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The outcome of vacuum wound dressing versus traditional wound dressing for post-debridement of necrotizing fasciitis wound care

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ABSTRACT

Objectives: This study aimed to evaluate the effectiveness of the traditional dressing and the vacuum wound dressing in cases of infected wound care, in terms of pain score during wound dressing, re-debridement, and hospitalization.

Material & Methods: Seventy patients who had a debridement procedure for necrotizing fasciitis were included in this study. Patients were divided into two groups, with 35 patients for each. Group A (the traditional dressing) and Group B (the vacuum wound dressing). The average pain score during wound dressing, re-operative debridement, and hospitalization were analyzed between the two groups.

Results: There is no difference between the two groups in terms of the pain score during wound dressing (4.54 ± 0.78 vs 4.46 ± 0.68 , p -value = 0.08). Also, the re-operative debridement rate in the traditional dressing group is slightly higher than in the vacuum wound dressing group (17.1% vs 14.2%, P -value = 0.10), and length of hospital stay in the vacuum wound dressing group is shorter than in the traditional dressing group (11.54 ± 2.68 vs 11.29 ± 1.90 , p -value = 0.14). The relative risk of re-debridement in traditional wound dressing compared with vacuum dressing was 1.11 (95% CI 0.61, 2.02).

Conclusion: Vacuum wound dressing is a modality that can be used for wound care in infected wound cases.

Keywords: Vacuum wound dressing, necrotizing fasciitis

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Introduction

Necrotizing fasciitis is a type of skin and soft tissue infection that results in necrosis of the muscle fascia and subcutaneous tissues. Typically, the infection spreads along the fascial plane, which has a low blood supply. The overlaying tissues are initially untouched, which can delay detection and surgical intervention. Infection of the fascia and perifascial planes, as well as secondary infections of the overlying and underlying skin, soft tissue, and muscle, can spread quickly.¹

Necrotizing fasciitis is usually an acute condition that develops over a few days. In around 80% of cases, it is a direct result of bacterial infection that enters through a skin wound. Gram-positive cocci, specifically strains of *Staphylococcus aureus* and *Streptococci* are the common organism.² Several report of the outcome of necrotizing fasciitis in Thailand with high mortality,^{3,4} while the factor that related of mortality are severity of sepsis,³ patient who need critical intensive care and renal insufficiency.⁴

The extensive debridement of the infected area, including the skin and all necrotic tissue, with the proper antibiotics is the standard treatment for necrotizing fasciitis.^{5,6} Wound care plays an important role in post-operation recovery, especially in large wounds. It may take a long time to heal the wound and be hospitalized. Wet dressing is a traditional wound care method for infected wounds that should be done daily. There

are reports of the use of vacuum-assisted closure wound care for acute and chronic wounds.⁷ Vajira hospital applied vacuum wound dressing for use in post-debridement necrotizing fasciitis wounds by developing a method based on vacuum wound dressing in temporary abdominal closure in damage control of abdominal trauma care. This study aimed to evaluate the effectiveness of the traditional dressing and the vacuum wound dressing in cases of infected wound care, in terms of pain score during wound dressing, re-debridement rate, and hospitalization.

Materials and Methods

A retrospective cohort review of 70 patients who were diagnosed with necrotizing fasciitis and admitted for surgical debridement at the Department of Surgery, Faculty of Medicine Vajira Hospital. They were divided into two groups with 35 patients for each; 35 patients for group A (the traditional wound dressing) and 35 patients for group B (the vacuum wound dressing). In traditional wound dressing, wet dressing will be performed once a day, while the vacuum wound dressing group applied the temporary wound closure method in damage control abdominal trauma and replaced the wound every 3 days.

The baseline characteristics were recorded. The outcome of interest was pain score during wound dressing, re-debridement rate, and hospitalization. The baseline characteristics of patients were provided using number, percent,



mean, and SD in the statistical analysis. The Chi square method for categorical variables and the independent *T*-test for continuous variables were used to compare the outcomes of the traditional and vacuum wound dressing groups. Statistical significance was defined as a *p*-value of less than 0.05. All statistical analysis using STATA/SE program version 14.1.

Results

Baseline characteristics of patients are summarized in Table 1. The mean age of the patients was 51.29 ± 10.99 years. The patients consisted of fifty-seven males and thirteen females. Most of the patients had co-morbidities including diabetes mellitus, hypertension, dyslipidemia and chronic kidney disease. The most

common area of necrotizing fasciitis is lower extremity.

There is no difference between the two groups in terms of the pain score during wound dressing (4.54 ± 0.78 vs 4.46 ± 0.68 , *p*-value = 0.08), while the re-operative debridement rate in the traditional dressing group is slightly higher than in the vacuum wound dressing group (17.1% vs 14.2%, *P*-value = 0.10), and length of hospital stay in the vacuum wound dressing group is shorter than in the traditional dressing group (11.54 ± 2.68 vs 11.29 ± 1.90 , *p*-value = 0.14). All outcome data univariate analysis demonstrated in Table 2. Those who had the traditional wound dressing had a 17% increase in risk of getting re-debridement, but no statistically significant (risk ratio 0.83, 95% confidence interval 0.28, 2.48).

Table 1 Baseline characteristics

	Traditional wound dressing (n = 35)	Vacuum wound dressing (n= 35)	<i>p</i> -value
Age (mean + SD)	$56.66 + 11.38$	$50.91 + 10.74$	0.03
Sex (M : F)	27 : 8	30 : 5	0.25
Underlying disease, n (%)			
- Diabetes	14 (40.0%)	8 (22.9%)	0.04
- Hypertension	10 (28.6%)	12 (34.3%)	0.20
- Dyslipidemia	8 (22.9%)	7 (20.0%)	0.35
- Chronic kidney disease	2 (5.71%)	3 (8.6%)	0.30
Area of necrotizing fasciitis, n (%)			
- Upper extremity	7 (20.0%)	4 (11.4%)	0.08
- Lower extremity	28 (80.0%)	30 (85.7%)	0.30
- Back	0	1 (2.9%)	0.03



Table 2 Outcome of wound care

	Traditional wound dressing	Vacuum wound dressing	p-value
Pain score during wound dressing (mean \pm SD)*	4.54 ± 0.78	4.46 ± 0.68	0.08
Re-debridement case (no.)	6	5	0.10
Hospitalization (day, mean + SD)	11.54 ± 2.68	11.29 ± 1.90	0.14

*pain visual analog scale 0-10

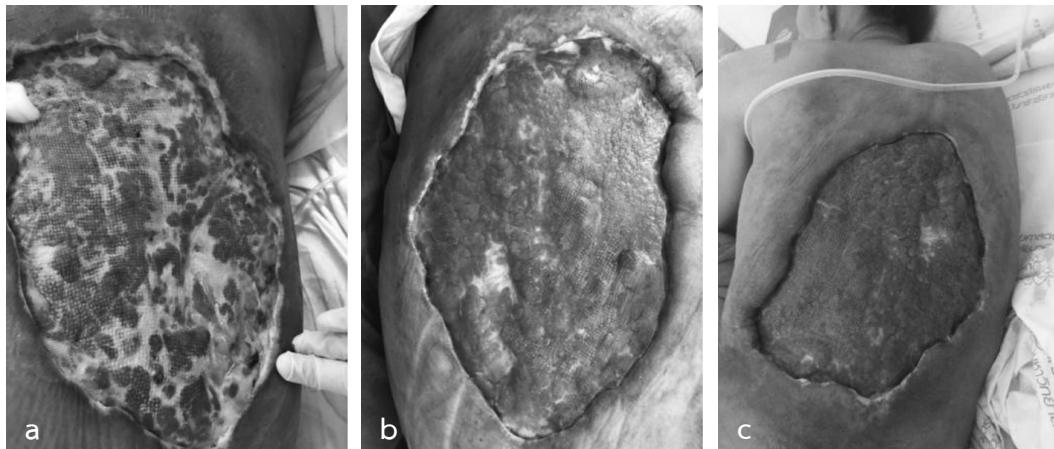


Figure 1 Demonstrated sample case that use vacuum wound dressing (a) immediate post-operative, (b) Post-operative day 3, and (c) Post-operative day 7.

Discussion

The therapy of necrotizing fasciitis requires prompt diagnosis and surgical debridement. Although considerable debridement is routinely performed, re-debridement is frequently required to clear necrotic tissues. They also aid in determining the wound's and infection's clinical progress.

The result, pain score during wound dressing, re-debridement, and hospitalization were all

evaluated in our study using vacuum wound dressing against standard wound dressing. The findings showed that vacuum wound dressing is just as effective as standard wound dressing. The benefit of vacuum wound dressing is that it eliminates the need to wound dressing every day.

Vacuum aided closure (VAC) therapy, according to Argenta et al., combines the benefits of closed and open wound treatment, shields the wound from contamination, and provides an ideal



physiologic environment for tissue healing.⁷ VAC therapy also promotes tissue growth and aids in the removal of accumulated fluids from the wound, both of which are critical in the treatment of infected wounds.

In Vajira hospital, we adapted the method of VAC and temporary abdominal closure to damage control for abdominal trauma. Although there was no significant difference in our study, vacuum wound dressing had wound care comparable to that of traditional wound dressing. In this study, the duration of hospital stays and re-debridement cases were lower in the vacuum wound dressing group. (Figure 1)

The other benefit of vacuum wound dressing is due to the wound secretions are absorbed until dry, so daily dressings are not required as with traditional wound dressings. However, the main limitation of our study was that it was a retrospective study with a small sample size. The large-scale randomized controlled trials will make the results clearer.

Conclusion

Vacuum wound dressing is a modality that can be used for wound care in infected wound cases.

Ethical approval

This study was ethical approval from Institutional Review Board, Faculty of Medicine Vajira hospital, Navamindradhiraj University.

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Declaration of competing interest

The authors report no declarations of interest.

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