

## Comparative Study on Healing Frequencies of Packing versus Primary Closure in Surgically Drained Skin Abscesses

Muhammad Salman <sup>1\*</sup>, Muhammad Maaz <sup>1</sup>, Asad Ullah Mehboob <sup>1</sup>, Hafiz Muhammad Umer Sayyam <sup>1</sup>,  
Muhammad Muqeet Ur Rehman <sup>1</sup>, Farhan Ali <sup>1</sup>, Umber Nisar <sup>2</sup>, Umer Saeed Ansari <sup>3</sup>

- 1- Shalamar Medical and Dental College, Lahore, Pakistan
- 2- Computer Science Department Forman Christian College University (FCCU), Lahore, Pakistan
- 3- Biochemistry Department, Rashid Latif Khan University Medical & Dental College (RLKU), Pakistan

\*Corresponding Author: Muhammad Salman Email: [razzaqs Salman43@gmail.com](mailto:razzaqs Salman43@gmail.com) Cell: +923244094263

### ABSTRACT

**Background:** Localized collection of pus in skin abscesses caused by bacterial infections always required surgical drainage which is usually accompanied by wound packing or primary closure.

**Objectives:** The objectives of the present study were to evaluate which of these two methods is faster in healing, caused less postoperative pain, patients stayed less in the hospital and created less complications after surgery.

**Methodology:** A comparative study was conducted on 100 patients with acute skin abscesses. Group A was the packing group and group B was the primary closure group, and patients were equally divided. Findings were gathered on the basis of time to heal, Visual Analog Scale (VAS) pain score, hospital stay, recurrence rate and complication rate. SPSS version 27.0 was used, descriptive statistics were performed using the T-test and Chi-square test ( $p \leq 0.05$ ) was considered statistically significant.

**Results:** The primary closure group showed statistically better results in terms of healing time, length of hospital stay, postoperative pain, and incidence of complications compared to the packing group. Recurrence rates were slightly higher in the packing group, but the difference was not statistically significant.

**Conclusion:** The present study has suggested that primary closure was better method for overall outcome, therefore these results considered as the method of choice for management of skin abscesses that have been drained surgically for coming surgeons.

**Keywords:** Skin abscess, primary closure, wound packing, surgical drainage, healing time.



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## INTRODUCTION

A common surgical problem is an abscess. It is an accumulation of pus that develops inside a tissue as a result of an inflammatory reaction to an infectious agent or foreign objects, such as contaminated wooden objects, needles, or gunshot wounds[1]. This reaction is the tissue's defense response, preventing the infection from spreading to other areas. When a foreign substance or organism kills local cells, cytokines are released, which in turn causes an inflammatory reaction, attracts a large number of blood cells to the location, and increases regional blood flow[2]. Clinically, an abscess appears as a painful, fluctuant soft tissue mass encircled by erythema and stiff granulation tissue. Subcutaneous abscesses are a frequent and frequently rather problematical disease of surgical clinic, which is a localized Suppurative-inflammatory process, caused by bacteria[3]. It can be due to trauma, injection drug use or the presence of foreign bodies such as an IUD. The conventional method of managing an abscess is by surgical incision and drainage (I & D) which is a process of making an incision to allow the pus to drain from the infected area[4]. Classically after this stage the wound is left open and packed with gauze in order to encourage the continued drainage and to avoid the complication of wound closure[5]. This method despite being useful in some of the cases is characterized by slow healing time, increased patient discomfort due to the need for constant dressing changes, and increased susceptibility to secondary infections[6]. Another technique is called primary suture in which the wound is closed soon after the abscess is drained by suturing the edges of the wound[7]. Some of the benefits that primary closure has been said to have been; it results to faster healing in comparison to secondary closure, it causes least post operative pain and the least number of days spent in hospital compared to other forms of closure[8]. However, due to various factors such as

increased risk of wound dehiscence, abscess recurrence and other complications, the use of this procedure has not gained popularity[9]. The aims and objectives of this study was to assess the differences between packing and primary closure of surgically drained skin abscesses by measuring certain variables that include healing time, hospital stay, pain, recurrence, and complications[10, 11]. Impaired host defense systems, the presence of foreign substances, tissue ischemia or necrosis, hematoma, or excessive fluid buildup in tissue are among the risk factors for the formation of an abscess. Another significant risk factor in this demographic is intravenous drug use, with rates as high as 75% recorded. A subcutaneous abscess is usually caused by several microorganisms. Most often included aerobic bacteria are group i.e. streptococci, *Staphylococcus aureus*, *Peptostreptococci*, and *Bacteroides*[12].

## MATERIALS AND METHODS:

### Study Design:

This research was a comparative study conducted in Shalamar Hospital and Hameed Latif teaching hospital, Lahore, Pakistan from August 2023 to June 2024. The target population was 100 patients with acute skin abscesses that needed surgery.

### Sampling Technique and Target population:

The participants were divided into two groups through a computer-generated randomization process. The first group consisted of n=50 patients who underwent traditional packing after incision and drainage, whereas the second group included n=50 patients those received primary closure drainage procedure.

### Inclusion Criteria:

Patients with 18 to 70 years of aged with acute superficial skin abscesses that does not exceed 5 cm in diameter and patients who can give their consent knowingly were considered for this study.

**Exclusion Criteria:**

Patients with abscesses that are located in deep tissues, those with spread of infection to various body systems or those with underlying medical conditions including diabetes or immunosuppression and greater than 5 cm was not considered for present study. or those which would require intricate surgeries.

**Procedure:**

All patients were operated in sterile fashion and the abscess was drained by simple surgical incision. In Group A, the abscess cavity was packed with sterile gauze dipped in antiseptic solution, and daily dressing was performed until healing. In Group B, primary sutures were applied after drainage, and a suction drain was placed to prevent fluid collection.

**Data Collection:**

The Biomarkers for data collection were Healing Time, Hospital Stay, Postoperative, Pain Recurrence Rate and medical Complications

**Ethical Statement:**

This study was conducted in accordance with the ethical standards of the institutional research committee and the Helsinki Declaration. Informed consent was obtained from all individual participants included in the study. The ethical review board of Rashid Latif khan university medical & dental college (RLKU) approved the study protocol (approval number: IRB-RLKU-22/08/23/13-A). All

personal patient data were anonymized to ensure privacy and confidentiality.

**Statistical Analysis:**

Raw data were analyzed by using SPSS software version 27. Continuous variables such as healing time and hospital stay were compared using independent t-tests, while categorical variables such as recurrence and complication rates were analyzed using chi-square tests. Statistical significance was set at ( $p \leq 0.05$ ).

**RESULTS**

Group B which was the primary closure group had a significantly faster healing time of about 9 days.  $18 \pm 0$ . Sixteen days as compared to 94 days.  $66 \pm 1$ . Average length of stay in packing group (Group A) was 94 days ( $p < 0.001$ ). From this it can be inferred that primary closure is faster in healing since it allows minimal interference by the external environment in the healing process. Patients in the primary closure group stayed in the hospital shorter time than patients in control group, they were  $4.0 \pm 0.73$  days as compared to  $7.12 \pm 0.72$  days of the packing group ( $p < 0.001$ ). The difference in the number of days of hospitalization in the group B is a clear indication of the fast healing that comes with primary closure as shown in table-1.

**Table-1:** Primary Closure in Surgically Drained Skin Abscesses

Outcome Biomarkers	Primary Closure (Group B)	P-Value	Statistical Test
Mean Healing Time (days)	$9.18 \pm 0.94$	$< 0.003$	Independent t-test
Mean Hospital Stay (days)	$4.0 \pm 0.73$	$< 0.001$	Independent t-test
Recurrence Rate (%)	4% (2 patients)	0.140	Chi-square test
Complication Rate (%)	12% (6 patients)	0.030	Chi-square test
Mean VAS Score (Day 1)	$4.52 \pm 0.58$	$< 0.001$	Independent t-test
Mean VAS Score (Day 7)	$1.06 \pm 0.24$	$< 0.001$	Independent t-test

Secondary outcomes were also in favor of the primary closure group, in terms of pain, measured through VAS scores, patients experienced less pain at all the time points. On Day 1 the mean VAS score of the participants in Group B was  $4.52 \pm 0.58$  which is much less than the  $7.40 \pm 0.76$  reported in Group A and only 76 in Group A ( $p < 0.001$ ). By Day 7, VAS scores were lower to  $1.06 \pm 0.24$  in Group B, to only  $2.76 \pm 0.56$  in Group A

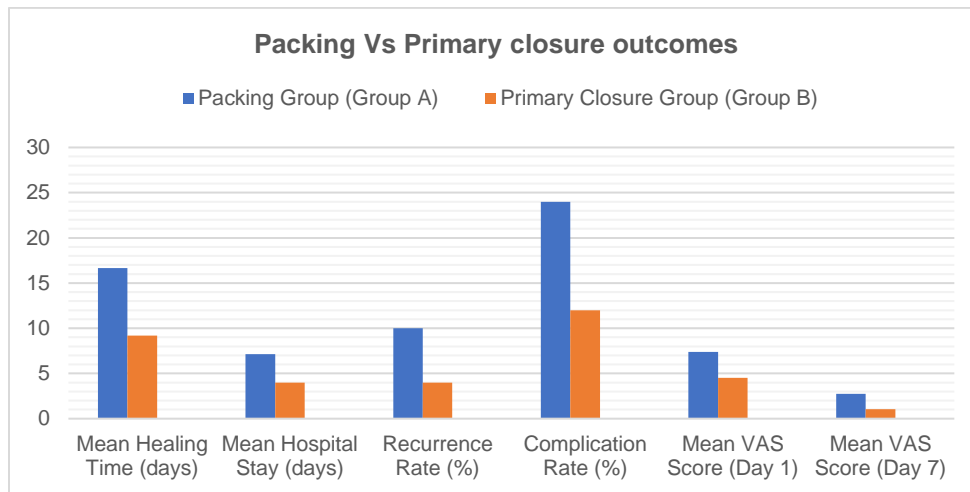
( $p < 0.001$ ). The frequency of abscesses' recurrence in the packing group was slightly higher and was 5 (10%) in contrast to the primary closure group where the recurrence was observed in 2 (4%) patients. But this difference was not found to be significant ( $p = 0.150$ ), therefore, both methods of interventions seem to be rather effective in controlling long-term recurrence as shown in table-2.

**Table-2:** Outcomes of Packing in Surgically Drained Skin Abscesses

Outcome Biomarkers	Packing (Group A)	P-Value	Statistical Test
Mean Healing Time (days)	$16.66 \pm 1.94$	$< 0.001$	Independent t-test
Mean Hospital Stay (days)	$7.12 \pm 0.72$	$< 0.001$	Independent t-test
Recurrence Rate (%)	10% (5 patients)	0.150	Chi-square test
Complication Rate (%)	24% (12 patients)	0.040	Chi-square test
Mean VAS Score (Day 1)	$7.40 \pm 0.76$	$< 0.001$	Independent t-test
Mean VAS Score (Day 7)	$2.76 \pm 0.56$	$< 0.001$	Independent t-test

The packing group had a considerably higher level of complication with 12 of the patients (24%) in this group developing complications, which was mainly in the form of wound infections. On the other hand, the primary closure group experienced a 12% complication rate or 6 patients and this was much lower than that of the mesh group in terms of post operative complications ( $p = 0.040$ ). Fig-1 Key results for surgically drained skin abscesses are compared between the packing and primary

closure groups in the figure. In comparison to the secondary closure group, the primary closure group showed reduced complication rates (12% vs. 24%), shorter hospital stays (4.0 days vs. 7.12 days), and quicker healing (9.18 days vs. 16.66 days). Furthermore, patients in the primary closure group reported much less pain following surgery, as indicated by Day 1 and Day 7 VAS ratings that were lower. Despite the packing group having greater recurrence rates, this difference was not statistically significant.



**Fig-1:** Comparison of outcomes between the Packing Group (Group A) and Primary Closure Group (Group B) in surgically drained skin abscesses: *key outcome measures, including healing time, hospital stay, recurrence rate, complication rate, and VAS pain scores, showing that the primary closure group had consistently better results across all parameters.*

## DISCUSSION

It is very clear from the findings of this study that primary closure of skin abscesses after surgical drainage yields better results than packing of the resulting wound[13, 14]. The faster rate of healing that was noted in the primary closure group is well supported by other literature as it has been established that early suturing decreases the likelihood of contamination of the wound by external pathogens and increases the likelihood of immediate tissue repair[15]. The fact that there is a shorter duration in the hospital after primary closure is also worth considering apart from patient preference[16, 17]. With regard to primary closure, it also provides an opportunity of early discharge, which in turn decreases the chances of contracting hospital-acquired infections as well as the total cost of treatment[9, 18]. Another important benefit from the primary closure is the ability to adequately address postoperative pain[19]. The results for the primary closure group are lower VAS scores, suggesting that this procedure is less invasive, probably

because of less tissue damage and inflammation. This finding goes further to endorse the increase in utilization of minimally invasive procedures in the conduct of surgery[20]. The lower rate of complications in the primary closure group especially concerning wound infections is another indicator of how safe and effective this method is. Despite the fact that there was no statistical difference between the two groups in terms of the recurrence rate, there was indication that the primary closure group had fewer recurrences in the long run[21]. In terms of healing time, post-operative discomfort, length of hospital stay, success rate, and cosmetic outcomes, the primary closure with closed suction approach outperformed the traditional procedure. The main closure approach also resulted in a decreased overall operation cost. For this reason, we advise treating acute cutaneous abscesses with primary closure and closed suction. Therefore, it is important that the surgeon should consider patient factors and circumstances of the injury when deciding between packing and primary closure[22, 23].

However, for more extensive or deep-seated abscesses, the use of the traditional packing material may still be required in order to achieve proper drainage of the wound and to minimize the chances of reoccurrence [24, 25].

## CONCLUSION

Primary closure of skin abscesses after surgical drainage has less pain, more rapid healing, shorter hospital stay and fewer complications as compared to the traditional packing technique. Such results provide a clear endorsement to primary closure as the most suitable approach for such cases because of the many advantages it holds for patients and health care delivery system.

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### Conflict of Interest:

The authors declare no conflict of interest related to this study.

### Authors' Contribution:

MS, MM, AUM, HMUS, MMR, and FA contributed to study design, data collection, and manuscript preparation. UN, a computer scientist, assisted in statistical modelling and computational analysis. USA supervised the study and provided critical revisions. All authors reviewed and approved the final manuscript.

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### Data Availability Statement:

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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