



COMPARISON OF VACUUM ASSISTED CLOSURE THERAPY WITH CONVENTIONAL DRESSING IN THE MANAGEMENT OF NECROTIZING FASCIITIS WOUND

General Surgery

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ABSTRACT

Background: The aim of our study was to compare the effect of vacuum assisted closure (VAC) therapy and conventional dressings in patients with open wounds resulting from necrotizing fasciitis (NF). The comparison was based on the healing rate, infection control, frequency of dressing and pain score. **Methods:** This study involve 50 patients diagnosed with NF which required surgery, followed for a period of 12 months. The patients were randomized into two groups. Group A patients received conventional dressings and in Group B patients was treated using vacuum assisted /negative pressure wound therapy. Serial assessment of both groups was done for four weeks. The parameters including size of wound, wound bed, amount and odor of exudate, pain were monitored. **Results:** In our study, patients with NF wounds treated by VAC therapy shown earlier granulation tissue formation, resolution of infection and readiness for skin grafting. The odour, and pain significantly reduced in group B (VAC) when compared to conventional dressing group. **Conclusions:** VAC therapy, when compared to the conventional dressing on NF wound, results in early appearance of granulation tissue, significant reduction of inflammation, wound odor, exudate, frequency of dressing and pain. Therefore, VAC dressing can be considered as a better option in the management of NF wounds.

KEYWORDS

NF(necrotizing fasciitis), Necrotizing soft tissue infections(NSTI), NPWT (Negative pressure wound therapy), VAC (vacuum assisted closure) therapy, Conventional dressing

INTRODUCTION :-

Necrotizing soft tissue infection (NSTI) is a bacterial infection that causes rapid inflammation and necrosis of skin, subcutaneous tissue and superficial fascia. This includes necrotizing fasciitis, myositis, and cellulitis.¹

These infections results in significant tissue destruction, systemic toxicity, and high mortality rates. Due to aggressive nature and rapid progression of disease, early diagnosis and treatment are important for survival. NSTIs commonly affects the extremities, perineum, chest, abdomen and genitalia, but can occur in any part of the body. This requires inoculation of the pathogen into the subcutaneous tissue, via any break in epithelial or mucosal surface. The standard treatment consists of broad-spectrum antibiotics covering gram-positive cocci, gram-negative rods and anaerobic organisms, wide surgical debridement, and supportive care.^{2,3} Most patients require multiple surgical debridement, and survivors often have large and complex wounds which requires soft tissue coverage and prolonged hospitalization. Even with optimal treatment, NSTIs are associated with significant morbidity and mortality rates ranging from 25% to 35% in recent series.⁴

In recent years, many surgeons have adopted NPWT for rapid and effective wound closure. NPWT helps create optimal wound healing environment through various mechanisms, which has been a breakthrough in complex and difficult wounds by creating a faster wound bed granulation.^{5,6} VAC device enhances wound healing by providing macrostrain and micro-strain to wound.

Under negative pressure, foam dressing applies both mechanical and biological forces to the wound to create an environment that promotes wound healing.⁷⁻⁹

There are little studies published over NPWT for NSTI. The purpose of our study is to compare and evaluate the efficacy of NPWT with conventional dressing in managing NSTI wounds in terms of complete healing of wound, readiness for grafting, decrease in size, resolution of infection, frequency of dressing and associated pain.

METHODS :-

The study was conducted on 50 patients admitted under the department of surgery, Safdarjung hospital, Delhi with NF requiring surgery over a period of 18 months from November 2017 to April 2019.

Inclusion Criteria:-

- All the patients undergoing emergency surgery for Necrotising fasciitis of upper or lower limb will be included.

- Age group between 12 to 70 years were taken.

Exclusion Criteria:-

- Critically ill patients (GCS <10), severe immune-compromised patients were not included in the study.

After admission detailed history of patient and routine investigation were done.

Patients were divided equally into two group through lottery system, Group A – normal dressing and Group B - vacuum assisted dressing.

Parameters measured were:-

1. Size of wound
2. Wound bed- necrotic/sloughed/granulation
3. Exudate amount and odour
4. Pain score by visual analogue score

Serial assessment was done weekly till the end of four weeks or until the appearance of healthy granulation tissue whichever happens early and outcomes were compared with respect to above parameters.

After gently cleaning the wound with warm normal saline, all slough and dead tissue was removed surgically under mild sedation. Frequency of dressing was depending on the type of exudates, soiling/soakage, loss of air seal/leakage etc. At each change the condition of the patient and wound was assessed in detail. The amount and type of contents of aspirate in NPWT was also noted.

Technique of conventional dressing:-

Wounds are dressed with betadiene soaked gauze.

Technique of VAC:-

Wounds are dressed with special foam with pores and was connected to VAC (pressure of 80-120 mmHg).

RESULTS:-

In our study majority of patient belongs to 41-50 years in both groups.

AGE	GROUP A	GROUP B
20-30	3	2
31-40	4	5
41-50	9	8
51-60	4	4
61-70	5	6
TOTAL	25	25

Duration of wound healing in both the groups were compared ,in which it was found that Group A take more time to get healed as compared to Group B.

DURATION OF WOUND HEALING (IN DAYS) HEALTHY GRANULATION	GROUP A	GROUP B
	26 3	20 4

Wound size was compared in both group ,it was found that on 1st week wound size was almost equal , and on 3rd and 4th week it was seen that wound size was significantly reduced in Group B as compared Group A.

WOUND SIZE (IN CM)	GROUP A	GROUP B
On admission	75 20	80 30
1 st week	65 25	70 20
2 nd week	50 20	55 25
3 rd week	30 10	20 10
4 th week	20 10	10 5

At the end of 4th week the wound size in both group were reduced when compare to the wound size on admission and at the end of 4th week almost both group shows healthy granulation and patient were posted for skin grafting.

PARAMETERS	GROUP A	GROUP B
Infection	10	4
Pain	15	10
Discharge	10	7
Odour from exudate	8	2

At the end of 4th week ,we found that infection was less in Group B as compared to Group A, pain was reduced in Group B and discharge and odour was also reduced in Group B as compared to Group A.

DISCUSSION:-

Necrotising Fascitis (NF) is a significant concern, particularly in a developing country like India. The clinical presentation is very vague but if left untreated disease can progress rapidly within hours resulting in high morbidity and mortality. Early diagnosis and intervention are therefore critical in the management of these patients..

NSTI can affect any age group but more common in middle age. Comorbid conditions are more prevalent in the middle and elderly age group ,making them more vulnerable for NSTI. These findings were comparable to other studies conducted by Anaya et al, Kucharzewski et al and Muqim et al.^{2,10,11}

There was male preponderance in our study . The most common etiological factor for NF in our study was trauma (44%) of vivid nature and severity. Other causes included insect bite (14%), abscess (8%), minor laceration (6%), intra venous cannulation (8%), and none (2.58%). The infection was idiopathic in (18%) of the patients.

In our study, the most common site involved by NSTI is lower limb followed by upper limb . We excluded other sites from the study. Many studies have observed a similar pattern where limbs were the most common site of NF.

NF often associated with patients having various co-existing morbidities . Most commonly associated co-morbidity was DM . Swain et al in their study showed 33% suffered from diabetes, 40% were hypertensive, 13% had morbid obesity and suffered from chronic renal failure.¹²

High blood sugar levels produce good culture medium for bacterial growth. It also causes defective phagocytosis, decreased cellular immunity and micro-vascular disease with resultant ischemia.

Radical debridement of all the necrotic tissue leaves a large soft tissue defect which is surgical challenge. Dressing of these wounds until they are ready for split thickness skin graft is the end point in the management of these wounds.

We observed that application of VAC dressing had significant impact in reducing the wound size compared to patients receiving conventional dressing at the end of 4 weeks. Various other studies have shown a wound size reduction varying between 25% to 60%. Lone et al observed that the VAC dressings resulted in an increased rate of granulation tissue formation and wound healing compared to

conventional dressings. We observed that the resolution of infection started as early as the end of first week in patients with VAC dressings. Group B patients had appearance of healthy granulation tissue by the end of second week compared to patients in the conventional dressing group, which was statistically significant .

It has been reported that regular debridement is associated with rapid healing of ulcers. In a retrospective cohort study, Wilcox et al indicated that frequent debridement healed wounds in a shorter time .

In fact, the more frequent the debridement, better is the healing. In our study the requirement for debridement was identical in first week in the both the groups. By the end of second week, the need for debridement significantly reduced in group B (VAC) patients . Thus, VAC dressing helped in reducing the need for debridement earlier than conventional dressing.

Bacterial colonization is a major factor affecting wound healing. NPWT reduces the bacterial burden and hence hastens the healing process.

Pain is a major factor in wound management as it affects wound healing also. In present study, patients in group B experienced significantly less pain when compared to conventional dressing VAS score.

CONCLUSION

In our study NF was more commonly seen in middle aged male patients with DM comorbidities. Tenderness, raised local temperature, skin necrosis, bullae, crepitus, tachycardia and hypotension were the common clinical presentations. Majority of cases found to have polymicrobial type I infections.

In the present study it was concluded that, application of VAC helped in early appearance of granulation tissue and reduced the need for debridement. It also helped in reducing surrounding skin maceration, wound edema and wound odor. The need for frequent dressing was also reduced significantly resulting in patients experiencing less pain.

Thus, VAC dressing can be considered as a better option in the management of NF wounds.

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