Comparison of Therapeutic Results of Skin Graft with Flap in the Treatment of Axillary Hidradenitis Suppurativa

Afsharfard A. MD[*], *Khodaparast M. B. MD*[**], *Mousavi Moghadam S. F. MSC*[***]

Abstract:

Introduction & Objective: Axillary hidradenitis suppurativa is one of the complaints of patients who refer to surgery clinics, which, in addition to problems for patients, also faces challenges regarding appropriate treatment methods. Currently, the treatments include surgical excision and then skin graft or flap for reconstruction. However, the therapeutic results of these two methods, and their benefits and disadvantages have not been fully determined in previous studies and there is no comprehensive consensus. Therefore, this study was conducted with the aim of comparing the skin graft and flap methods for treatments of patients with axillary hidradenitis suppurativa who underwent surgery.

Materials & Methods: In this clinical trial study, patients with the complaint of bilateral axillary hidradenitis suppurativa referred to Imam Khomeini Hospital in Tehran between 2009 and 2014 were included. In all patients, standard surgical treatment was performed, then skin reconstruction was conducted on the right axilla with a skin flap, and the left axilla with a graft method. Hence, the patients were followed-up for one, three, six, and twelve months, and the treatment outcomes and the recurrence rate between the graft and skin flap methods were analyzed.

Results: In this study, 30 patients including 16 men and 14 women with mean age of 35.2 years (and standard deviation 9.3 years) were included. The statistical analysis showed that in the one-month follow-up, although the pain and limitation of shoulder movement in the skin graft was less compared to the flap, the rate of necrosis was less than 25% in the flap method and the satisfaction with symmetry and beauty in the flap method was reported to be higher than the graft method. However, there was no statistically significant difference between the two methods. Also, after 12 months of patient follow-up, none of them reported evidence of recurrence at the graft or flap site.

Conclusions: This study showed that the treatment results and the rate of recurrence among the flap and graft methods in patients with axillary hidradenitis suppurativa did not have a statistically significant difference; therefore, both methods can be safely used in the patients according to their conditions.

Key Words: Hidradenitis Suppurativa, Skin Flap, Skin Graft, Necrosis, Pain, Limitation of Movement

[*] Professor of General & Vascular Surgery, Shahid Beheshti University of Medical Sciences, Shohada Tajrish Hospital
[**] Assistant Professor of Plastic Surgery, Shahid Behshti University of Medical Sciences and Health Services
[***] Department of Nursing, School of Nursing, Jahrom University of Medical Sciences
Received: 20/04/2024
Accepted: 12/10/2024

Corresponding author: Dr. Abulfazl Afsharfard
Tel: 22721144

E-mail: drafsharfard@gmail.com

Background and Objective

Axillary hidradenitis suppurativa, commonly referred to as axillary abscess, is a debilitating inflammatory condition that primarily affects the apocrine sweat glands situated in the axillary region. This condition is characterized by significant pain, swelling, and the formation of purulent abscesses.[1] The impact of axillary hidradenitis suppurativa is profound, leading to a marked decline in the quality of life for affected individuals, which is often exacerbated by chronic discomfort, impaired mobility, and psychological distress.[2,3] Despite advancements in pharmacological therapies, surgical intervention remains the cornerstone of treatment for this condition.[4,5]

Traditionally, the surgical management of axillary hidradenitis suppurativa involves the excision of the affected tissue, followed by either skin grafting or flap reconstruction.[6] Skin grafting entails the transplantation of a thin layer of skin from a donor site to cover the surgical defect, whereas flap procedures utilize adjacent, healthy tissue that retains its vascular supply for reconstruction purposes. Each technique presents distinct advantages and disadvantages;[7] however, there currently exists no consensus regarding the optimal treatment outcomes for axillary hidradenitis suppurativa.[8]

A comparative analysis of the treatment outcomes associated with skin grafting and flap techniques is essential for clinical practice. By evaluating the efficacy and safety of these surgical methods, healthcare providers can make informed decisions tailored to the individual needs of patients.[9] Furthermore, insights derived from such comparisons will contribute to the refinement of treatment protocols and the establishment of evidence-based guidelines for the management of axillary hidradenitis suppurativa.[10]

Consequently, the objective of this study is to rigorously compare the treatment outcomes of skin grafting and flap techniques in patients who have undergone surgical intervention for axillary hidradenitis suppurativa.

Materials and Methods

Participants

This study included patients diagnosed with bilateral axillary hidradenitis suppurativa who presented to Shahid Tajrish Hospital and Khatam-al-Anbia Hospital in Tehran between 201 and 2015.

Inclusion and Exclusion Criteria

The eligibility criteria for participation in this study were delineated as follows: a) Inclusion Criteria: 1. A confirmed diagnosis of bilateral axillary hidradenitis suppurativa, validated through clinical examination and imaging findings. 2. Participants must be 18 years of age or older. 3. Willingness to participate in the study and provision of informed consent. b) Exclusion Criteria: 1. A history of prior surgical interventions involving grafts or flaps for the treatment of axillary hidradenitis suppurativa. 2. The presence of existing dermatological conditions or previous surgical procedures in the axillary region. 3. Pregnancy or breastfeeding status at the time of recruitment. 4. Inability to comply with the study protocol or follow-up requirements.

Study Design

This study was designed as a clinical trial aimed at comparing the treatment outcomes of two surgical techniques—skin grafting and flap reconstruction—in patients diagnosed with bilateral axillary hidradenitis suppurativa. Initially, all participants underwent wide excision of the axillary lesions, which entailed the removal of affected tissue and subcutaneous layers down to the deep fascia. Following the excision, patients received comprehensive wound care, including cleansing and dressing, for a duration of 15 days to mitigate the risk of infection and to facilitate the formation of granulation tissue. Subsequently, delayed reconstructive surgery was performed by a qualified surgeon. In this trial, lesions on the left axilla were treated with the skin grafting technique, whereas

those on the right axilla were addressed using flap reconstruction.

Surgical Method

For the skin graft procedure, a relatively thin layer of skin was harvested from the anterior aspect of the right thigh. In contrast, the flap procedure involved utilizing random cutaneous fascia from the para-scapular region. The donor site for the flap was initially sutured, and the first dressings for the skin graft and flap were removed after 5 to 6 days and 3 days post-surgery, respectively. Patients were monitored closely for signs of necrosis and ischemia throughout their recovery period. Upon discharge, they were provided with a medication regimen consisting of cefixime (400 mg daily for three days) and were instructed to change the dressing every three days.

Data Collection

The individual characteristics of the patients were meticulously documented using a pre-designed checklist, which encompassed data on age, gender, underlying medical conditions, and body mass index (BMI). Following the initial assessment, patients were monitored at intervals of 1, 3, 6, and 12 months. To evaluate pain levels, participants utilized a visual analog scale (VAS), depicted as a 10-centimeter ruler ranging from (indicating no pain) to 10 (indicating severe pain). For comparative analysis, pain intensity was categorized into three groups: mild pain (scores 1 to 3), moderate pain (scores 4 to 6), and severe pain (scores 7 to 10). In addition, patients were assessed for satisfaction regarding the symmetry and aesthetics of the surgical site, any limitations in shoulder mobility, the presence of necrosis (greater than 25%), the duration of the illness, and the rate of recurrence at the designated follow-up intervals.

Data Analysis

Data were presented as frequencies, percentages, means, and standard deviations. Statistical analyses were conducted using SPSS version 17, employing tests such as the Student's t-test and Fisher's Exact Test. A significance level of $P < .05$ was established as the threshold for statistical significance.

Results

Patient Demographics

A total of 30 patients participated in the study, comprising 16 men (53.3%) and 14 women (46.7%), with a mean age of 35.2 years (standard deviation: 9.3 years). The average body mass index among the patients was 28 kg/m^2 (standard deviation: 5.52), and the mean duration of the disease was 6.46 years (standard deviation: 2.22 years; range: 3 to 10 years). Underlying comorbidities, including hypertension and diabetes, were identified in 5 patients (16.7%).

Pain Intensity Assessment

At the one-month follow-up, pain assessments revealed that 24 patients (80%) at the graft site and 26 patients (86.7%) at the flap site reported experiencing no pain (see Figure 1). Mild pain was reported by 3 patients (10%) at the flap site and 4 patients (13.3%) at the graft site. Furthermore, moderate pain was noted in 1 patient at the flap site and in 2 patients at the graft site. Statistical analysis indicated no significant difference in pain intensity between the graft and flap sites ($P = .07$). Notably, no patients reported pain at either site during the follow-up assessments at 3, 6, or 12 months.

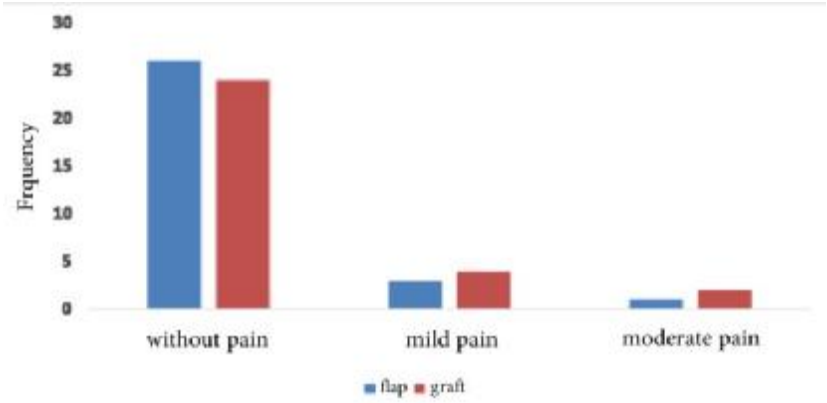

Chart1: Severity of patient's pain in 1month follow-up.

Shoulder Range of Motion

To evaluate the range of motion (ROM) of the right shoulder (flap) and the left shoulder (graft), patients underwent assessments at the 1, 3, 6, and 12-month follow-up intervals, during which their satisfaction regarding shoulder mobility was also documented.

the one-month follow-up, only three patients reported limitations in the left shoulder, while four patients indicated limitations in the right shoulder. As a result, there was no statistically significant difference in shoulder range of motion or limitations between the flap and graft sites at this juncture (P = .6).

By the three-month follow-up, only one patient reported restricted movement in the left shoulder, whereas no patients experienced limitations in the right shoulder. This further corroborated the absence of statistically significant differences in movement limitations between the right and left shoulders at the one-month follow-up (P = .2).

Notably, during the six and twelve-month follow-ups, no patients reported any limitations in shoulder mobility.

Symmetry and Aesthetics

To assess the symmetry and aesthetics of the surgical sites, patients underwent regular evaluations, with their overall satisfaction recorded as either satisfied or dissatisfied. At the one-month follow-up, 26 patients expressed satisfaction with the symmetry and aesthetics of the flap site, while 25 expressed satisfaction with the graft site, revealing no statistically significant difference. Similarly, at the three-month follow-up, 28 patients reported satisfaction with the flap site, while 27 reported satisfaction with the graft site, again demonstrating no significant difference.

Furthermore, during the six and twelve-month follow-ups, all patients expressed complete satisfaction with the symmetry and aesthetics of both the flap and graft surgical sites. The results indicated no statistically significant difference between the areas treated with a flap and those treated with a graft, signifying that patients were entirely satisfied with the aesthetics and symmetry of the surgical area after six months.

Necrosis and Recurrence Rate

At the one-month follow-up, necrosis exceeding 25% was observed in two patients (6.6%) at the flap site and in four patients (13.3%) at the graft site. No new cases of necrosis were detected at either the flap or graft sites during the three, six, and twelve-month follow-ups. Statistical analysis revealed no significant difference in the rate of necrosis between the flap and graft sites (P = .9). Additionally, there were no reported recurrences among the patients throughout the twelve months of follow-up, underscoring the effectiveness of the surgical interventions.

Discussion and Conclusion

This study was conducted to evaluate and compare the therapeutic effects of two surgical techniques—skin grafting and flap surgery—in the treatment of axillary hidradenitis suppurativa. The findings indicate that pain intensity was comparable between the two methods at the one-month follow-up, with the majority of patients reporting no pain at either the graft or flap sites. Moreover, the assessment of shoulder range of motion revealed no significant limitations associated either surgical technique. Patients expressed high levels of satisfaction regarding the symmetry and aesthetics of both the graft and flap. Additionally, the incidence of necrosis and recurrence was low across both methods, suggesting outcomes for each treatment approach.

Skin grafting has emerged as a successful reconstructive method for surgical sites where primary closure or skin flaps are viable, particularly in cases involving large wounds on the buttocks or thighs, as supported by prior.[11]

In the present research, the pain intensity at the graft site was observed to be greater than at the flap site, consistent with previous findings.[12,13] This increased pain may be attributed to the necessity of a donor site for the graft, which is not required in flap procedures. However, the difference in pain levels was not statistically significant.

The study also evaluated shoulder range of motion, an essential factor for functional recovery, and found no significant limitations at either the graft or flap sites during the one-month follow-up. This suggests that both skin grafting and flap techniques can achieve satisfactory shoulder function in patients with axillary hidradenitis suppurativa. While prior research has indicated that skin grafting may be associated with increased pain, immobility, and longer recovery times when compared to flap surgery, our findings reveal that both techniques can yield comparable functional outcomes.[14]

Concerning cosmetic results, the degree of symmetry and aesthetics was positively rated for both skin graft and flap methods, with the majority of patients expressing satisfaction with the appearance of the treated area during the one-month follow-up. This suggests that both surgical techniques can achieve aesthetically pleasing results thereby enhancing patient satisfaction and contributing positively to their psychological well-being.

Furthermore, previous evidence[14,15] has emphasized the role of hair follicles and sweat glands in the pathogenesis of hidraden suppurativa. While skin grafting may diminish the likelihood and extent of recurrence due to the absence of hair follicles, grafts are often perceived as less aesthetically pleasing in comparison to flaps. Nevertheless, this study demonstrated that patient satisfaction levels were acceptable for both methods, with no statistically significant differences observed.[16,17]

Importantly, the results revealed that the rates of necrosis and recurrence—two critical complications in the management of axillary hidradenitis suppurativa—were low for both skin graft and flap techniques. No new instances of necrosis were reported at either site during the follow-up period of three to twelve months, indicating successful graft or flap survival. Additionally, no recurrence was noted among patients throughout the twelve-month follow-up, underscoring of both surgical approaches in preventing disease recurrence.

In conclusion, both skin grafting and flap surgery demonstrate comparable efficacy in managing axillary hidradenitis suppurativa, yielding satisfactory outcomes in terms of pain relief, range of motion, aesthetic satisfaction, and low rates of complications. These findings contribute to a better understanding of optimal treatment strategies for this challenging condition.

Skin flaps and skin grafts represent two distinct surgical techniques employed in reconstructive procedures, differing

fundamentally in their mechanisms of healing.[7,18] Skin flaps maintain their inherent blood supply, thereby ensuring immediateization, whereas skin grafts rely on the formation of new blood vessels for integration into the surrounding tissue.

The findings of our study indicate that both approaches yield acceptable success rates, underscoring their utility in clinical. It is essential to note that specific conditions influencing the choice of treatment modality were not considered in this study, as patients received both treatment options concurrently.

Previous research has several critical factors that inform the selection treatment. Key considerations include the size and depth the wound, the availability local tissue, the overall health of the patient, and the expertise of the surgeon.[19] Additionally, the anatomical location of the wound and associated aesthetic concerns may also play a significant role in decision-making.[20] Patient characteristics, such as age, comorbidities, lifestyle, and personal preferences, should also be integral to the treatment planning process. Involving patients in the decision-making not only empowers them but also ensures they are well-informed about potential outcomes and risks associated with each method.[21]

To facilitate an informed approach, a multidisciplinary team—including dermatologists, plastic surgeons, and wound care specialists—can collaboratively assess these factors and determine the most suitable treatment strategy for each individual patient.[22]

Nevertheless, the present study possesses limitations that may impact the generalizability and reliability of its findings. A significant limitation is the relatively small sample size of 30 patients, which constrains the statistical power and robustness of the results.

Furthermore, the absence of a control group impedes a comprehensive comparison of the effectiveness of skin grafting and flap methods against conservative treatment or alternative surgical interventions.

Additionally, the study's relatively short follow-up period of 12 months may not adequately capture long-term outcomes, late complications, or the recurrence of hidradenitis suppurativa. An extended follow-up would provide a more thorough of the durability and stability of treatment.

Furthermore, the study lacks detailed information regarding the specific techniques and variations utilized in the skin grafts and flaps, including the selection of donor sites and the surgical methods employed. This lack of specificity limits the ability to discern subtle differences and outcomes related to various graft or flap techniques.

Future research should address these limitations by employing larger sample sizes, extending follow-up durations, utilizing comparative designs, and standardizing protocols for graft and flap techniques. Such studies could yield more comprehensive and reliable evidence regarding the therapeutic outcomes of skin grafts and flaps in the management of axillary hidradenitis suppurativa. In conclusion, our study suggests that both skin grafts and flaps are effective methods for managing axillary hidradenitis suppurativa, demonstrating positive results in terms of pain relief, improved shoulder mobility, aesthetic satisfaction, and low recurrence rates This comparative analysis highlights the necessity for continued exploration of these surgical options to optimize patient care.

Abstract:

Comparison of Therapeutic Results of Skin Graft with Flap in the Treatment of Axillary Hidradenitis Suppurativa

Afsharfard A. MD[*]*, Khodaparast M. B. MD*[**]*, Mousavi Moghadam S. F. MSC*[***]

(Received: 20 April 2024 Accepted: 12 Oct 2024)

Introduction & Objective: Axillary hidradenitis suppurativa is one of the complaints of patients who refer to surgery clinics, which, in addition to problems for patients, also faces challenges regarding appropriate treatment methods. Currently, the treatments include surgical excision and then skin graft or flap for reconstruction. However, the therapeutic results of these two methods, and their benefits and disadvantages have not been fully determined in previous studies and there is no comprehensive consensus. Therefore, this study was conducted with the aim of comparing the skin graft and flap methods for treatments of patients with axillary hidradenitis suppurativa who underwent surgery.

Materials & Methods: In this clinical trial study, patients with the complaint of bilateral axillary hidradenitis suppurativa referred to Imam Khomeini Hospital in Tehran between 2009 and 2014 were included. In all patients, standard surgical treatment was performed, then skin reconstruction was conducted on the right axilla with a skin flap, and the left axilla with a graft method. Hence, the patients were followed-up for one, three, six, and twelve months, and the treatment outcomes and the recurrence rate between the graft and skin flap methods were analyzed.

Results: In this study, 30 patients including 16 men and 14 women with mean age of 35.2 years (and standard deviation 9.3 years) were included. The statistical analysis showed that in the one-month follow-up, although the pain and limitation of shoulder movement in the skin graft was less compared to the flap, the rate of necrosis was less than 25% in the flap method and the satisfaction with symmetry and beauty in the flap method was reported to be higher than the graft method. However, there was no statistically significant difference between the two methods. Also, after 12 months of patient follow-up, none of them reported evidence of recurrence at the graft or flap site.

Conclusions: This study showed that the treatment results and the rate of recurrence among the flap and graft methods in patients with axillary hidradenitis suppurativa did not have a statistically significant difference; therefore, both methods can be safely used in the patients according to their conditions.

Key Words: Hidradenitis Suppurativa, Skin Flap, Skin Graft, Necrosis, Pain, Limitation of Movement

[*]*Professor of General Surgery, Shahid Behshti University of Medical Sciences and Health Services, Shohadaye Tajrish Hospital, Tehran, Iran*

[**]*Assistant Professor of Plastic Surgery, Shahid Behshti University of Medical Sciences and Health Services, Tehran, Iran*

[***]*Department of Nursing, School of Nursing, Jahrom University of Medical Sciences, Jahrom, Iran*

References:

1. Revuz J. Hidradenitis suppurativa. Journal of the European Academy of Dermatology and Venereology. 2009 Sep; 23(9): 985-98.
2. Preda-Naumescu A, Ahmed HN, Mayo TT, Yusuf N. Hidradenitis suppurativa: pathogenesis, clinical presentation, epidemiology, and comorbid associations. International Journal of Dermatology. 2021 Nov; 60(11): e449-58.
3. Deckers IE, Prens EP. An update on medical treatment options for hidradenitis suppurativa. Drugs. 2016 Feb; 76: 215-29.
4. Shah N. Hidradenitis suppurativa: a treatment challenge. American family physician. 2005 Oct 15; 72(8): 1547-52.
5. Sabat R, Jemec GB, Matusiak Ł, Kimball AB, Prens E, Wolk K. Hidradenitis suppurativa. Nature Reviews Disease Primers. 2020 Mar 12; 6(1): 18.
6. Lin CH, Chang KP, Huang SH. Deroofing: an effective method for treating chronic diffuse hidradenitis suppurativa. Dermatologic Surgery. 2016 Feb 1; 42(2): 273-5.
7. Dini V, Oranges T, Rotella L, Romanelli M. Hidradenitis suppurativa and wound management. The International Journal of Lower Extremity Wounds. 2015 Sep; 14(3): 236-44.
8. Humphries LS, Kueberuwa E, Beederman M, Gottlieb LJ. Wide excision and healing by secondary intent for the surgical treatment of hidradenitis suppurativa: a single-center experience. Journal of plastic, reconstructive & aesthetic Surgery. 2016 Apr 1; 69(4): 554-66.
9. Wollina U, Langner D, Heinig B, Nowak A. Comorbidities, treatment, and outcome in severe anogenital inverse acne (hidradenitis suppurativa): a 15-year single center report. International Journal Of Dermatology. 2017 Jan; 56(1): 109-15.
10. Alikhan A, Lynch PJ, Eisen DB. Hidradenitis suppurativa: a comprehensive review. Journal of the American Academy of Dermatology. 2009 Apr 1; 60(4): 539-61.
11. Janse I, Bieniek A, Horváth B, Matusiak Ł. Surgical procedures in hidradenitis suppurativa. Dermatologic clinics. 2016 Jan 1; 34(1): 97-109.
12. Morgan WP, Harding KG, Richardson G, Hughes LE. The use of silastic foam dressing in the treatment of advanced hidradenitis suppurativa. Journal of British Surgery. 1980 Apr; 67(4): 277-80.
13. Kofler L, Schweinzer K, Heister M, Kohler M, Breuninger H, Häfner HM. Surgical treatment of hidradenitis suppurativa: an analysis of postoperative outcome, cosmetic results and quality of life in 255 patients. Journal of the European Academy of Dermatology and Venereology. 2018 Sep; 32(9): 1570-4.
14. Svensson JB. Surgical treatment of hidradenitis suppurativa. Scandinavian journal of plastic and reconstructive surgery and hand surgery. 2001 Jan 1; 35(3): 305-9.
15. Varkarakis G, Daniels J, Coker K, Oswald T, Akdemir O, Lineaweaver WC. Treatment of axillary hidradenitis with transposition flaps: a 6-year experience. Annals of plastic surgery. 2010 May 1; 64(5): 592-4.
16. Blanc D, Tropet Y, Balmat P. Surgical treatment of suppurative axillary hidradenitis: value of a musculocutaneous island flap of the latissimus dorsi. Apropos of 3 cases. InAnnales de dermatologie et de venereologie 1990 Jan 1 (Vol. 117, No. 4, pp. 277-281).
17. Solanki NS, Roshan A, Malata CM. Pedicled gracilis myocutaneous flap for treatment of recalcitrant hidradenitis suppurativa of the groin and perineum. Journal of wound care. 2009 Mar; 18(3): 111-2.
18. Schwabegger AH, Piza H, Herczeg E. The lateral thoracic fasciocutaneous island flap for treatment of recurrenthidradenitis axillaris suppurativa and other axillary skin defects. British journal of plastic surgery. 2000 Dec 1; 53(8): 676-8.
19. Skorochod R, Margulis A, Adler N. Surgical Management of Hidradenitis Suppurativa: Factors Associated with Postoperative Complications and Disease Recurrence. Plastic and Reconstructive surgery. Global Open. 2023 Jan 18; 11(1): e4752.
20. Mandal A, Watson J. Experience with different treatment modules in hidradenitis suppuritiva: a study of 106 cases. The Surgeon. 2005 Feb 1; 3(1): 23-6.
21. Sugio Y, Tomita K, Hosokawa K. Reconstruction after excision of hidradenitis suppurativa: are skin grafts better than flaps?. Plastic and Reconstructive Surgery Global Open. 2016 Nov; 4(11).
22. Wortsman X, Moreno C, Soto R, Arellano J, Pezo C, Wortsman J. Ultrasound in-depth characterization and staging of hidradenitis suppurativa. Dermatologic surgery. 2013 Dec; 39(12): 1835-42.