ORIGINAL ARTICLE

The use of autologous epidermal grafts for diabetic foot ulcer emergencies: A clinical study

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ABSTRACT

BACKGROUND: There are various surgical and invasive treatment systems such as conservative skin grafts and autologous epidermal grafting (AEG) for diabetic foot ulcers. This study aims to evaluate the feasibility of using a novel epidermal graft harvesting system in diabetic foot ulcer emergencies.

METHODS: A retrospective clinical study was conducted with 15 diabetic foot ulcer patients, and after written and signed consent forms were taken, AEG system was applied to all patients. All of the clinical data of the patients such as their American Society of Anesthesiologists (ASA) Physical Status Classification System scores, size of pre-application wound area (cm^2), time to complete re-epithelization of the wound, pain scores using the visual analog scale (VAS) for both donor and recipient sites, changes in size of wound, complete dermal response time, and patients' demographics, comorbidities were recorded. The age, gender, pre-post application wound area (cm^2), time of healing, ASA, and VAS variables were compared each other and analyzed statistically. $P<0.05$ was considered as statistically significant.

RESULTS: The mean of time for complete wound healing was 5.9 (range 4–8) weeks. There was no statistically difference between recipient wound size and patient's age; size of both types of wounds (cm^2) and time (weeks) for complete reduction for both types of wounds; and time to complete both types of wound healing and gender ($p=0.509$, 0.788, and 0.233, respectively). ASA scores did not impact the time required for complete healing of the wound ($p=0.749$).

CONCLUSION: The current study has tried to evaluate the efficacy of the AEG system in a homogenous population with diabetic foot ulcers. An epidermal harvesting system may be used effectively and safely in patients with diabetic foot ulcer emergencies.

Keywords: Autologous harvesting system; diabetic foot ulcer; epidermal grafting.

INTRODUCTION

A wound is the disruption of skin integrity due to a disease or external factors such as trauma or cold/hot burn injuries. The consecutive stages of the wound healing process are hemostasis, inflammation, proliferation, maturation, remodeling, and any pause and/or failure in any of these steps make the wound a chronic one.[1] Diabetic foot ulcer is an important clinical entity associated with neurological and peripheral vascular disease of the deep tissues of the lower limbs, which occurs as a chronic complication in diabetic patients. It has been estimated that a single diabetic ulcer carries a cost of nearly US$50,000 and chronic wounds as a whole cost the medical system over US$25 billion per year.[2] The lifetime risk of developing a foot ulcer is about 25% for diabetic patients. While approximately half of the patients with diabetic ulcers are expected to be infected, over 20% of patients with ulcers are reported to have moderate or severe diabetic foot infections that may progress to amputation.[3]

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Chronic wound management is a considerably challenging clinical entity with its nature including a prolonged healing; requiring frequent dressing changes or autologous skin grafting (full and split thickness). Despite skin grafting being an important modality for wound closure, it has many disadvantages for patients such as having another painful wound which needs more time to heal and also have the risk of infection in the donor site.[4,5] Moreover, it often requires a hospital admission, a period of immobility, and anesthesia. As an alternative to these skin grafts, a technique based on application of negative pressure was first described in 1964 as autologous epidermal grafting (AEG).[6] The harvesting system commercially developed is the CELLUTOME™ Epidermal Harvesting System (KCI, San Antonio, Texas, USA).[7,8] This study aims to evaluate the feasibility of using a novel epidermal graft harvesting device in diabetic foot ulcer.

MATERIALS AND METHODS

After approval by the Local Ethics Committee, a retrospective clinical study was conducted with diabetic foot ulcer patients who had been referred to the Chronic Wound Clinic of Diskapi Training and Research Hospital Ankara, Turkey, and the Diabetic Foot Clinic of Gulhane Health of Sciences, Training and Research Hospital, Ankara, Turkey, from March 2017 to December 2019. After providing detailed information about AEG application by CELLUTOME™, written and signed consent forms were taken from all patients. Inclusion criteria were having a moderate diabetic foot ulcer and approving the use of AEG. Patients who refused to participate, had non-diabetic chronic wounds, and whose wounds area were >20 cm^2 were excluded from the study. Before grafting, the wound bed was prepared by other chronic wound care modalities included frequent wound dressing changes, surgical debridement, negative pressure wound therapy, and epidermal growth factor (Heberprot-p; Heber Biotec S.A., Havana, Cuba) applications to achieve effective granulation tissue formation. In the event of vascular obstruction, vascularization was achieved with peripheral angioplasty until the ulcer exhibited healthy granulation tissue. In addition, culture samples were obtained from each patient before grafting and submitted for culture sensitivity assays. If the ulcer presented with no infection, then epidermal grafts were applied (Figs. 1 and 2).

Patient demographics, comorbidities, their American Society of Anesthesiologists (ASA) Physical Status Classification System scores, size of pre-application wound area (cm^2), time to complete re-epithelization of the wound, pain scores using the visual analog scale (VAS) for donor and recipient sites, changes in size of wound area at each visit, and complete dermal response time were recorded. Wounds were checked and evaluated weekly at least for 8 weeks. After follow-up, one application of CELLUTOME™ was observed to be sufficient specific to our patients. The age, gender, pre-post application wound area (cm^2), time of healing, ASA, and VAS variables were compared each other and analyzed statistically.

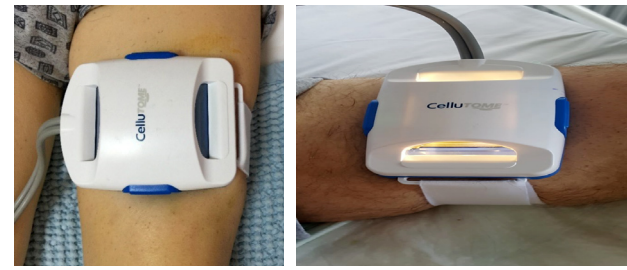

Figure 1. Cellutome application to the donor site.

Figure 2. Autologous epidermal grafting application to the recipient site.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics 21 software. The results were presented as the mean (ranges) and median±standard deviation. The time for complete reduction of wound size and gender variables: The time for complete reduction of wound size and size of both types of wounds variables were compared using the Student's t-test. The Pearson's correlation coefficient was used to determine the association between age, gender, and healing time of donor/wound sites, and also ASA scores with time required for complete healing of the wound. $P<0.05$ was considered as statistically significant.

RESULTS

AEG was applied to 15 patients (nine males and 6 females), and mean age was of 58.4 years (range: 46–75 years) (Table 1). The mean wound size of the patients was 11, 55 cm^2 (range 6–18) (Table 1). The median of VAS level of the patients was 2±0.86 (Table 1). The mean of time for complete wound healing was 5.9 (range 4–8) weeks. The mean of time for complete donor site healing was 4.2 (range 3–6) weeks (Table 1).

Because this application allows outpatient care, 10 of the patients were discharged on the same day. The remaining five patients had been hospitalized for their comorbidities and were receiving intravenous medications.

There was no difference between recipient wound size and patient's age ($p=0.509$). There was no difference between size of both types of wounds (cm^2) and time (weeks) for complete reduction for both types of wounds ($p=0.788$).

Table 1. Clinical data of patients treated with epidermal grafts

Patient	Gender	Age (years)	ASA Score	Wound size (cm^2)	Time for 100% reduction of wound size (weeks)	Time for 100% reduction of donor size (weeks)	Pain Score (VAS)
1	F	58	3	12.5	5	3	1
2	M	59	3	14	6	4	2
3	M	47	3	12	7	5	1
4	M	46	3	6	4	3	3
5	M	75	4	8	4	3	2
6	F	58	3	12.6	8	5	1
7	M	59	3	14	7	5	3
8	M	47	3	6	4	3	3
9	F	62	3	16	6	5	1
10	F	63	4	18	8	6	2
11	M	48	3	8	6	5	2
12	M	72	3	14.6	8	5	1
13	M	56	3	6	4	3	3
14	F	68	4	12	5	4	1
15	F	59	3	13.6	7	5	1
Mean/Median	9M–6F	58.4 (46–75)	3±0.1	11.55 (6–18)	5.9 (4–8)	4.2 (3–6)	2±0.86

F: Female; M: Male; ASA: American Society of Anesthesiologist; VAS: Visual Analog Scale.

There was no difference between time to complete recipient wound healing and gender (p=0.25). There was no difference between time to complete donor site healing and gender (p=0.233).

The ASA scores did not impact the time required for complete healing of the wound (p=0.749). The median of VAS was 2±0.86 (Table 1).

DISCUSSION

Both acute and chronic wounds are defined as debilitating diseases by the World Health Organization and are serious public health issues putting on dramatic costs to the reimbursement institutions.[9] There are usually two types of treatment, split-thickness skin grafting (STSG) and conservative treatment. STSG prevents the loss of protein by covering the granulated tissues and enables the closure of the area in question to avoid infection and facilitate rapid epithelization. Conservative treatment requires long-term procedures involving medications and successive dressings, which should usually be done by professional personnel like the other method. The STSG method includes surgical intervention where the operating room is used, requiring anesthesia and involving various professional equipment, and hospitalization of the patients. Other invasive interventions include surgical treatments, negative pressure wound therapy, epidermal growth factor applications, and dressings may be ended early through properly timed STSG. AEG systems were developed as an alternative to these methods and have been widely used in chronic wound treatment for about 3–4 decades and their outcomes have been published.[10,11] After the efficacy and ease-of-use of the epidermal harvesting systems have been demonstrated with various studies, it has been widely used, especially in patients with chronic wound complaints and especially in the outpatients setting.[12]

Almost all of these devices work with the principle of applying continuous negative pressure to healthy skin and creating skin islets in blister format.[13,14] The currently used system is commercially called the CELLUTOME™ epidermal harvesting system and consists of an automated harvester, a vacuum head, and a control unit. It combines a negative pressure of 400–500 mmHg and a temperature of 40°C, allowing 128 microblisters (each of 2 mm diameter, 2 mm apart) to be raised within 30 min.[12] The system has a built-in blade to excise the epidermal microblisters. After that, the microblister can be transferred to the wound site by the use of an adhesive dressing. The epidermal harvesting system in question provides high negative pressure that is applied at 40°C to ensure a shorter harvest time compared to the former systems.[15] The system has also some additional advantages such as relatively lower VAS scores to the other conventional systems, without any need for anesthesia, which is easily performed in the outpatient setting, simplicity, affordability, reproducibility, efficiency, and practicability that allow non-surgeon clinicians to perform after a short and a simple training course.[8,16]

Table 2. Comparison of SSG and AEG in terms of type of wound, patients, and general usability

	SSG	AEG
Load-bearing zone	More convenient as it provides a thicker area	Appropriate offloading should be added
Wounds with cavity and volume loss	Convenient	Unconvenient
Mobil zone	Convenient with proper immobilization	Unconvenient
Operating room	Necessary	Unnecessary
Pain	Possible	Not seen much
Recipient zone	An area that needs attention, sometimes primary suture and sometimes left to secondary healing	It is left completely open on the 3rd day, and recurrent biopsies can be taken from the same area
Risk of infection	Significant risk for donor area and recipient area	No risk for donor area and recipient area

SSG: Split-thickness graft; AEG: Autologous epidermal grafting.

Both techniques (STSG and AEG) have advantages and disadvantages compared to each other (Table 2). The STSG method is a more suitable method for load-bearing areas, wounds with cavities or volume loss, and mobile areas. Infection, graft necrosis, partial necrosis, and avulsion are the most common complications of STSG, and the complication rate of STSG technique is 1.74–2.8% according to the literature.[17–19] Most possible risk for donor area and recipient area in STSG is the infection compared to other technique in question.[19] In addition, particularly, the recipient area in STSG needs more attention and requires primary suture or left to secondary healing contrast to AEG system which allows being completely open on the 3rd day, and recurrent biopsies can be taken from the same area. The AEG method, on the other hand, is a more convenient method for patients with simpler and non-complicated wounds and for who have more infection risk and comorbidity (Fig. 2), and above all we can witness complete wound healing in a shorter time (Figs. 3 and 4).

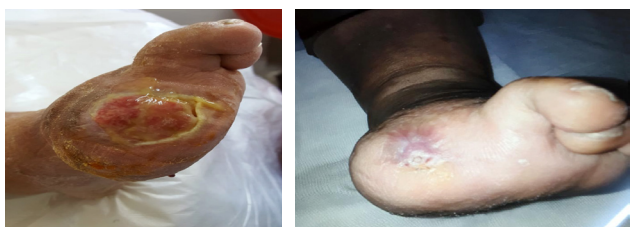

Figure 3. Pre-cellutome application (left), after the 7th week appearance of the wound (right).

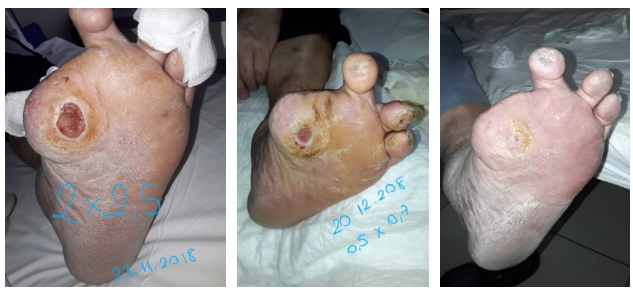

Figure 4. Complete healing steps of the wound.

Detailed histological and biochemical studies on the mechanism of action of the autologous epidermal graft procedure showed that the device produces an array of epidermal microdomes that contain multilayered keratinocytes through to the basal layer which is available for the transfer. The keratinocytes include a variety of other cell types with specialized functions such as the melanin pigment-producing melanocytes, the immune-competent Langerhans cells, and the neuroendocrine Merkel cell, while its basal layer contains epidermal stem cells.[20] Within 24 h, the keratinocytes begin to migrate from the wound edges to the wound bed where they then proliferate and form new epithelium. They produce some extracellular matrix components, such as laminin, fibronectin, and type IV collagen, and also some growth factors, such as epidermal growth factor (EGF), transforming growth factor-alpha, and heparin-binding EGF.[21,22] Thus, they also stimulate the endogenous process of wound healing with their products.

Our results indicate that these systems can be used reliably even for a systemic disease like moderate diabetic foot ulcers, which the wound healing process is considerably impaired. Any kind of graft application should be considered as surgical intervention. To ensure proper granulation and wound healing, especially, hyperglycemia should be brought under control. Correction of nutritional/nutritional parameters and lifting practices is important for graft success. Taking the culture and controlling the infections in the donor area are necessary for granulation, graft survival, and epithelialization. Although there is not much information when the literature is scanned, complete wound healing times in patients applied AEG, our results are correlated with the literature, with an average healing time of 6 weeks.[23] Although these results are promising for chronic and difficult (or complex) diseases such as diabetes, especially in wound healing, it should not be forgotten that we apply this method to more selected patients whose wounds were simpler. However, based on our clinical experience, this method can be applied in parallel with diabetes regulation

therapy, especially in selected patients. The patients included in the current study had elevated HbA1c. However, this did not cause any failure in the AEG system application and follow-up. Parallel results were obtained even in some studies where STSG was applied in the literature.[24] Disorder of albumin and nutritional parameters in surgical applications is crucial due to require fasting for anesthesia and additional surgical interventions.[25] However, since our defects are small and non-complicated, nutritional disorder has no significant effect.

In our study, we restricted wound size to 20 cm^2, and it may have affected the results. In the literature, there is no consensus on an upper limit on the wound area for AEG to be efficient; however, we chose 20 cm^2 as the cutoff due to reported high failure rates in wounds larger than 20–25 cm^2.[12] On the other hand, success rates of 90% of wound closure in STSG are about 78% in literature.[26] The reason for this rate being lower than AEG is that STSG is a major surgical procedure and the wounds in AEG are simpler and more controlled ones. In addition, we used only initial application of CELLUTOME™ to our cases and it was sufficient after complete follow-up. Nevertheless, multiple applications may be required for worse or with bigger wound size patients.

Another advantage of AEG system is that they allow grafting of the wound for patients who are not eligible for surgical interventions under anesthesia. Epidermal grafts can even be applied safely to patients with an ASA score of 4. Thus, patients are prevented from both the potential risks of anesthesia and possible complications of a surgical procedure. The patients in this study were assessed ASA scores of 3 or 4 and the epidermal harvesting method did not require a visit to the operating room. Besides, while another major intervention except grafting is applied in the operating room, AEG can be used simultaneously.

Undoubtedly that, one of the most important advantages of these systems over other conventional grafting systems is the good pain management. Conventional grafting can be painful since the dermis is affected where the sensory nerves end. In AEG methods, only the epidermis is used and sensory nerves in the dermis are not exposed. In addition, the hair follicles in the donor site are left, resulting in a better cosmetic result.[27] In our study, VAS scores were quite acceptable but it should not be forgotten that all of our patients had diabetes and diabetes affects the neurosensory system. In addition, although the patients had anxiety, AEG is a simple procedure in general, the pain scores were quite low. Moreover, pain management is generally good in also non-diabetics treated with AEG, in the literature.[28] Since the dermal layer remains intact, bleeding and post-intervention scarring are minimal at the donor site. In addition, the epithelization of the donor site has reached was 80% and 100% at the 2nd week and 5th week visits, respectively. Cosmesis, pain management, and time to complete healing of the donor site were found superior to conventional graft harvesting.[29,30]

The main limitation of our study is the relatively low number of subjects. All of the patients were selected, and their wounds were less complicated and simpler than STSG candidates. Another limitation is that the graft we applied to patients facilitates rapid discharge and early epithelialization but may have problems in terms of load management and require very strict follow-up. We do not have much experience about application of AEG in carrying load-bearing and mobile (joint) areas, in this study. In addition, this study is a retrospective presentation of the AEG technique. Despite STSG is performed in our clinic, we did not find appropriate to compare STSG and CELLUTOME™ statistically, because the defects need to be applied with surgical technique and the defects need to be applied in AEG were different in terms of size, location. and depth. On the other hand, since the AEG system was developed as an alternative to STSG, they deserve to be compared conceptually, although the techniques are surgically different from each other.

Conclusion

The current study tried to evaluate the efficacy of the AEG system in a homogenous population with diabetic foot ulcers. An epidermal harvesting system was used effectively and safely in patients with DFUs. After well-planned diabetes regulation, less pain and better cosmetic results for the donor site especially can be achieved without the need for an operating environment, especially in patients whose wounds are simpler and non-complicated. Prospective clinical studies which have high patient numbers and have more complicated wounds, and with different clinical etiologies, are needed to fully demonstrate the efficacy and feasibility of these systems.

Ethics Committee Approval: This study was approved by the Health Sciences University Ethics Committee (Date: 11.02.2020, Decision No: ATADEK-2020-46).

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: M.S., K.B.Y.; Design: M.S., K.B.Y.; Supervision: M.S., K.B.Y.; Resource: M.S., M.T.B., M.T.; Data: M.S., M.T.B., M.T.; Analysis: K.B.Y., M.T.B., M.O.; Literature search: M.S., İ.Y.; Writing: M.S., İ.Y.; Critical revision: M.A., H.E.G.

Conflict of Interest: None declared.

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REFERENCES

1. George H, Roger C. Chronic wound healing: A review of current management and treatments. Adv Ther 2017;34:599–610. [CrossRef]
2. Harold B, Olivera S, Robert FD, Hyacinth E, Brian L, Irena P, et al. Molecular markers in patients with chronic wounds to guide surgical debridement. Mol Med 2007;13:30–9. [CrossRef]
3. Prompers L, Huijberts M, Apelqvist J, Jude E, Piaggesi A, Bakker K, et al. High prevalence of ischaemia, infection and serious comorbidity in patients with diabetic foot disease in Europe. Baseline results from the Eurodiale study. Diabetologia 2007;50:18–25. [CrossRef]

4. Chung KC, Ghori AK. Systematic review of skin graft donor-site dressings. Plast Reconstr Surg 2009;124:307–8. [CrossRef]
5. Demirtas Y, Yagmur C, Soylemez F, Ozturk N, Demir A. Management of split-thickness skin graft donor site: A prospective clinical trial for comparison of five different dressing materials. Burns 2010;36:999–1005.
6. Kiistala U, Mustakallio KK. In vivo separation of epidermis by production of suction blisters. Lancet 1964;2:1444–5. [CrossRef]
7. Osborne SN, Schmidt MA, Derrick K, Harper JR. Epidermal micrografts produced via an automated and minimally invasive tool form at the dermal/epidermal junction and contain proliferative cells that secrete wound healing growth factors. Adv Skin Wound Care 2015;28:397–405.
8. Serena T, Francius A, Taylor C, MacDonald J. Use of a novel epidermal harvesting system in resource-poor countries. Adv Skin Wound Care 2015;28:107–12. [CrossRef]
9. World Health Organization. Non-communicable Diseases Country Profiles 2014. Geneva, Switzerland: World Health Organization; 2014.
10. Costanzo U, Streit M, Braathen LR. Autologous suction blister grafting for chronic leg ulcers. J Eur Acad Dermatol Venereol 2008;22:7–10.
11. Jung KE, Kim MH, Kim JY, Park BC. Comparison of modified Korean cupping method and conventional respiratory suction unit for epidermal graft. Int J Dermatol 2014;53:e384–6. [CrossRef]
12. Nadine H-H, Nicola B, Muholan K, Oliver S, Keith H, Ash M, et al. A prospective, multicentre study on the use of epidermal grafts to optimise outpatient wound management. Int Wound J 2017;14:241–9. [CrossRef]
13. Gupta S, Ajith C, Kanwar AJ, Kumar B. Surgical pearl: Standardized suction syringe for epidermal grafting. J Am Acad Dermatol 2005;52:348–50.
14. Awad SS. Chinese cupping: A simple method to obtain epithelial grafts for the management of resistant localized vitiligo. Dermatol Surg 2008;34:1186–92; discussion 1192–3. [CrossRef]
15. Gabriel A, Sobota RV, Champaneria M. Initial experience with a new epidermal harvesting system: Overview of epidermal grafting and case series. Surg Technol Int 2014;25:55–61.
16. Richmond NA, Lamel SA, Braun LR, Vivas AC, Serena T, Kirsner RS. Epidermal grafting using a novel suction blister-harvesting system for the treatment of pyoderma gangrenosum. JAMA Dermatol 2014;150:999–1000. [CrossRef]
17. Anderson JJ, Wallin KJ, Spencer L. Split thickness skin grafts for the treatment of non-healing foot and leg ulcers in patients with diabetes: A retrospective review. Diabet Foot Ankle 2012;3:1–7. [CrossRef]
18. Yammine K, Assi C. Surgical offloading techniques should be used more often and earlier in treating forefoot diabetic ulcers: An evidence-based review. Int J Low Extrem Wounds 2019;19:112–9. [CrossRef]
19. Bordianu A, Bobircă F, Pătraşcu T. Skin grafting in the treatment of diabetic foot soft tissue defects. Chirurgia (Bucur) 2018;113:644–50. [CrossRef]
20. Potten CS. Cell replacement in epidermis (keratopoiesis) via discrete units of proliferation. Int Rev Cytol 1981;69:271–318. [CrossRef]
21. Ortonne JP, Loning T, Schmitt D, Thivolet J. Immunomorphological and ultrastructural aspects of keratinocyte migration in epidermal wound healing. Virchows Arch A Pathol Anat Histol 1981;392:217–30. [CrossRef]
22. Kirfel G, Herzog V. Migration of epidermal keratinocytes: Mechanisms, regulation, and biological significance. Protoplasma 2004;223:67–78.
23. Oliver JS, Sarah JE, Nicki B, Nadine HH, Muholan K, Toby R, et al. The CelluTome epidermal graft-harvesting system: A patient-reported outcome measure and cost evaluation study. Int Wound J 2017;14:555–60.
24. Sanniec K, Nguyen T, van Asten S, Fontaine J, Lavery LA. Split-thickness skin grafts to the foot and ankle of diabetic patients. J Am Podiatr Med Assoc 2017;107:365–8. [CrossRef]
25. Ramanujam CL, Han D, Fowler S, Kilpadi K, Zgonis T. Impact of diabetes and comorbidities on split-thickness skin grafts for foot wounds. J Am Podiatr Med Assoc 2013;103:223–32. [CrossRef]
26. Brant McC, Thanh D. The Use of split-thickness skin grafts on diabetic foot ulcerations: A literature review. Plast Surg Int 2012;2012:715273.
27. Metze D, Luger T. Nervous system in the skin. In: Freinkel RK, Woodley DT, editors. The Biology of the Skin. New York: The Parthenon Publishing Group; 2001. p. 153–76.
28. Sandra NO, Marisa AS, John RH. An automated and minimally invasive tool for generating autologous viable epidermal micrografts. Adv Skin Wound Care 2016;29:57–64. [CrossRef]
29. Chuenkongkaew T. Modification of split-thickness skin graft: Cosmetic donor site and better recipient site. Ann Plast Surg 2003;50:212–4. [CrossRef]
30. Edwards J. Management of skin grafts and donor sites. Burns 2007;33:850–4. [CrossRef]

ORİJİNAL ÇALIŞMA - *ÖZ*

Diyabetik ayak ülser acillerinde otolog epidermal greftlerin kullanımı: Klinik çalışma

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AMAÇ: Diyabetik ayak ülserlerinin cerrahi tedavisinde konservatif deri greftleri ve otolog epidermal aşılama gibi çeşitli invaziv tedavi sistemleri bulunmaktadır. Bu çalışmayla; diyabetik ayak ülseri acil durumlarında yeni bir epidermal greft aşılama sisteminin uygulanabilirliğini değerlendirmeyi amaçlamaktayız.

GEREÇ VE YÖNTEM: Hastanemiz acil servise başvuran ve yazılı ve imzalı onam formları alınarak otolog epidermal aşılama sistemi kullanılmış 15 diyabetik ayak ülseri hastası ile geriye dönük klinik çalışma planlandı. Hastaların uygulama öncesi yara alanı boyutu (cm^2), yaranın yeniden epitelizasyonunu tamamlama süresi, hem verici hem de alıcı bölgeler için yaranın boyutundaki değişiklikler, tam dermal yanıt süresi, hastaların demografik özellikleri ve komorbiditeleri; "American Society of Anesthesiologists" (ASA) Fiziksel Durum Sınıflandırma Sistemi puanları, Visual Analog Scale (VAS) kullanılarak ağrı skorları olmak üzere tüm klinik verileri; kaydedildi. Yaş, cinsiyet, uygulama sonrası yara alanı (cm^2), iyileşme zamanı, ASA ve VAS değişkenleri birbirleriyle karşılaştırılarak istatistiksel olarak analiz edildi. $P<0.05$ değeri istatistiksel olarak anlamlı kabul edildi.

BULGULAR: Tam yara iyileşmesi için geçen süre ortalama 5.9 (dağılım, 4–8) haftaydı. Alıcı yara boyutu ile hastanın yaşı; her iki yara türünün boyutu (cm^2) ile her iki yara türü için tam küçültme süresi (hafta); her iki yara türünün iyileşmesini tamamlama süresi ile her iki cinsiyet arasında istatistiksel olarak bir fark yoktu (sırasıyla, $p=0.509$, 0.788, 0.233). ASA skorları yaranın tam iyileşmesi için gereken süreyi etkilemedi ($p=0.749$).

TARTIŞMA: Bu çalışma, diyabetik ayak ülseri olan homojen bir popülasyonda otolog epidermal aşılama sisteminin etkinliğini değerlendirmeye çalışmıştır. Diyabetik ayak ülseri acilleri olan hastalarda epidermal aşılama sistemi etkili ve güvenli bir şekilde kullanılabilir.

Anahtar sözcükler: Diyabetik ayak ülseri; epidermal greftleme; otolog aşılama sistemi.

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