Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/81qxq187

LOOP DRAINAGE VERSUS CONVENTIONAL INCISION AND DRAINAGE TECHNIQUE IN CUTANEOUS ABSCESSES – A RANDOMIZED CONTROLLED TRIAL

Muhammad Kamil Zulfiquar[1*], Muhammad Adil Zulfiquar[2], Usama Rafi[3], Muhammad Saim Azam[4], Affaf Ahmed[5], Iqra Khalid[6], Fajar Noor[7], Hareem Nazeef[8]

[1*,2,3,4]Post Graduate Trainee in General Surgery, Services Hospital, Lahore Pakistan
[5]Post Graduate Trainee in General Surgery, Allied Hospital, Faisalabad Pakistan
[6]Post Graduate Trainee in Paediatric Surgery, Allied Hospital, Faisalabad Pakistan
[7]Mayo Hospital, Anarkali, Lahore Pakistan
[8]Central Park Teaching Hospital, Lahore Pakistan

***Corresponding Author:** Muhammad Kamil Zulfiquar
*Email: kamilzulfiqar786@gmail.com

ABSTRACT

Background: Cutaneous abscesses are increasingly frequent in adult and paediatric surgical emergency rooms. The treatment methods include conventional incision and drainage and secondary closure, primary closure with antimicrobial coverage, and loop incision, drainage.

Objective: To compare the short term outcomes after Loop Drainage of Cutaneous abscess versus conventional Incision and Drainage technique in the adult population.

Study design: Randomized controlled trial (no blinding).

Place and duration of study: Department of Surgery, Services Hospital, Lahore, Pakistan from 30th November 2019 to 30th May 2020.

Methodology: Study was conducted on 256 participants. Participants were randomized in two groups in 1:1 ratio using lottery method. Group A included Conventional Incision and Drainage Technique which is Simple incision made at the most fluctuant part of the swelling. Group B was Loop Drainage Technique in which two small incisions were made at abscess edges, 3-5cm apart. Outcome variables including operative time, pain score, change in abscess diameter were recorded on proforma.

Results: Patients in group A had a mean age of 42.61±13.34 years, whereas those in group B had 41.80±14.79 years. Compared to group B, group A included 56 men (43.8%) and 72 females (56.3%). The mean operating time in group A was 16.49±1.12 min while in group B the mean operating time was 14.99±3.41 min ($p<0.05$). The mean pain score in group A was 4.28±1.79, whereas in group B the mean pain score was 6.00±1.47 (p-value=0.000). The mean diameter in abscess before drainage in group A was 3.35±1.04 while in group B the mean diameter of abscess before drainage was 3.51±1.17. The mean diameter in abscess after drainage in group A was 2.66±1.04 whereas in group B the mean diameter of abscess after drainage was 2.77±1.16. The change in diameter in abscess in group A was 0.68±0.10. On the other side in group B the mean change in diameter of abscess was 0.60±0.11 (p-value=0.000)

Conclusion: The loop drainage technique was found to have better outcome as compared to conventional incision and Drainage Technique. So, it is concluded that Loop Drainage Technique for Cutaneous abscess is a safe and effective technique in the adult population.

Key words: Loop Drainage, Cutaneous, Abscess, Conventional, Incision, Adult, population

INTRODUCTION

In both adult and paediatric surgical emergency rooms, cutaneous abscesses are a frequent concern with an increasing prevalence.[1] Gram-positive cocci are often the causative organisms.[2] Despite the significant disease burden, a variety of care techniques have been used to treat these abscesses. These treatments differ greatly from one another.[3, 4] These consist of the previously used loop incision and drainage technique, the traditional approach and primary closure with antibiotic coverage, and the drainage technique and secondary closure. The more recent loop incision, drainage procedure has become more common in paediatric patients and has shown to be both economical and safe. Furthermore, studies have shown that it is less invasive and uncomfortable than traditional incision and drainage.[5, 6] Making a minimal incision at the borders of the abscess, followed by wound exploration and irrigation, is the loop incision and drainage procedure. One Vessiloop is inserted through one incision, the other is pulled out, and the two ends are fastened together. After the drainage stops, which normally happens in seven days, the drain is removed from its original location.[7-10]

RCTs comparing the two approaches in the adult population are, however, very rare. According to an Australian research, the loop incision and drainage procedure is a useful method that reduces operating room time by 30%.[11] Since there is little local literature on this topic, a randomised controlled trial is planned to compare short-term abscess resolution, complications, and return visits after conventional incision and drainage vs loop incision and drainage in adult cutaneous abscesses.

This study aims to compare the short-term outcomes after loop drainage of cutaneous abscess versus conventional incision and drainage technique in adult population.

MATERIALS AND METHODS

Study design: Randomized controlled trial (non-blinding)

Place and duration of study: Department of Surgery, Services Hospital, Lahore from 30th November 2019 to 30th May 2020.

Sample size: Sample size of 256 cases; (128 cases in each group is calculated with 80% power of test, 95% confidence level and taking mean operative time was 15.75±0.88 in Loop drainage and 15±2.89 in I & O Group. (10)

Sampling Technique: Non-probability consecutive sampling

Selection criteria

Inclusion criteria: Patients of age 18 – 65 years of either gender presenting with abscess swelling of size ≤ 5 cm in diameter, as larger abscess may required more intervention. Abscess at upper and lower extremities, trunk, inguinal/groin region and head and neck region were enrolled in the study.

Exclusion criteria: Patients not giving consent or requiring re-drainage of abscesses were excluded from the study.

Data collection: After taking approval of study from Institutional Review Board, study was conducted on 256 participants (128 in each group). Written informed consent was sought from the study participants and surgery was performed by same trained surgical team. Patient demographics, comorbidities, abscess location and its diameter was clinically assessed and recorded. Participants were randomized in two groups in 1:1 ratio using lottery method.

1. **Group A: Conventional Incision and Drainage Technique:** Simple incision at the swelling's most fluctuant point. Pus pockets opened. Drained pus. Loculations fail. Washing wound with regular saline. Packing and treating wounds. Secondary intention heals wounds.
2. **Group B: Loop Drainage Technique:** Two tiny 3-5cm incisions were made at abscess margins. It was followed by wound exploration and loculation breaking. The abscess cavity was extensively irrigated with a 10ml sterile syringe of normal saline. At the commencement of the surgery, a sterile loop drain, modified 8Fr/6Fr feeding tube, modified glove, or Vessiloop were inserted via one incision and removed from the other. Then the loop's edges were knotted with an outside knot. To

avoid adhesions and promote drainage, patients may handle the drain themselves. The drain was left in place and removed after drainage stopped.

We recorded outcome variables as follow:

1. Operative time, from the start of the procedure i.e. the period between first incision to the end, measured in minutes.
2. Post-operative pain score, measured on Visual Analog Scale i.e. 10=worst possible pain, 0=no pain. It was assessed at completion of procedure
3. Change in diameter of abscess and cellulitis 7 days after procedure, measured in cm. i.e. Change in diameter=Diameter before the procedure – Diameter at 7^{th} post-op day.

Data analysis: The data was entered and analyzed in SPSS version 20. Visual analogue scale pain scores, change in diameter of abscess, operative time was compared using independent sample's t-test. P value of ≤0.05 was considered as significant.

RESULTS

The mean age of the patients in group A was 42.61±13.34 years whereas in group B the mean age of the patients was 41.80±14.79 years. In group A, there were 56(43.8%) males and 72(56.3%) females. In group B, there were 67(52.3%) males and 61(47.7%) females. The mean operating time (primary outcome) in group A was 16.49±1.12 min while in group B the mean operating time was 14.99±3.41 min. There was significant difference in the mean values of mean operating time in treatment groups (p<0.05). The mean pain score (primary outcome) in group A was 4.28±1.79, whereas in group B the mean pain score was 6.00±1.47 and the difference was calculated as significant (p-value=0.000). ***Table 1***

Secondary outcome

The mean diameter in abscess before drainage in group A was 3.35±1.04 while in group B the mean diameter of abscess before drainage was 3.51±1.17. The mean diameter in abscess after drainage in group A was 2.66±1.04 whereas in group B the mean diameter of abscess after drainage was 2.77±1.16. The change in diameter in abscess in group A was 0.68±0.10. On the other side in group B the mean change in diameter of abscess was 0.60±0.11 and the difference was calculated as significant (p-value=0.000) ***Table 2***

Table 1: Demographics and primary outcome of patients in both Treatment Groups

	Group A	***Group B***	***P-value***
n	***128***	***128***	
Age	42.61 ± 13.34	41.8 ± 14.79	0.6458
Gender			
Male	56(43.8%)	67(52.3%)	0.1690
Female	72(56.2%)	61(47.7%)	
Primary outcome			
Mean operative Time	16.49 ± 1.12	14.99 ± 3.41	<0.0001
Pain score	4.28 ± 1.79	6 ± 1.47	<0.0001

Table 2: Secondary outcome of patients in both Treatment Groups

	Group A	***Group B***	***P-value***
n	128	128	
Secondary outcome			

Diameter of abscess before drainage	3.35 ± 1.04	3.51 ± 1.17	0.2486
Diameter of abscess after drainage	2.66 ± 1.04	2.77 ± 1.16	0.4251
Change in diameter of abscess	0.68 ± 0.1	0.74 ± 0.11	<0.0001

DISCUSSION

Recent years have seen a rise in the use of the loop drainage technique for skin abscesses, and several retrospective studies have been conducted. [12, 13]. Abscess drainage is marketed as a straightforward, less invasive, and more pleasant operation; however, a randomised clinical study has not been used to assess the technique's effectiveness in treating adults. According to early study results, there is no difference in abscess and cellulitis resolution between the loop drainage approach and traditional incision and drainage technique. [14]

In our study, there was a significant difference in the mean values of mean operating time, mean pain score, and change in abscess diameter in treatment groups. However, Ozturan et al. reported that no statistically significant difference was observed between the groups regarding adverse effects, satisfaction, or repetitive drainage need in adult population.[15] A recent research found that loop drainage resulted in a 0.6 cm (95% CI: −1.7–0.5) and −3 cm (95% CI: −3.4–0.8) decrease in abscess and cellulitis diameter compared to incision and drainage. The operation time was comparable across the two groups, with a median of 15 minutes (15.75±0.88) (IQR: 15-18) for loop drainage and 15 minutes (10-20) for incision and drainage (p =0.388). After the surgery, pain intensity was 5.8 ± 3.2 in loop drainage and 6.4 ± 1.9 in traditional incision and drainage (p=0.468). Loop drainage needed 3 (14.0%) follow-up visits, whereas traditional incision and drainage needed 7 (30.4%) with p value of 0.153.[10] The data supporting the use of the loop drainage approach in skin abscesses is somewhat unstable and mostly consists of retrospective research. Tsoraides et al. examined the need of repeat drainage and reported the benefits of the loop technique in skin abscesses. In this trial, just 5.5% of the 110 patients needed repeat drainage, and the authors contend that because fewer patients needed wound care supplies, there should be cost savings with this procedure [12].

In addition, Ladd et al. examined the early results of loop drainage in 128 patients at two institutions and found no evidence of treatment failure linked to the method; in contrast, our research found a significant difference in the mean values of change in abscess diameter between treatment groups (p-value=0.000).[16] Many of the patients in each of these investigations were sedated, and the researchers were surgeons. The effectiveness of the loop drainage approach was previously compared to incision and drainage in two retrospective cross-sectional studies. Treatment failure rates were 1.4% in the loop and 10.5% in the incision and drainage groups, according to Ladde et al.[13] Additionally, McNamara et al. treated 85 patients with subcutaneous abscess using subcutaneous drains and discovered no recurrences or incomplete drainages [17].

Gaszynski et al. completed the only adult experiment comparing loop drainage to normal incision and drainage in 2015. Loop drainage outperformed incision and drainage in this retrospective, cross-sectional investigation. We found that loop drainage was better than conventional incision and drainage in terms of operation time, pain score, and abscess diameter change.[18] Ozturan et al. reported 100% follow-up rates, no repeat drainage, and a 30% reduction in operation time in the loop drainage group, while our study found a 15% reduction compared to the Conventional incision and Drainage Technique.[15, 18]

Gaszynski et al. say Loop Drainage of Cutaneous Abscesses is safe and beneficial for any subcutaneous abscess.[18] Loop Drainage of Cutaneous Abscess shows high post-intervention compliance. Investigations showed that Loop Drainage of Cutaneous Abscess is well tolerated and may be done in the Emergency Department, avoiding hospital stays. Technically, it's easy and fast. The patient may undertake post-insertion care with soap and water without community nursing. The drain is cut with a stitch cutter or scissors and removed from the incision with smooth steady traction in a painless and quick operation.[16]

Loop drainage improves follow-up compliance when patients return for loop removal. Ozturan et al. found loop drainage to be a safe and effective alternate therapy for adult ED cutaneous abscesses[15]. Another study found no difference in treatment success, pain intensity, or procedure duration between loop drainage and standard incision and drainage, but our study found a reduction in operation time, pain score, and abscess diameter.[15] According to another study their findings were not able to show superiority of Loop Drainage of Cutaneous abscess over Conventional incision and Drainage Technique. [18]

CONCLUSION

The loop drainage technique was found to have better outcome as compared to conventional incision and Drainage Technique. So, it is concluded that Loop Drainage Technique for Cutaneous abscess is a safe and effective technique in the adult population.

REFERENCES:

1. May AK. Skin and soft tissue infections. Surgical Clinics of North America. 2009;89(2):403-20.
2. Gatti M, Gasparini LE, Grimaldi CM, Abbati D, Clemente S, Brioschi PR, et al. Septic shock due to NSTI caused by Actinomyces turicensis: the role of clinical pharmacology. Case report and review of the literature. Journal of Chemotherapy. 2017;29(6):372-5.
3. Guyatt G, Gutterman D, Baumann MH, Addrizzo-Harris D, Hylek EM, Phillips B, et al. Grading strength of recommendations and quality of evidence in clinical guidelines: report from an American College of Chest Physicians task force. Chest. 2006;129(1):174-81.
4. Simonsen SE, Van Orman E, Hatch B, Jones S, Gren L, Hegmann K, et al. Cellulitis incidence in a defined population. Epidemiology & Infection. 2006;134(2):293-9.
5. Schechter-Perkins EM, Dwyer KH, Amin A, Tyler MD, Liu J, Nelson KP, et al. Loop Drainage Is Noninferior to Traditional Incision and Drainage of Cutaneous Abscesses in the Emergency Department. Academic Emergency Medicine. 2020;27(11):1150-7.
6. Tsoraides SS, Pearl RH, Stanfill AB, Wallace LJ, Vegunta RK. Incision and loop drainage: a minimally invasive technique for subcutaneous abscess management in children. Journal of pediatric surgery. 2010;45(3):606-9.
7. Vinh DC, Embil JM. Rapidly progressive soft tissue infections. The Lancet infectious diseases. 2005;5(8):501-13.
8. Björnsdóttir S, Gottfredsson M, Thórisdóttir AS, Gunnarsson GB, Ríkardsdóttir H, Kristjánsson M, et al. Risk factors for acute cellulitis of the lower limb: a prospective case-control study. Clinical infectious diseases. 2005;41(10):1416-22.
9. Ki V, Rotstein C. Bacterial skin and soft tissue infections in adults: a review of their epidemiology, pathogenesis, diagnosis, treatment and site of care. Canadian Journal of Infectious Diseases and Medical Microbiology. 2008;19(2):173-84.
10. Gabillot-Carré M, Roujeau J-C. Acute bacterial skin infections and cellulitis. Current opinion in infectious diseases. 2007;20(2):118-23.
11. Kowalski TJ, Berbari EF, Osmon DR, editors. Epidemiology, treatment, and prevention of community-acquired methicillin-resistant Staphylococcus aureus infections. Mayo Clinic Proceedings; 2005: Elsevier.
12. Tsoraides SS, Pearl RH, Stanfill AB, Wallace LJ, Vegunta RK. Incision and loop drainage: a minimally invasive technique for subcutaneous abscess management in children. Journal of pediatric surgery. 2010;45(3):606-9.
13. Ladde JG, Baker S, Rodgers CN, Papa L. The LOOP technique: a novel incision and drainage technique in the treatment of skin abscesses in a pediatric ED. The American journal of emergency medicine. 2015;33(2):271-6.
14. Pastorino A, Tavarez MM. Incision and drainage. Treasure Island (FL): StatPearls Publishing; 2020.

15. Özturan İU, Doğan NÖ, Karakayalı O, Özbek AE, Yılmaz S, Pekdemir M, et al. Comparison of loop and primary incision & drainage techniques in adult patients with cutaneous abscess: A preliminary, randomized clinical trial. The American journal of emergency medicine. 2017;35(6):830-4.
16. Ladd AP, Levy MS, Quilty J. Minimally invasive technique in treatment of complex, subcutaneous abscesses in children. Journal of pediatric surgery. 2010;45(7):1562-6.
17. McNamara WF, Hartin Jr CW, Escobar MA, Yamout SZ, Lau ST, Lee Y-H. An alternative to open incision and drainage for community-acquired soft tissue abscesses in children. Journal of pediatric surgery. 2011;46(3):502-6.
18. Gaszynski R, Punch G, Verschuer K. Loop and drain technique for subcutaneous abscess: a safe minimally invasive procedure in an adult population. ANZ journal of surgery. 2018;88(1-2):87-90.