal breast abscess by catheter drainage procedure in 75 patients.<sup>9</sup> In 1998 Pluchinotta AM et al performed percutaneous pigtail catheter drainage of peripheral non lactational breast abscess successfully in eight patients.<sup>10</sup> In 1998 Tan SM et al described about the non-operative treatment of breast abscess-needle aspiration and oral antibiotics as a viable alternative to conventional incision and drainage. Nineteen out of twenty one patients were successfully treated by needle aspiration and antibiotics.<sup>11</sup> In 2004 Berna-serna JD et al reported their experience with percutaneous management of breast abscess by means of needle aspiration (for fluid collection <or=3cm) and catheter drainage (for fluid collection >3cm) in 39 patients.<sup>12</sup>

Tewari M et al described a minimally invasive palpatory method of drainage of breast abscess i.e., percutaneous placement of suction drain but in that method there was percutaneous puncture of loculi by trochar only so there were still chances of remaining loculi and recurrent abscess.<sup>13</sup> Avoidance of repeated aspirations was the advantage of catheter placement in abscess cavity. Local instillation of antibiotics into abscess cavity is probably beneficial.

Resolution time is faster in percutaneous drain placement as compared to incision and drainage. Moisture is maintained and antibiotic instillation in cavity can be done.

Advantages of percutaneous suction drain placement over conventional incision and drainage are:

1. All loculi are traversed and punctured with the help trocar.
2. Negative suction of drain collapses remaining loculi. There was almost no chance of residual abscess or recurrent abscess.
3. Breast feeding was continued in all patients having pus c/s report sterile or breast emptying was counselled. Evidence today recommends that breast feeding should be continued during treatment of puerperal breast abscess.

4. There was no scarring or distortion of breast parenchyma.
5. Treatment was cost effective and there is maintenance of function of breast.
6. Morbidity was minimal only discomfort with attachment of suction drain.
7. There was no discomfort of repeated dressings which occurs in I and D.
8. There is no risk of fistula or sinus formation.
9. Patient easily carry out post catheter placement care of treated breast and suction drain.
10. This method of evacuation of pus is one stop outpatient procedure. Hospitalization was not required in any patient and need for repeated USG or puncture is precluded.

However this method is applied to large fluctuant abscess (size > 4 cm). The point of entry and exit of suction drain trocar vary according to the position of abscess in breast.

Needle aspiration with or without ultrasound guidance and antibiotic therapy are recommended as the first-line treatment of lactational breast abscesses measuring <4 cm in diameter.

Larger abscesses (>4 cm in diameter) and some recurrent abscesses require catheter drainage or surgical incision and drainage. Regular natural milk emptying of the breast is an essential part of treatment (Figure 2).

## CONCLUSION

This technique is technically safer, effective, very less painful, cosmetically more promising and healing is quicker in this technique as compared to conventional incision and drainage.

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*Ethical approval: The study was approved by the institutional ethics committee*

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