ORIGINAL ARTICLE

Comparison of negative pressure wound therapy and wet-to-dry dressing after fasciotomy in earthquake victims: A retrospective cohort study

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ABSTRACT

BACKGROUND: This study aimed to compare the clinical effectiveness of negative pressure wound therapy (NPWT) with traditional wet-to-dry dressings in patients undergoing fasciotomy for acute compartment syndrome of the lower extremities following the February 6, 2023 earthquakes in Kahramanmaraş, Türkiye.

METHODS: This retrospective cohort study included 28 patients (15 males, 13 females) admitted to our hospital between February 6 and March 6, 2023, who underwent fasciotomy for lower extremity acute compartment syndrome. A total of 109 fasciotomy incisions were performed across 60 extremities. Of these, 78 wounds were managed with NPWT and 31 with wet-to-dry dressings. Group allocation was determined by NPWT device availability during the disaster period. All patients were managed using a standardized wound closure protocol, including serial debridement followed by primary closure or split-thickness skin grafting when indicated. Outcomes compared between groups included number of debridements, infection rate, primary wound closure, graft requirement, dressing-related complications, and length of hospital stay.

RESULTS: The NPWT group required significantly fewer debridements ($p<0.05$). Dressing-related complications and the need for additional dressing interventions were significantly higher in the wet-to-dry group ($p<0.05$). No significant differences were observed between groups in infection rate, primary wound closure, graft requirement, or length of hospital stay ($p>0.05$). Among pediatric patients, infection rates were lower than in adults, whereas unplanned dressing changes were significantly more frequent ($p<0.05$).

CONCLUSION: NPWT is an effective wound management modality in fasciotomy patients, even under disaster conditions. It significantly reduced the need for debridement and dressing-related complications compared to traditional methods, despite similar outcomes in infection and wound closure. These findings support the preferential use of NPWT in mass-casualty settings, where healthcare personnel and resources may be limited. In addition to its clinical benefits, NPWT offers logistical advantages by simplifying wound care and reducing healthcare workload. Future prospective, randomized, multicenter studies are needed to confirm these findings and evaluate the broader applicability and cost-effectiveness of NPWT in both disaster and routine clinical settings.

Keywords: Compartment syndrome; fasciotomy; gradual approximation; negative pressure wound therapy; wet-to-dry dressing.

INTRODUCTION

Acute compartment syndrome (ACS) is a condition that arises from increased compartment pressure in the extremities and requires emergency fasciotomy to reduce this pressure.[1,2] Following fasciotomy, wound closure and dressing strategies vary depending on tissue status, surgeon preference, and resource availability.[3] Common wound closure approaches include early primary closure, staged closure, skin grafting, and negative pressure wound therapy (NPWT), also known as vacuum-assisted closure (VAC).[4] Traditionally, wet-to-dry dressing has been the standard method for wound management

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following emergency fasciotomy for acute compartment syndrome, while NPWT has emerged as a potential alternative.[5] There is currently no consensus regarding the optimal wound closure and dressing strategy.[6] Although numerous studies[7] have been conducted in recent years to establish evidence-based approaches for managing musculoskeletal injuries following earthquakes, variability in clinical practice persists. Specifically, differences in wound closure and dressing techniques among surgeons highlight a lack of consensus on optimal management strategies.[8] The February 2023 Kahramanmaraş earthquake resulted in a substantial increase in patients presenting with acute compartment syndrome, underscoring the urgent need for rapid, efficient, and resource-conscious wound care approaches. In disaster settings, treatment strategies must be not only effective but also reproducible and feasible under constrained conditions. In this context, the benefits of NPWT have not been adequately explored.

The aim of this retrospective cohort study was to compare NPWT with wet-to-dry dressing in patients who underwent fasciotomy following the earthquake. Outcomes of interest included infection rates, frequency of debridement, dressing-related complications, and wound closure success under a standardized closure protocol.

We hypothesized that compared with traditional wet-to-dry dressing, NPWT would reduce infection rates, decrease the need for repeated surgical debridement, and lower the incidence of dressing-related complications.

MATERIALS AND METHODS

Study Design and Patients

This study employed a retrospective cohort design and was conducted in strict accordance with the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants, as well as from the parents of underage participants. This study was approved by the Fırat University Non-Interventional Research Ethics Committee (Date: June 6, 2024, Decision No: 2024/09-26).

Patients admitted to our hospital following the February 6 Kahramanmaraş earthquake were included. The following variables were compared between two dressing groups: demographic characteristics, number of extremities undergoing fasciotomy, number of debridements, dressing-related complications, primary wound closure rate, graft requirement, infection rate, and length of hospital stay.

Primary and Secondary Endpoints

The primary endpoints were the number of debridements and dressing-related complications (defined as unplanned additional dressing changes). Secondary endpoints included infection rate, primary wound closure, graft requirement, and length of hospital stay.

Level of Analysis

Demographic characteristics were analyzed at the patient level. In contrast, debridement count, dressing-related complications, infection, wound closure outcomes, and graft requirement were analyzed at the wound level.

Figure 1. Renewal of wet-to-dry dressing on the extremity following fasciotomy using the gradual approximation method.

Treatment Protocol and Dressing Groups

Wet-to-Dry Dressing Group: In the first group, following fasciotomy of the extremity, sterile gauze dressings impregnated with bacitracin and neomycin-containing creams were applied to fill the fasciotomy site and then covered with dry gauze. Dressings were changed every 8 hours (Fig. 1). Antibiotic-impregnated gauze was used exclusively in this group.

NPWT Group: In the second group, NPWT was initiated immediately after fasciotomy. The vacuum device was operated in intermittent mode (5 minutes on, 2 minutes off) at a mean pressure of 125 mmHg (Fig. 2). Polyurethane (PU) foam was used in all applications, and wounds were sealed with standard transparent medical adhesive drapes. Treatment was delivered using the single portable NPWT device available in our hospital during the disaster period.

In both groups, a gradual approximation technique was used for wound closure, taking into account the progression of wound healing and the presence of tissue edema at the fasciotomy site. Primary wound closure was performed when-

Figure 2. Dressing of a fasciotomized extremity using negative pressure wound therapy (NPWT).

Figure 3. Saturation of the wet-to-dry dressing and exposure to the external environment due to bleeding and edema in the fasciotomy area, necessitating re-dressing.

Figure 4. Requirement for re-dressing due to device blockage caused by hemorrhage and edema, as well as loosening of adhesives, in a patient treated with negative pressure wound therapy (NPWT).

ever feasible; otherwise, closure using a partial-thickness skin graft was planned and applied as needed. Serial debridements were initially conducted every 48 hours and subsequently every 72 hours under sedation anesthesia in the operating room. During debridement, tissue samples were collected for microbiological analysis when infection was suspected. Antibiotic therapy was initiated in consultation with infectious disease specialists in the patients with positive culture results. In the first group, early postoperative complications such as bleeding, hematoma formation, and soft tissue edema were observed within the initial hours following fasciotomy. Additional dressing changes outside the scheduled intervals were required due to dressing saturation from edema and exposure of the wound to the external environment. These events were recorded as dressing-related complications (Fig. 3). In the second group, dressing-related complications included device occlusion due to hemorrhage and edema, detachment of adhesive components, and the need for reapplication of dressings (Fig. 4).

Due to the emergency conditions following the February 6 Kahramanmaraş earthquake, patient allocation to dressing methods was not randomized but was determined by the availability of NPWT devices during the initial disaster response. The first ten patients received NPWT as devices were readily available in the hospital. As supplies became scarce, the subsequent eight patients were treated with wet-to-dry dressings. Following the arrival of additional NPWT devices from neighboring provinces, the final ten patients were again managed with NPWT (Fig. 5). Although this non-randomized

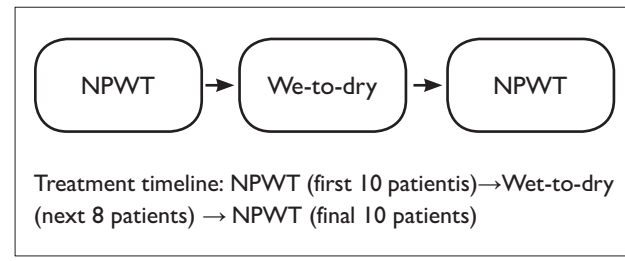

Figure 5. Flow diagram illustrating the sequential allocation of dressing methods during the disaster period.

allocation may introduce selection bias, the sequential treatment approach, combined with the use of consistent surgical teams and standardized wound management protocols, helped preserve internal consistency. Nevertheless, the potential for temporal confounding inherent in this design has been acknowledged in the interpretation of the study findings.

Inclusion and Exclusion Criteria

Patients were included in the study if all of the following criteria were met:

- Diagnosis of acute compartment syndrome confirmed clinically by two orthopedic surgeons.
- Emergency fasciotomy performed at our institution following the February 6, 2023 earthquake.
- Fasciotomy limited to the lower extremity (anterolateral and/or posteromedial incisions for leg compartments; lateral incision for the thigh).
- Continuation of treatment with a single designated dressing method (either NPWT or wet-to-dry dressings) until definitive wound closure.
- Wound debridement and closure procedures performed by the same orthopedic surgical team.
- Availability of complete clinical, microbiological, and follow-up data throughout hospitalization.

Patients were excluded if any of the following criteria were present:

- Fasciotomy performed outside the lower extremity (e.g., upper limb, gluteal region, isolated foot involvement, etc.).
- Initial fasciotomy performed at an external facility prior to transfer.
- Presence of a bone fracture in the same limb as the fasciotomy.
- Requirement for intensive care due to multitrauma or shock, precluding scheduled wound management.
- Contraindication to repeated anesthesia or inability to undergo serial debridement.
- Incomplete hospitalization records or loss to follow-up prior to wound closure.

Due to the retrospective study design and the natural pattern of patient admissions following the earthquake, no patients aged 15–18 years who met the inclusion criteria were identified in the study cohort.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics 22 (IBM SPSS, Türkiye). The normality of data distribution was assessed using the Shapiro–Wilk test. Descriptive statistics were presented as mean ± standard deviation or frequency and percentage. For quantitative variables that did not follow a normal distribution, the Mann–Whitney U test was used. Non-normally distributed data were reported as median and interquartile range (IQR), and exact p-values were provided for all analyses. Qualitative data were compared using Fisher's exact test or the Fisher–Freeman–Halton test. A p value of <0.05 was considered statistically significant.

RESULTS

A total of 28 patients (patient-level analysis) with 109 fasciotomy wounds (wound-level analysis) were included in the study. Demographic characteristics were analyzed at the patient level, while wound-related outcomes—including the number of debridements, infection status, wound closure type, graft requirement, and dressing-related complications—were evaluated at the wound level. The study retrospectively analyzed 28 earthquake victims treated between February 6, 2023 and March 6, 2023. The cohort included 15 males (53.6%) and 13 females (46.4%), with a mean age of 31.11±12.8 years (range: 12–54 years) (Table 1). Patients were categorized according to dressing method: eight patients (28.6%) received wet-to-dry dressings (Group 1), and 20 patients (71.4%) were treated with NPWT (Group 2). Fasciotomy distribution was as follows: 7 patients (25%) underwent fasciotomy in one leg, 14 patients (50%) in both legs, three patients (10.7%) in both legs and one thigh, and four patients (14.3%) in both legs and both thighs. In total, 60 extremities underwent fasciotomy, resulting in 109 fasciotomy wounds (two fasciotomy incisions per leg and one per thigh). Of these, 78 wounds were managed with NPWT and 31 with wet-to-dry dressings (Table 2). No infection was detected in 67.9% of patients, whereas 32.1% developed infections based on culture results. The number of limbs undergoing fasciotomy, infection rates, fasciotomy sites, and the numbers of limbs achieving primary wound closure or requiring graft closure were compared between the two dressing methods (Table 2). No statistically significant differences were observed between groups ($p>0.05$). Culture-based infection rates were evaluated at the wound level, with infection recorded per fasciotomy incision rather than per patient.

The number of debridements and the frequency of additional dressings beyond the planned schedule (defined as dressing-

Table 1. Patients demographics

	Min-Max	Mean±SD (median)
Age	12-54	31.11±12.8
	n	%
Sex		
Male	15	53.6
Female	13	46.4
Age group		
12-14	7	25
19-54	21	75

SD: Standard deviation.

Table 2. Comparison of wound-related outcomes between wet-to-dry dressing and negative pressure wound therapy (NPWT) groups (wound-level data)

Variable	Wet-to-dry (n=8)	NPWT (n=20)	p-value
Number of fasciotomized ex-tremities[1]	2 (1–4)	2 (1–4)	0.680
Number of debridements[1]	3 (2–6)	2 (1–6)	0.049
Wound infection[2]	Absent: 5 (62.5%)	Absent: 14 (70%)	
	Present: 3 (37.5%)	Present: 6 (30%)	0.516
Fasciotomy location[3]			0.406
One leg	3 (37.5%)	4 (20%)	
Two legs	3 (37.5%)	11 (55%)	
Two legs + one thigh	0 (0%)	3 (15%)	
Two legs + two thighs	2 (25%)	2 (10%)	
Additional dressing interven-tions[3]			0.034
1	1 (16.7%)	4 (80%)	
2	1 (16.7%)	1 (20%)	
3	2 (33.3%)	0 (0%)	
4	1 (16.7%)	0 (0%)	
5	1 (16.7%)	0 (0%)	
Primary closure[2]	0: 24 (77.2%)	0: 63 (80.4%)	
	1: 5 (16.4%)	1: 9 (11.8%)	
	2: 1 (6.4%)	2: 3 (7.6%)	1.000
Graft requirement[3]	1: 10 (32.2%)	1: 20 (25.6%)	
	2: 4 (25.8%)	2: 20 (51.5%)	
	3: 2 (19.2%)	3: 1 (3.6%)	0.179

[1]Mann–Whitney U test; [2]Fisher's exact test; [3]Fisher–Freeman–Halton test. NPWT: Negative pressure wound therapy.

related complications) were significantly higher in the wet-to-dry dressing group (Group 1) compared to the NPWT group ($p<0.05$) (wound-level analysis) (Table 2).

Patients were stratified in two age groups (12–14 years and 19–54 years) based on the available dataset. Due to the retrospective design and post-disaster admission pattern, no eligible patients aged 15–18 years were identified. There was no statistically significant difference in the distribution of dressing methods between age groups ($p>0.05$) (Table 3). In the pediatric group (12–14 years), a total of six wounds in three patients were treated with wet-to-dry dressings, while 10 wounds in four patients were managed with NPWT. When comparing age groups across both treatment methods, no statistically significant differences were observed between pediatric patients and adults (19–54 years) in terms of debridement count or primary wound closure rates ($p>0.05$). Pediatric and adult subgroups were analyzed at both the wound and patient levels, as appropriate. The infection rate was lower in the pediatric group compared to adults, whereas the frequency of cases requiring additional dressings beyond the planned schedule was significantly higher in the pediatric group ($p<0.05$) (Table 4). No statistically significant differences were found in the length of hospital stay between patients treated with NPWT and those receiving wet-to-dry dressings, nor between age groups ($p>0.05$) (Table 5). Length of stay was evaluated at the patient level.

Table 3. Distribution of dressing methods by age group

Dressing method	Age group		p*
	12–14 years n (%)	19–54 years n (%)	
Wet-to-dry dressing	3 (42.9%)	5 (23.8%)	0.306
NPWT	4 (57.1%)	16 (76.2%)	–

*Fisher's exact test. *Due to the retrospective study design and the pattern of patient admissions following the earthquake, no patients aged 15–18 years met the inclusion criteria and were therefore excluded from the analysis. NPWT: Negative pressure wound therapy.

DISCUSSION

This study is among the limited number of investigations

Table 4. Comparison of debridement, infection, primary closure, and dressing-related complications between age groups

Parameter	12–14 years	19–54 years	p-value
Number of debridements	2 (2–3)	2 (2–3)	0.977[1]
Wound infection	Absent: 6 (85.7%)	Absent: 13 (61.9%)	
	Present: 1 (14.3%)	Present: 8 (38.1%)	0.025[2]
Number of wounds with primary closure	0: 12 (75%)	0: 74 (79.5%)	
	1: 2 (12.5%)	1: 9 (9.7%)	0.425[2]
	2: 1 (12.5%)	2: 5 (10.8%)	
Dressing-related problems	1: 1 (20%)		
	2: 1 (20%)		
	3: 1 (20%)	1: 4 (66.7%)	
	4: 1 (20%)	2: 1 (16.7%)	0.035[3]
	5: 1 (20%)	3: 1 (16.7%)	

[1]Mann–Whitney U test; [2]Fisher's exact test; [3]Fisher–Freeman–Halton test.

Table 5. Comparison of length of hospital stay by dressing method and age group

Parameter	12–14 years	19–54 years	p-value
Dressing method (overall)	Wet-to-dry (n=8): 15 (15–26)	NPWT (n=20): 20 (17–20)	0.564
Age groups (overall)	12–14 years (n=7): 18 (15–20)	19–54 years (n=21): 20 (15–20)	0.511
Wet-to-dry subgroup	12–14 years (n=3): 15 (15–23)	19–54 years (n=5): 15 (15–25)	0.873
NPWT subgroup	12–14 years (n=4): 19 (16–20)	19–54 years (n=16): 20 (17–20)	0.455

[1]Mann–Whitney U test. IQR: interquartile range; NPWT: Negative pressure wound therapy.

evaluating the effectiveness of NPWT and conventional wet-to-dry dressings in a stepwise wound closure approach for patients who developed compartment syndrome of the thigh and leg following an earthquake and underwent emergency fasciotomy at our institution. Our findings demonstrate that NPWT and wet-to-dry dressings result in comparable clinical outcomes in terms of wound healing. However, our findings indicate that NPWT dressings should be favored whenever feasible, as they require less debridement and are associated with fewer dressing-related complications compared to wet-to-dry dressings. Another key observation of our study is that pediatric patients who underwent fasciotomy for acute compartment syndrome exhibited lower infection rates than adults, although they experienced a higher incidence of dressing-related complications. Furthermore, the stepwise use of NPWT, standard dressings, and wet-to-dry dressings produced comparable outcomes in terms of primary wound closure and graft requirements. This study is among the few in the literature to evaluate the effectiveness of wound care strategies following fasciotomy. It also offers insights from our experience managing fasciotomy wounds in pediatric and adult patients after disasters, which we hope will contribute to the literature.

Unlike controlled environments in randomized trials, this study provides real-world data obtained under mass-casualty conditions following a major natural disaster. The logistical challenges—such as limited device availability, personnel shortages, and prolonged inpatient stays due to housing destruction—underscore the practicality and feasibility of NPWT in disaster settings. Despite comparable infection and closure rates, NPWT facilitated more efficient wound management by reducing the number of dressing changes and surgical debridements. This advantage is particularly valuable in overwhelmed hospitals where time, equipment, and healthcare personnel are limited.

Acute compartment syndrome is a condition requiring urgent intervention to prevent the death of muscle and nerve cells.[9] Fasciotomy is essential to prevent irreversible necrosis of muscle and nerve tissue caused by impaired tissue perfusion.[10] By immediately reducing compartment pressure and restoring perfusion, early fasciotomy can prevent muscle and nerve tissue necrosis.[11] In our study, patients included those who arrived in our city or neighboring areas within the first 12 hours after the earthquake and were diagnosed with acute compartment syndrome in the emergency department. Diag-

nosis was established by two orthopedic and traumatology specialists, and all patients underwent emergency fasciotomy. Patients who presented later and were diagnosed with crush injuries were excluded from the study.

There is no clear consensus in the literature regarding optimal closure methods and dressing techniques for fasciotomy wounds.[12] Most approaches depend on the surgeon's preference, the condition of the surrounding tissue, the availability of materials and equipment, and institutional and financial resources.[12] Typically, fasciotomy wounds are left open and managed with moist sterile dressings to prevent tissue drying and retraction.[11] Alternatively, NPWT may be applied.[13] In a study of 227 patients evaluating the impact of dressing type on clinical outcomes following fasciotomy, NPWT was associated with higher primary closure rates and shorter hospital stays compared with traditional wet-to-dry dressings. The average hospital stay was 21 days for primarily closed wounds and 27 days for wounds requiring grafting.[14] In our study, hospital stays ranged from 10 to 30 days, with a mean duration of 20 days. According to the literature, we believe that the prolonged hospital stays observed in some patients in our study were partly attributable to social factors, particularly the destruction of patients' homes following the earthquake.

Previous studies have shown that NPWT promotes early granulation, reduces edema, and decreases the need for debridement.[15] Consistent with these findings, the number of debridements in our study was higher in patients treated with the wet-to-dry dressing method than in those treated with NPWT. This difference may be explained by the negative pressure provided by NPWT, which facilitates early reduction of tissue edema and thereby decreases the need for debridement. The use of the same gradual approximation protocol in both groups likely contributed to the similar infection and closure outcomes. We believe that discrepancies between our findings and those reported in the literature may be related to our use of NPWT as a dressing method rather than a definitive wound closure technique, while a stepwise approach was employed as the closure method in both groups. In contrast to previous reports, no statistically significant difference in infection rates was observed between the two dressing methods in our study; however, infection rates were lower in pediatric patients compared to adults. The comparable infection rates between groups may be attributed to the fact that all patients underwent wound debridement under sedation anesthesia in sterile operating theatre conditions. The lower infection rate in pediatric patients may reflect their greater healing capacity and tissue viability. During the follow-up of fasciotomy wounds, various techniques can be used for stepwise wound closure, aiming to gradually approximate the skin edges as soft tissue edema resolves.[16] In our study, NPWT was applied to the first 10 consecutive patients who underwent fasciotomy. Subsequently, due to supply limitations, the wet-to-dry dressing method was used in eight patients. During serial debridements performed in the operating theatre, the stepwise wound closure approach was used in both groups.

Although the literature suggests that NPWT improves local blood flow, maintains a moist wound environment, prevents wound edge retraction, and reduces infection rates,[2,12] our findings did not demonstrate a difference in infection rates between the two treatment groups. This may be explained by the fact that all patients underwent sterile wound debridement under sedation anesthesia in operating theatre conditions, as well as the frequent dressing changes in patients treated with wet-to-dry dressings, which are exposed to the external environment.

The literature also indicates that NPWT may prevent hematoma and seroma formation in the wound area, facilitating earlier closure of fasciotomy wounds and reducing the need for skin grafts.[17] In our study, although NPWT was associated with reduced hematoma and seroma formation, no statistically significant difference was observed between the NPWT and wet-to-dry dressing groups in terms of primary wound closure rates or skin graft requirements ($p>0.05$). This finding may be related to the fact that NPWT was not used as a stepwise wound closure technique in our study; however, no definitive conclusion can be drawn, as the same stepwise closure approach was applied to all patients in our study.

In contrast to many reports emphasizing its advantages, some studies have highlighted potential disadvantages of NPWT compared to other closure techniques, including increased morbidity, higher costs, and longer treatment duration.[14] A randomized controlled trial reported that using NPWT as part of a stepwise approach increased the need for skin grafts, raised costs, and prolonged treatment duration.[13] Another study reported that NPWT could cause excessive granulation tissue formation, which may delay epithelialization in the wound area.[18] In cases of large muscle swelling, which are more common in patients undergoing fasciotomy due to acute compartment syndrome following an earthquake, NPWT may not sufficiently approximate the wound edges, and the tissues may gradually harden due to granulation, further limiting complete skin edge closure.[19] In this study, NPWT served only as a dressing method, while gradual approximation was uniformly used for closure, preventing an independent assessment of NPWT's effect on closure time.

After fasciotomy, the wound should be closed as soon as possible, taking into account the condition of the wound area, soft tissue edema, and infection status, to reduce the risk of complications.[19] However, it should be borne in mind that early primary wound closure may lead to increased muscle pressure and recurrent compartment syndrome; therefore, caution is required.[20] In a similar study comparing the effectiveness of NPWT with wet-to-dry dressing, the NPWT group had a higher primary closure rate and shorter treatment duration and hospital stay than the wet-to-dry dressing group.[14,21] Another study evaluating the clinical outcomes

of 52 patients who underwent fasciotomy concluded that NPWT reduced the primary skin closure rate, increased the need for grafts, and was comparable to the stepwise approach and wet-to-dry dressing in terms of wound closure time and infection rates.[19]

Partial-thickness skin grafts reduce patient morbidity and lower infection rates associated with wound complications. They also help minimize delays in rehabilitation compared to primary or secondary closure of fasciotomy wounds. Owing to these advantages, partial-thickness skin grafts are widely used for the closure of fasciotomy wounds.[22] In our study, consistent with the literature, we aimed to achieve early wound closure in all patients. Wounds were managed either by primary closure or, when necessary, by split-thickness skin grafting, depending on the condition of the wound, degree of tissue edema, and presence of infection.

A study evaluating the closure and management of fasciotomy wounds in pediatric patients reported that the use of NPWT reduced both infection rates and the number of required debridements.[4] Additionally, primary wound closure rates were higher in pediatric patients compared to adults, while infection rates and length of hospital stay were lower in the pediatric population.[23,24] In our study, in agreement with the literature, infection rates in fasciotomy wounds were lower in pediatric patients than in adults. Although the rate of primary wound closure was higher in the pediatric group in our study, this difference did not reach statistical significance, in contrast to previous reports in the literature. We speculate that this finding may be related to the increased number of debridements performed in pediatric patients, particularly in the early postoperative period, due to bleeding and tissue edema. Furthermore, no statistically significant difference was observed in the duration of hospitalization between pediatric and adult patients in our study. This finding may be attributable to hospital admissions driven by social factors rather than clinical necessity.

Limitations and Strengths

This study has certain limitations, primarily its retrospective design and relatively small sample size. Due to the unplanned nature of the disaster, dressing allocation was not randomized but instead determined by equipment availability. Nevertheless, the quasi-randomized sequence (NPWT → wet-to-dry → NPWT), along with the use of a standardized surgical team, minimized allocation bias. Additionally, cost analysis could not be performed due to the lack of consistent data on material usage and billing in the emergency setting. Despite these limitations, the study provides valuable insight into real-world wound care practices during mass-casualty events. Furthermore, the exclusive use of bacitracin/neomycin-impregnated gauze in the wet-to-dry dressing group should be acknowledged as a potential confounding factor that may have influenced dressing-related complications.

A key strength of this study is the homogeneity of the patient population: all fasciotomies involved the lower extremity, all wound closures were performed using the same gradual approximation technique, and all surgical procedures were conducted by the same orthopedic team. Additionally, the inclusion of pediatric patients and the comparison across age groups offer a unique contribution to the existing literature.

CONCLUSION

In this cohort of earthquake victims who underwent fasciotomy for acute compartment syndrome, both NPWT and wet-to-dry dressing methods yielded comparable outcomes in terms of primary wound closure, graft requirement, and infection rates when used alongside a standardized gradual approximation technique. However, NPWT demonstrated clear advantages, significantly reducing the number of required debridements and dressing-related complications. These benefits may simplify wound care and reduce the burden on healthcare systems, particularly in disaster settings with limited personnel and resources.

Based on these findings, NPWT may be considered a preferred dressing method for fasciotomy wounds in mass-casualty situations, not only for its clinical benefit but also for its logistical advantages. Future prospective, randomized, multicenter studies are needed to validate these results and to further assess the cost-effectiveness and broader applicability of NPWT across diverse healthcare settings.

Ethics Committee Approval: This retrospective cohort study was approved by the Fırat University Non-Interventional Clinical Research Ethics Committee (Date: 06.06.2024, Decision No: 2024/09-26).

Peer-review: Externally peer-reviewed.

Informed Consent: Written informed consent was obtained from all participants, as well as from the parents of underage participants.

Authorship Contributions: Concept: M.K.; G.O.; A.S.Ş.; Design: O.A.; A.S.Ş., H.K.; Supervision: M.K.; G.O.; Resource: M.K., H.K., O.A. A.S.Ş.; Materials: O.A. A.S.Ş.; Data collection and/or processing: M.K., G.O.; Analysis and/or interpretation: O.A., H.K.; Literature review: O.A. A.S.Ş.; Writing: M.K., G.O.; Critical review: M.K.; G.O.; A.S.Ş.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Depremzedelerde fasyotomi sonrası negatif basınçlı yara tedavisi ile ıslak-kuru pansumanın karşılaştırılması: Retrospektif bir kohort çalışması

AMAÇ: Bu çalışmada, 6 Şubat 2023 Kahramanmaraş depremleri sonrası akut kompartman sendromu nedeniyle alt ekstremitelerine fasyotomi uygulanan hastalarda negatif basınçlı yara tedavisi (NPWT) ile geleneksel ıslak-kuru pansuman yönteminin klinik etkinliği karşılaştırılmıştır.

GEREÇ VE YÖNTEM: Çalışma retrospektif kohort tasarımda yürütülmüş olup, 6 Şubat–6 Mart 2023 tarihleri arasında hastanemize başvuran ve alt ekstremite akut kompartman sendromu nedeniyle fasyotomi uygulanan 28 hasta (15 erkek, 13 kadın) dahil edilmiştir. Bu hastalara toplam 109 fasyotomi yapılmış, 60 ekstremite tedavi edilmiştir. Fasyotomi uygulanan 78 yara NPWT, 31 yara ise ıslak-kuru pansuman yöntemi ile tedavi edilmiştir. Pansuman grupları cihaz erişilebilirliğine göre belirlenmiştir. Her iki grup, standart yara kapama protokolüyle (seri debridmanlar sonrası primer veya greft ile kapama) tedavi edilmiştir. Karşılaştırmalar; debridman sayısı, enfeksiyon oranı, primer yara kapama, greft ihtiyacı, pansumanla ilişkili komplikasyonlar ve hastanede kalış süresi parametreleri üzerinden yapılmıştır.

BULGULAR: NPWT uygulanan hastalarda ortalama debridman sayısı anlamlı şekilde daha düşüktü ($p<0.05$). Islak-kuru pansuman grubunda ek pansuman gereksinimi ve pansumanla ilişkili komplikasyonlar anlamlı olarak daha yüksekti ($p<0.05$). Enfeksiyon oranı genel grupta %32.1 olup, iki pansuman yöntemi arasında enfeksiyon, primer kapama ve greft ihtiyacı açısından istatistiksel fark saptanmadı ($p>0.05$). Hastanede kalış süresi de gruplar arasında benzerdi ($p>0.05$). Çocuk hastalarda enfeksiyon oranı erişkinlere göre daha düşük, ancak planlanan dışında ek pansuman ihtiyacı anlamlı olarak daha yüksekti ($p<0.05$).

SONUÇ: NPWT, afet koşullarında dahi uygulanabilirliği yüksek, komplikasyonları azaltan ve debridman ihtiyacını düşüren etkili bir yara bakım yöntemidir. Yara kapama başarıları benzer olsa da, NPWT ile daha az işlem gereksinimi gözlenmiştir. Bu doğrultuda, kısıtlı personel ve kaynakla çalışılan afet senaryolarında NPWT'nin öncelikli tercih edilmesi önerilmektedir. Ayrıca, ileriye dönük randomize, prospektif ve çok merkezli çalışmalara ihtiyaç vardır.

Anahtar sözcükler: Fasyotomi; ıslak-kuru pansuman; kademeli yaklaştırma; kompartman sendromu; negatif basınçlı yara tedavisi.

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