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CME Information: A Randomized Controlled Trial of Novel Loop Drainage Technique Versus Standard Incision and Drainage in the Treatment of Skin Abscesses

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Authors: Jay Ladde, MD, Sara Baker, MD, Natali Lilburn, MD, Michelle Wan, MD, Linda Papa, MDCM, MSc

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Educational Objectives

After reading the article, participants should be able to compare loop drainage vs drainage and packing for skin abscesses.

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CME

A Randomized Controlled Trial of Novel Loop Drainage Technique Versus Standard Incision and Drainage in the Treatment of Skin Abscesses

Jay Ladde, MD[1], Sara Baker, MD[1], Natali Lilburn, MD[2], Michelle Wan, MD[3], and Linda Papa, MDCM, MSc[1]

ABSTRACT

Objectives: The objective was to compare the failure rate of incision and drainage (I&D) with LOOP technique versus I&D with standard packing technique in adults and children presenting to the emergency department (ED) with subcutaneous abscess.

Methods: This prospective, randomized controlled trial (NCT03398746) enrolled a convenience sample of patients presenting to two Level 1 trauma centers over 12 months with skin abscesses. Of 256 patients screened, 217 patients were enrolled, 109 randomized to I&D with packing (50%) and 108 (50%) to I&D with LOOP. The primary outcome was treatment failure defined by admission, IV antibiotics, or repeat drainage within 10-day follow-up. The secondary outcomes included ease of procedure, ease of care, pain, and satisfaction using a 10-point numeric rating scale.

Results: There were no differences in patient characteristics between groups. Follow-up data were available in 196 (90%). Treatment failure occurred in 20% (range = 12%–28%) of packing patients and 13% (range = 6%–20%) of LOOP patients ($p = 0.25$). There were no significant differences in failure rates in adults ($p = 0.82$), but there was a significant difference in children (age ≤ 18 years) at 21% (range = 8%–34%) in the packing group and 0 (0%) in the LOOP group ($p = 0.002$). Operators reported no significant differences in ease of procedure between techniques ($p = 0.221$). There was significantly less pain at follow-up in the LOOP group versus packing ($p = 0.004$). The wound was much easier to care for over the first 36 hours in the LOOP group ($p = 0.002$). Patient satisfaction at 10 days postprocedure was significantly higher in the LOOP group ($p = 0.005$).

Conclusions: The LOOP and packing techniques had similar failure rates for treatment of subcutaneous abscesses in adults, but the LOOP technique had significantly fewer failures in children. Overall, pain and patient satisfaction were significantly better in patients treated using the LOOP technique.

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INTRODUCTION

Background

Cutaneous abscesses are commonly treated in the emergency department (ED). Incision and drainage (I&D) of these infections are performed over 1.4 million times per year in the United States.[1,2] While some form of I&D is clearly the standard of care, additional packing of the abscess cavity is controversial.[3,4] Treatment options for outpatient management of cutaneous abscesses include I&D with or without oral antibiotics, packing, or drains. Since community-acquired methicillin-resistant *Staphylococcus aureus* (ca-MRSA) has become a predominant causal pathogen in abscess development, increasing importance has been placed on both thorough I&D and appropriate antibiotic use.[2,4] Although antibiotics have traditionally been prescribed after I&D, evidence suggests that antibiotic use is of limited benefit for uncomplicated abscesses.[2,5] Both ACEP's "Choosing Wisely Guidelines" and the Infectious Disease Society of America (IDSA) have previously recommended avoiding antibiotics in many circumstances. Increasingly, cutaneous abscesses are treated with I&D alone; effective technique is especially important. The LOOP technique, in which one or multiple vessel loops is placed in through the abscess cavity, is an alternative to traditional packing that still allows the abscess cavity to continue to drain.[6-9]

Most providers follow standard I&D with wound packing.[2,4] Traditionally, this is believed to prevent premature wound margins from closing and promote continued drainage, although evidence for this is limited, and recent investigations have questioned the necessity of packing.[3,10] Despite these and other investigations questioning the utility of packing or even the need to leave the wound open, most non-packing approaches have been limited to small abscesses in uncomplicated patients or have required relatively large incisions to expose most of the length of the abscess cavity.[4] Furthermore, packing can be harmful: placement and maintenance of packing is painful for patients, who use more analgesia as a result.[11] Return visits to have packing replaced can be inconvenient for patients, and packing can prematurely dislodge from the abscess cavity. However, the vast majority of ED providers report that they routinely do proceed with packing after I&D likely due to concerns relating to early abscess closure, incision size, and abscess size.[4]

The LOOP technique offers an alternative to packing that does not require large incisions and can be used in small and large abscesses, preventing premature closure and promoting continued drainage in a manner similar to packing.[6,11] A vessel loop is placed into the abscess cavity through two small incisions after loculations are bluntly opened and the cavity is irrigated. The vessel loop is tied loosely and left in place for several days so that the wound can drain and then removed by cutting the vessel loop and gently retracting it from the wound (Figure 1). If the abscess is large, multiple vessel loops can be placed to span the entire abscess cavity. Vessel loops do not need to be changed or replaced. The use of the LOOP

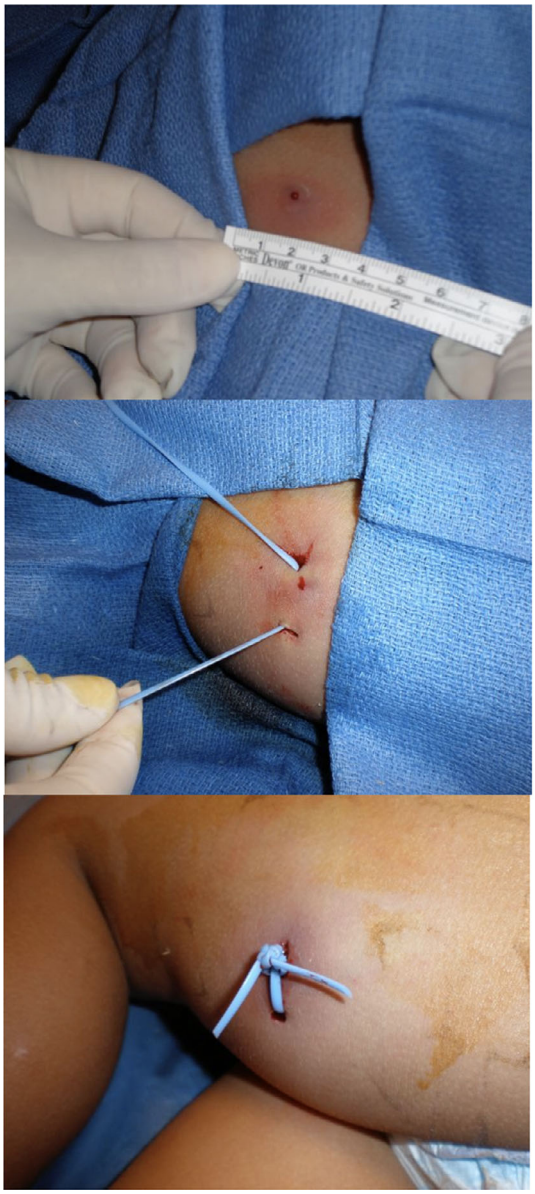

Figure 1. LOOP technique for abscess.

technique by emergency physicians in a pediatric ED was first described by Ladde et al.[6] in which failure rates were found to be 1% using the LOOP technique versus 11% using standard I&D. A small randomized trial on 46 patients showed that loop drainage technique was similar to standard I&D technique in abscess resolution and complications.[8] A meta-analysis published in 2018 concluded that the LOOP technique was associated with a lower failure rate than packing.[11]

Importance

Current investigations are limited by small sample sizes and predominantly retrospective study designs.[11] This study is addressing these limitations by comparing the failure rates of I&D utilizing the LOOP technique versus standard packing in both adults and children presenting to the ED with subcutaneous abscess.

Goals of This Investigation

This investigation compares overall treatment failure rates in two groups of patients: I&D with LOOP technique versus I&D with packing in the management of subcutaneous skin abscesses in both adult and pediatric patients presenting to the ED. Also assessed are ease of procedure, pain, wound care, and satisfaction.

METHODS

Study Design and Setting

This was a prospective unblinded randomized clinical trial (Clinical Trials Registration ID NCT03398746) comparing the efficacy of the I&D with LOOP technique with I&D with packing for the treatment of subcutaneous abscesses in the ED. This study was approved by our institutional review board. Verbal and written consent was obtained from all patients or their legal guardians. This study was conducted from March 14, 2009, until April 10, 2010, in a Level 1 tertiary care adult trauma center with annual volume of 70,000 patients and a Level 1 tertiary care pediatric trauma center with an annual volume of 40,000 patients.

Selection of Participants

A convenience sample of eligible patients based on when the research team was available was approached 7 days a week 24 hours a day. Patients of any age presenting to either ED with subcutaneous skin abscesses necessitating ED drainage were eligible for the study. Patients were excluded if the abscess was located on hand, foot, or face or if it required admission and/or operative intervention. After the treating emergency physician evaluated and determined that patient met study eligibility criteria based on these inclusion and exclusion criteria, a study investigator approached the patient and/or guardians to obtain written informed consent.

Interventions and Measurements

After eligibility was confirmed and consent was obtained, personal data and characteristics of the abscess were gathered. Patients were assigned in a 1:1 ratio to either the LOOP or packing group via randomly coded envelopes in a blinded fashion. Numbered study packets were randomized using an online randomization tool and placed in a research bin in the ED. Researchers were instructed to take envelopes in sequential order. Study group assignments were not revealed to any member of the research team until after the patient was consented and the seal was broken.

The LOOP group underwent I&D as described in previous literature using a vessel tie loop.[6] The standard packing group was packed with sterile ribbon gauze. Both groups had procedural consents and skin preps per protocol. The treating physician used local anesthesia as needed in all adult and most pediatric patients. The treating physician was given full discretion on the use of sedation in the pediatric population. The utilization of antibiotics was solely at the discretion of the treating physician. These data were recorded along with presence of cellulitis which was measured as erythema beyond 2 cm from edge of palpated abscess. Patients had pain scores recorded using a 10-cm visual analog scale (VAS). Ten-centimeter VAS scores were also utilized to record treating physician's ease in doing procedure as well as follow-up pain scores and patient ease of care at 36 hours. Patients were all instructed to follow-up at 36 hours for reevaluation. They also had a live or phone follow-up at 10 days postprocedure. Those patients who did not return and could not be reached by phone were sent a registered letter with a follow-up form along with a self-addressed stamped envelope and instructions to call an investigator. Those patients who were never reached had a medical record review at 1 year after initial presentation.

Outcome Measures

The primary outcome measurement was treatment failure defined as requiring additional procedure, intravenous antibiotics, or operative intervention on follow-up. Secondary measures were ease of procedure at time of intervention (clinician's perspective), pain at time of treatment (patient/parent's perspective), ease of care at 36 hours (patient/parent's perspective), and pain at 36 hours (patient/parent's perspective). Ease of procedure and ease of care were measured using a 10-point numeric rating scale from 0 (easiest) to 10 (most difficult). Pain was measured using a 10-point numeric rating scale from 0 (none) to 10 (most); in children too young to verbalize pain, parents were asked to rate the pain with assistance of Wong-Baker Faces scale. A tertiary outcome measure was patient satisfaction at 10 days postprocedure, also measured using a 10-point numeric rating scale from 0 (very unsatisfied) to 10 (very satisfied).

Data Analysis

Data were analyzed using descriptive statistics including proportions and means with 95% confidence intervals (CIs). Univariate analyses included Fisher's exact test, contingency coefficient, and Mann-Whitney U-test. Comparison of failure rates between the two treatment groups was performed using Fisher's exact test. Significance was set at 0.05. An a priori sample size calculation was performed prior to starting the study and yielded a sample of 180 patients (for both adults and children) with 90 patients in the LOOP group and 90 in the packing group. This achieved an 80% power using two-sided Z-test with unpooled variance to detect a difference between the group proportions of 0.09. This difference was determined using data from a retrospective study at our institution.[6] The significance level of the test was targeted at 0.05. Assuming a lost-to-follow-up rate of 15%, we targeted a total sample size of 212 patients. Post hoc we conducted another power analysis specifically for the pediatric population.

RESULTS

Characteristics of Study Subjects

We identified 256 potential study patients with abscesses during the 12-month study period; 217 patients met enrollment criteria and were randomized. A total of 109 cases were randomized to packing (50%), and 108 cases (50%) were randomized to the LOOP technique. Figure 2 depicts the flow diagram of patients screened and enrolled into the study. Patient characteristics in each group are provided in Table 1. There were no statistically significant differences in any of the patient characteristics including age (p = 0.76), sex (p = 0.50), location of the abscess (p = 0.15), or use of sedation (p = 0.99) between the packing and LOOP groups. About 72% (95% CI = 64% to 81%) of patients randomized to packing and 69% (95% CI = 61% to 78%) of LOOP had overlying cellulitis. There were also a large proportion of patients prescribed antibiotics; 95% (95% CI = 91% to 99%) of packing and 94% (95% CI = 90% to 99%) of LOOP groups received some combination of antibiotics. The antibiotics prescribed in 80% of both children and adults were a combination of cefalexin and trimethoprim/sulfamethoxazole.

Main Results

Outcome data were available in 90% (196 of 217) of enrolled patients. Overall, treatment failure occurred in 32 (15%) of all enrolled patients with follow-up. Treatment failure occurred in 19 (20%; 95% CI = 12% to 28%) of those in the packing group and in 13 (13%; 95% CI = 6% to 20%) of those in the LOOP group (p = 0.25; Figure 3A). Among the adults, there were no significant differences in treatment failure between the two groups (p = 0.82; Figure 3B). However, among the children aged younger than 19 years, treatment failure occurred in nine (21%; 95% CI =

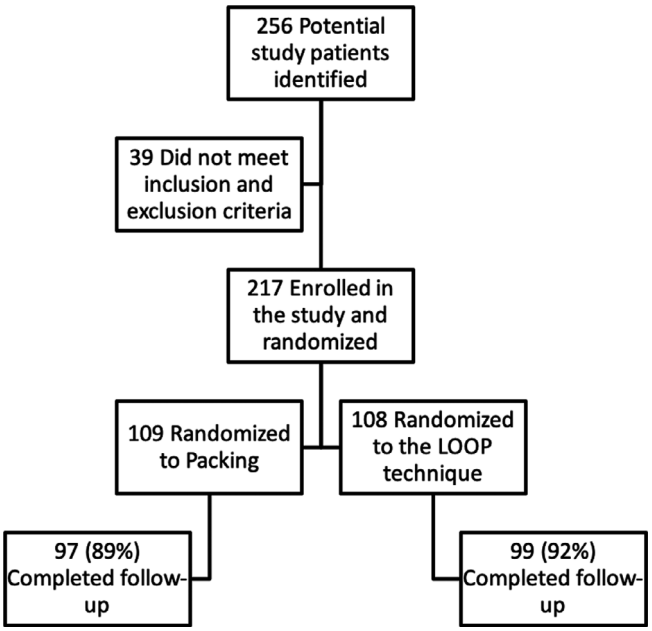

Figure 2. Flow diagram of screened and enrolled patients.

Table 1
Description of Patient Characteristics in the I&D With Packing Versus I&D With LOOP

	Packing, *n* = 109 (%)	LOOP, *n* = 108 (%)	Total, *N* = 217	p-value
Age (years), mean [95% CI]	22 [19–25]	21 [18–25]	22 [19–24]	
Range	0.2–69	0.5–65	0.2–69	0.757
Sex (% female)	58 (53%)	52 (48%)	110 (51%)	0.498
Location of abscess				
Head and neck	4 (4)	3 (3)	7 (3)	0.126
Torso	10 (9)	13 (12)	23 (11)	
Extremities	64 (59)	47 (44)	111 (51)	
Buttocks/groin	31 (28)	45 (42)	76 (35)	
Size of abscess (cm)				
<1	4 (4)	9 (8)	13 (6)	0.533
1–2.5	46 (42)	44 (41)	90 (42)	
2.5–4	40 (37)	36 (33)	76 (35)	
>4	19 (17)	19 (18)	38 (18)	
Cellulitis	79 (73)	75 (69)	154 (71)	0.656
Sedation	32 (30)	32 (30)	64 (30)	0.999
Antibiotics prescribed at discharge (*n* = 213)	102 (95)	100 (94)	202 (93)	0.768
Antibiotics (*n* = 202)				
Cefalexin	1 (1)	0 (0)	1 (1)	0.053
Trim/sulfa	6 (6)	17 (17)	23 (11)	
Cefalexin and trim/sulfa	86 (84)	79 (79)	165 (82)	
Clindamycin	4 (4)	3 (3)	7 (4)	
Other	5 (5)	1 (1)	6 (3)	

I&D = incision and drainage; Trim/sulfa = trimethoprim/sulfamethoxazole.

8% to 34%) of those in the packing group and in 0 (0%) of those in the LOOP group (p = 0.002; Figure 2C). Figure 4 depicts the flow chart of outcomes by age group.

The operators reported no significant differences in ease of performing the procedure between the two techniques (p = 0.221; Table 2). There was no statistically significant difference in pain between the two groups at the time of the procedure (p = 0.446; Table 2). However, there was significantly less pain at follow-up in those having the LOOP technique versus packing (p = 0.004; Figure 5). Furthermore, patients reported that the wound was much easier to care for (ease of care) over the first 36 hours in the LOOP group (p = 0.002; Table 2). Overall patient satisfaction at 10 days postprocedure was significantly higher in the LOOP group compared to the packing group (p = 0.005; Table 2).

A comparison of characteristics and outcomes in adults versus children is provided in Table 3. Notably, size of abscess was not significantly different between children and adults. Wound characteristics were similar in both age groups except children had more abscesses on the buttock/groin areas, and adults had more on the extremities and the torso. Children were sedated more often (73% vs. 2%), and adults had more antibiotics prescribed at discharge (98% vs. 91%). Patients' or parents' perceptions of ease of care, pain over the first 36 hours, and satisfaction at 10 days were not statistically different between groups. Pain at time of procedure was higher in adults than children (4.9 vs. 3.1).

Given the failure rates between the LOOP and packing groups were significant in children and not in adults, we conducted a post hoc power calculation to assess the adequacy of the sample size in the subset of children. With a set sample size of 87 children and a difference in treatment failure of 0.21 between groups, a two-sided Z-test with unpooled variance with a significance of 0.05 yielded a power of 90%. Table 4 is a comparison of characteristics between the two treatment groups (packing vs. LOOP) in children only. There were no significant differences in patient or wound characteristics in the packing or LOOP groups.

DISCUSSION

This randomized controlled study was conducted in adult and pediatric EDs to compare the I&D with the LOOP technique versus traditional I&D with packing

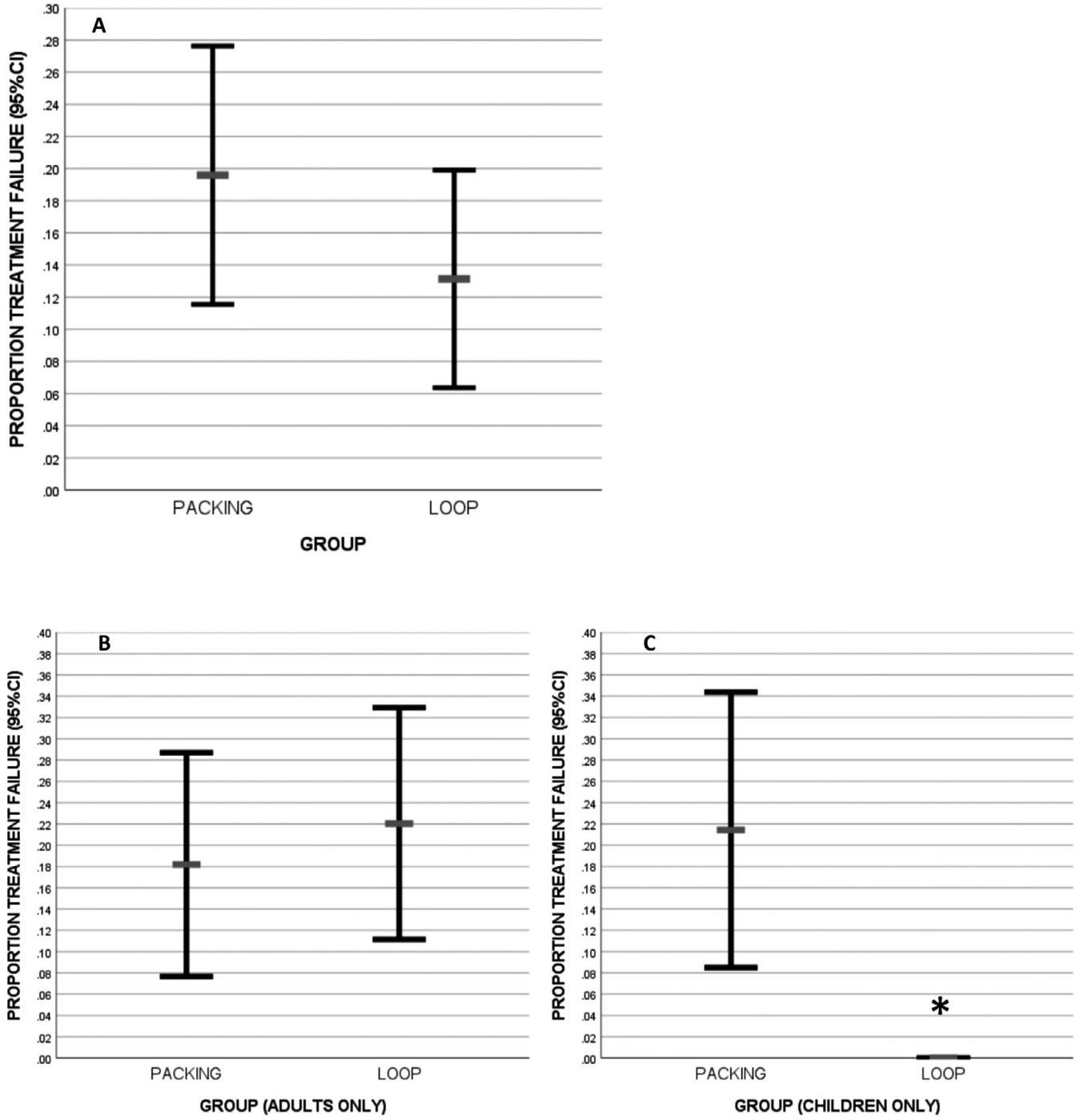

Figure 3. Comparison of treatment failure between the packing versus the LOOP group. (A) All enrolled patients. (B) Adults only. (C) Comparison in children only. *p<0.05

to treat skin abscesses. Overall, treatment failure occurred in 15% of all enrolled patients with follow-up. There were no significant differences in treatment failure between the two groups in adults. However, LOOP performed significantly better than the packing group among the children aged younger than 19 years with treatment failure of 0 and 21%, respectively. This is consistent with findings from our previous work in children which showed a 1% failure rate with the LOOP technique.[6] Among possible explanations for the superior performance of the LOOP technique in young children is the challenge of daily wound care. For instance, the diapers and constant mechanical manipulation of the lower torso area with movement make wound care more difficult and increase wound contamination. Moreover, high activity levels and

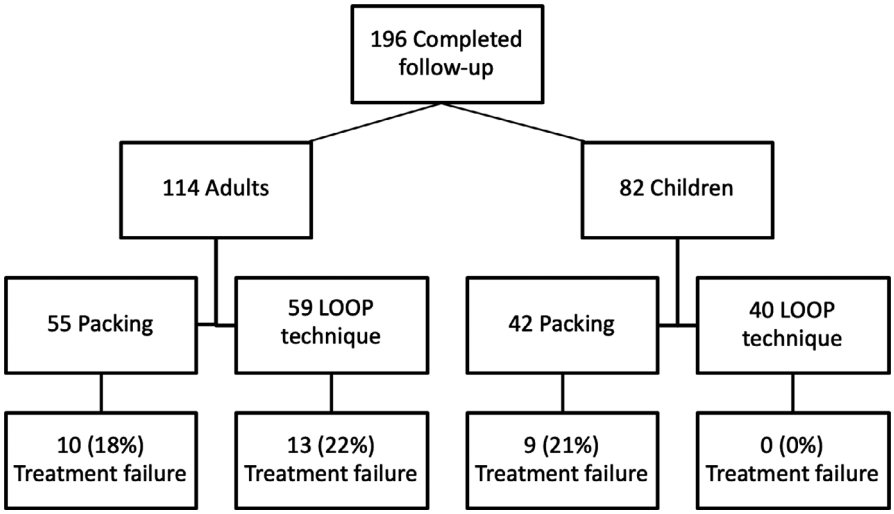

Figure 4. Flow diagram of outcomes.

Table 2
Description of Secondary Outcome Measures in the Packing Versus LOOP Group

	Packing, *n* = 109 [95% CI]	LOOP, *n* = 108 [95% CI]	p-value, *N* = 217
Ease of procedure Clinician perspective (*n* = 208)	3.2 [2.8–3.6]	2.9 [2.5–3.2]	0.168
Pain of procedure Patient/parent perspective (*n* = 206)	4.4 [3.9–4.9]	4.1 [3.6–4.6]	0.446
Ease of care over first 36 hours Patient/parent perspective (*n* = 174)	2.9 [2.4–3.5]	2.0 [1.5–2.5]	0.002
Pain over first 36 hours Patient/parent perspective (*n* = 175)	3.7 [3.2–4.3]	2.7 [2.1–3.3]	0.004
Patient/parent satisfaction at 10 days (*n* = 139)	8.9 [8.6–9.3]	9.5 [9.2–9.8]	0.005

curious toddlers who touch their wounds and remove packing materials, and disassemble their dressings, limit healing.

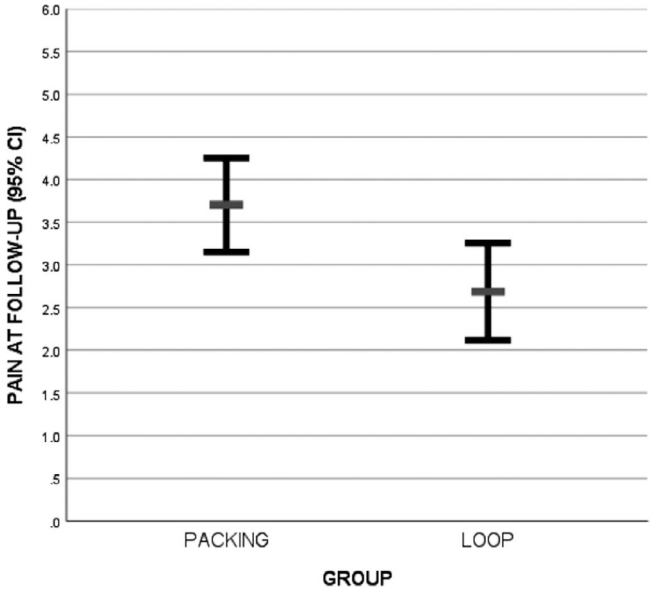

Figure 5. Comparison of pain on follow-up between the packing versus the LOOP group.

The LOOP technique for abscess drainage has been shown to be a viable alternative to standard I&D in the care of subcutaneous abscesses by surgeons in the inpatient setting.[7,12,13] Ladd et al.[12] examined 128 patients with an average age of 52 months over a 14-month period (76% ca-MRSA). There were no local recurrences of subcutaneous abscesses. Similarly, Tsoraides et al.[13] examined the LOOP technique in 115 pediatric patients (50% ca-MRSA) and found a 5.5% failure rate. In a large retrospective case series, clinicians found that loop drainage offered shorter time to discharge, lower recurrence rates, and minimal scarring. A small randomized trial on 46 patients showed that loop drainage technique was similar to standard I&D technique in abscess resolution and complications.[8] Another retrospective review of adult patients showed that this technique is safe and effective.[9] A systemic review compiling data from four studies demonstrated a lower failure rate with the LOOP with an odds ratio (OR) of 2.63 in favor of failure compared with conventional incision and packing.[11] In all these studies, the LOOP technique eliminated the need for repetitive and cumbersome wound packing and

Table 3
Comparison of Children Versus Adults

	Pediatric, n = 87 (%) [95% CI]	Adults, n = 130 (%) [95% CI]	Total, N = 217 (%) [95% CI]	p-value
Median age (years)	4.4 [3.4–5.5]	33.5 [31.5–35.6]	22 [19.5–24.1]	<0.001
Range	0.2–18	18–69	0.2–69	
Sex (female)	52 (60%)	58 (45%)	110 (51%)	0.038
Location of abscess				
Head and neck	2 (2)	5 (4)	7 (3)	0.002
Torso	5 (6)	18 (14)	23 (11)	
Extremities	37 (43)	74 (57)	111 (51)	
Buttocks/groin	43 (50)	33 (25)	76 (35)	
Size of abscess (cm)				
<1	8 (9)	5 (4)	13 (6)	0.342
1–2.5	32 (38)	58 (45)	90 (42)	
2.5–4	31 (36)	45 (35)	76 (35)	
>4	16 (18)	22 (17)	38 (18)	
Cellulitis	66 (76)	88 (68)	154 (71)	0.224
Sedation	62 (73)	2 (2)	64 (30)	<0.001
Antibiotics prescribed at discharge (n = 213)	76 (91)	126 (98)	202 (93)	0.027
Antibiotics (n = 202)				
Cefalexin	1 (1)	0 (0)	1 (1)	<0.001
Trim/sulfa	21 (28)	2 (2)	23 (11)	
Cefalexin and trim/sulfa	51 (67)	114 (91)	165 (82)	
Clindamycin	2 (3)	5 (4)	7 (4)	
Other	1 (1)	5 (4)	6 (3)	
Ease of procedure Clinician perspective (n = 208)	2.9 [2.5–3.3]	3.1 [2.8–3.5]	3.0 [2.8–3.3]	0.364
Pain of procedure Patient/parent perspective (n = 206)	3.1 [2.6–3.6]	4.9 [4.5–5.4]	4.2 [3.9–4.6]	<0.001
Ease of care over first 36 hours Patient/parent perspective (n = 174)	2.2 [1.7–2.7]	2.7 [2.1–3.2]	2.4 [2.1–2.8]	0.177
Pain over first 36 hours Patient/parent perspective (n = 175)	3.0 [2.4–3.5]	3.4 [2.8–3.5]	3.2 [2.8–3.6]	0.304
Patient/parent satisfaction at 10 days (n = 139)	9.5 [9.2–9.7]	9.1 [8.7–9.4]	9.2 [9.0–9.5]	0.088

Trim/sulfa = trimethoprim/sulfamethoxazole.

simplified postoperative wound care. Our study is consistent with the findings in these studies.

While data for not packing abscesses exist, it is still common practice to drain and pack most abscesses in the ED.[3,4,10,14] Other techniques have been assessed for community-acquired soft tissue abscesses such as ultrasound-guided aspiration and drain placement. In a randomized trial, ultrasound-guided aspiration showed significantly higher failure rates in patients with ca-MRSA compared to I&D (55% vs. 8%).[15] In a retrospective study comparing placement of a subcutaneous drain to open I&D, no recurrences of the abscess occurred in those having subcutaneous drain group compared to 4% failure in open I&D, and the cosmetic appearance of the healed wound during the immediate follow-up period was better.[16] Despite these limited studies, packing is still widely used especially in larger abscesses.[14] During the enrollment period at the study sites, packing was the institutional norm along with the LOOP technique and thus was chosen for this study.

Operators reported no significant differences in ease of procedure between techniques in both children and adults suggesting that the LOOP technique is feasible in the ED. There was significantly less pain at follow-up in the LOOP group versus packing, and the wound was much easier to care for over the first 36 hours in the LOOP group. Patient satisfaction at 10 days postprocedure was significantly higher in the LOOP group, which may reflect the finding that the

Table 4
Description of Patient Characteristics in Children in the Packing Versus LOOP Group

	Packing, *n* = 43 (%)	LOOP, *n* = 44 (%)	p-value
Age (years), mean [95% CI]	5.1 [3.4–6.8]	3.8 [2.4–5.2]	0.241
Range	0.5–17	0.2–18	
Age distribution (years)			
<1	5 (12)	8 (18)	0.167
1–4.9	24 (56)	27 (61)	
5–9.9	5 (12)	3 (7)	
10–17	9 (21)	6 (14)	
Sex (female)	29 (67)	23 (52)	0.191
Location of abscess			
Head and neck	0 (0)	2 (5)	0.148
Torso	1 (2)	4 (9)	
Extremities	26 (61)	11 (25)	
Buttocks/groin	16 (37)	27 (61)	
Size of abscess (cm)			
<1	2 (5)	6 (14)	0.604
1–2.5	18 (42)	14 (32)	
2.5–4	14 (33)	17 (39)	
>4	9 (21)	7 (16)	
Cellulitis	33 (77)	33 (75)	0.999
Sedation	31 (74)	31 (72)	0.999
Antibiotics prescribed at discharge (*n* = 84)	41 (100)	43 (100)	0.713
Antibiotics (*n* = 76)			
Cefalexin	1 (3)	0 (0)	0.146
Trim/sulfa	6 (16)	15 (40)	
Cefalexin and trim/sulfa	29 (76)	22 (58)	
Clindamycin	1 (3)	1 (3)	
Other	1 (3)	0 (0)	
Ease of procedure Clinician perspective (*n* = 82)	3.0 [2.5–3.5]	2.7 [2.1–3.3]	0.442
Pain of procedure Patient/parent perspective (*n* = 80)	3.3 [2.6–4.0]	2.9 [2.1–3.7]	0.484
Ease of care over first 36 hours Patient/parent perspective (*n* = 76)	3.0 [2.2–3.8]	1.3 [0.8–1.74]	<0.001
Pain over first 36 hours Patient/parent perspective (*n* = 76)	4.3 [3.5–5.0]	1.6 [0.9–2.2]	<0.001
Patient/parent satisfaction at 10 days (*n* = 54)	9.0 [8.5–9.4]	9.9 [9.8–10]	0.001

Trim/sulfa = trimethoprim/sulfamethoxazole.

wound is much easier to care for acutely within the first 36 hours of placement. Given the potential for less pain, easier postprocedure care, this technique should be considered for the treatment of skin and soft tissue abscesses in the ED setting, particularly in children.

The majority of patients received some kind of antibiotic treatment. More than 70% of patients had an overlying cellulitis; patients with underlying medical issues such as diabetes were also not excluded. These patients are generally excluded from studies examining use of antibiotics. Those that received antibiotics were covered for MRSA. Talan et al.[17] demonstrated that drained abscesses greater than 2 cm had a higher cure rate when trimethoprim/sulfamethoxazole was given. Similarly, a recent meta-analysis demonstrated an OR for clinical cure of 2.32 in favor of antibiotics.[18] These data lend credence to appropriate use of antibiotics in the care of skin abscesses.

LIMITATIONS

The authors recognize that there are limitations to this study. This was a dual-center study performed as a

convenience sample. This was due to the fact patients could only be enrolled when investigators were available. Given such limitations, it would have been ideal to enroll a much larger number of patients. Fortunately, safety and previous success with LOOP technique have been described in literature.

This study was carried out as a randomized study but could not be double blinded. The two I&D techniques are inherently different. It would have been impossible to mask which technique was used once the procedure needed to be done. In fact, a number of patients specifically asked for the LOOP and thus were not enrolled in the study.

The choice to use packing as the control in this randomized study may not pertain to institutions who do not routinely pack abscesses. This was our institutional norm, yet it could have affected pain scores as well ease-of-care scores if packing was not used. A small percentage of measured abscesses were under 1 cm; the decision to use some kind of adjunct (packing vs. LOOP) was left to physician judgement. Most of these abscesses were in areas where it was felt the fluctuance extended deep into tissue such as on the thigh or buttock.

Several other factors were not controlled such as antibiotic use and selection, use of sedation, and performing clinician. All clinicians at both sites have extensive experience in both techniques as both institutions have been using LOOP for over 10 years. The choice of sedation and antibiotics was solely at the discretion of the treating physician. The high antibiotic usage rate may not correlate with practice patterns at other institutions. Their judicious use may have contributed to successful treatment of the smallest abscesses regardless of technique employed. The distribution of each of these variables was not statistically different between the two groups.

Given the nature of routine use of both techniques in our EDs as well as the similar variability in other centers in relation to the above variables, we wanted to provide a study that would translate clinically at any ED. Controlling for too many variables may have limited the usefulness of this data across all centers.

Subgroup analyses should be interpreted with caution. Although we conducted an a priori sample size for both adults and children, we felt that it was important to conduct a power calculation for the sample of children given that the failure rates between the LOOP and packing groups were significant in children and not in adults. In the subset of children, the power of a sample of 87 children was 90% (beta 10%).

CONCLUSIONS

Although not designed as an equivalence study, the LOOP technique for incision and drainage of abscesses in adults appears to be a safe and effective alternative to the traditional incision and drainage with packing. As evidenced by a significantly higher failure rate in children treated with packing, this technique may offer an alternative to this standard regimen in the treatment of uncomplicated skin abscesses in pediatric patients following further study.

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