

Original Research

Assessment of role of vacuum assisted closure therapy in chronic wounds

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ABSTRACT:

Background: Various surgical methods have been developed to obtain coverage in these difficult situations. The present study was conducted to assess role of vacuum assisted closure therapy in chronic wounds. **Materials & Methods:** 74 cases of chronic wounds of both genders was enrolled. A thorough local examination was carried out. Procedure involves wound preparation, placement of white foam (PVA - Polyvinyl alcohol) & black foam; sealing with drapes and application of pressure. Parameters such as size of wound, etiology, Gustilo Anderson classification and bacterial growth was recorded. **Results:** Out of 74 patients, males were 30 and females were 44. Size of wound was 1-4.9mm in 20, 5-9.9mm in 35 and >10mm in 19 patients. Etiology was RTA in 52, machinery injury in 15 and fall from height in 7 cases. Gustilo Anderson classification grade IIIb was seen in 41, grade IIIc in 25, grade IIIa in 5 and grade II in 3 cases. Bacterial growth on day 0 was seen in 74, on day 4 in 56 and on day 8 in 28 patients. The difference was significant ($P < 0.05$). **Conclusion:** Vacuum assisted closure therapy is treatment of choice in infected / non-healing wounds. It prepares wounds for closure via split thickness skin grafting or secondary closure in lesser time leading to less overall morbidity with decreased hospital stay.

Key words: healing, vacuum assisted closure therapy, wound

Received: 20-11-2019

Accepted: 27-12-2019

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This article may be cited as: Jindal YP, Aggarwal G. Assessment of role of vacuum assisted closure therapy in chronic wounds. J Adv Med Dent Sci Res 2020;8(1):365-367.

INTRODUCTION

A wound is defined as damage or disruption to the normal anatomical structure and function. This can range from a simple break in the epithelial integrity of the skin or it can be deeper, extending into subcutaneous tissue with damage to other structures such as tendons, muscles, vessels, nerves, parenchymal organs and even bone.¹ Wound healing remains a challenging clinical problem and correct, efficient wound management is essential.²

Various surgical methods have been developed to obtain coverage in these difficult situations. These include skin grafts, local rotation flaps, and myocutaneous or fasciocutaneous tissue transfers.³ Although skin grafts are readily obtainable, they are dependent on the vascularity of its recipient bed and may be contraindicated when exposed bone, cartilage, tendons, or surgical implants exist.⁴

Vacuum Assisted Closure (VAC) is a non-invasive therapeutic technique using a vacuum dressing to

promote healing in acute or chronic and enhance healing of first & second degree burns.⁵ It involves controlled application of subatmospheric pressure to local wound environment, using a sealed wound dressing connected to a vacuum pump. It uses vacuum assisted drainage to remove blood or serous fluid from operative site. It promotes dry surgical field & control blood flow.⁶ The present study was conducted to assess role of vacuum assisted closure therapy in chronic wounds.

MATERIALS & METHODS

The present study comprised of 74 cases of chronic wounds of both genders. All agreed to participate in the study.

Data such as name, age, gender etc. was recorded. A thorough local examination was carried out. Procedure involves wound preparation, placement of white foam (PVA - Polyvinyl alcohol) & black foam; sealing with drapes and application of pressure.

Parameters such as size of wound, etiology, Gustilo Anderson classification and bacterial growth was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 74		
Gender	Males	Females
Number	30	44

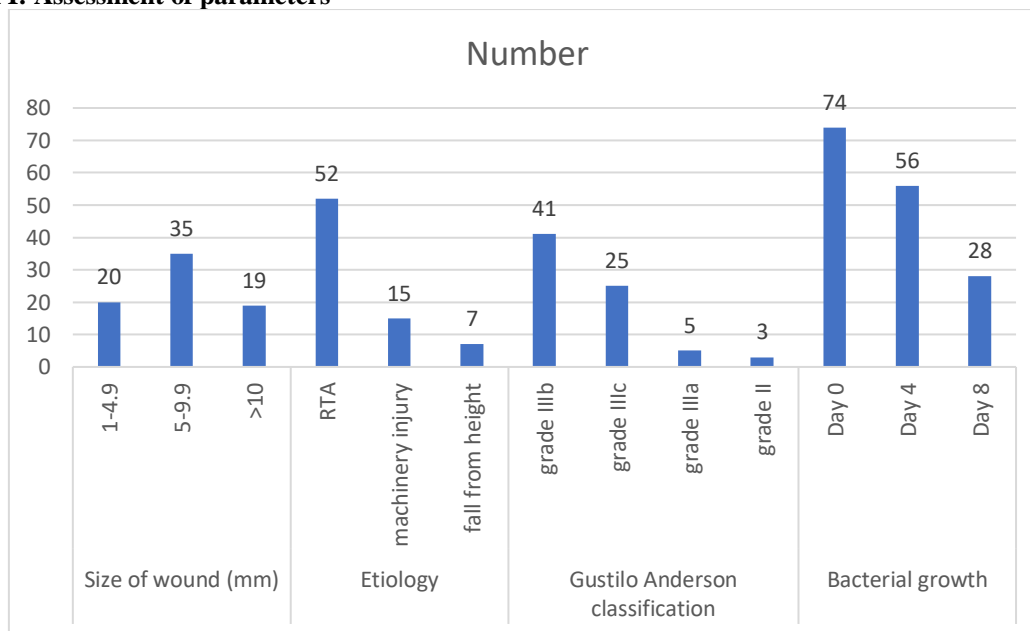
Table I shows that out of 74 patients, males were 30 and females were 44.

Table II: Assessment of parameters

Parameters	Variables	Number	P value
Size of wound (mm)	1-4.9	20	0.12
	5-9.9	35	
	>10	19	
Etiology	RTA	52	0.02
	machinery injury	15	
	fall from height	7	
Gustilo Anderson classification	grade IIIb	41	0.01
	grade IIIc	25	
	grade IIIa	5	
	grade II	3	
Bacterial growth	Day 0	74	0.05
	Day 4	56	
	Day 8	28	

Table II, graph I shows that size of wound was 1-4.9mm in 20, 5-9.9mm in 35 and >10mm in 19 patients. Etiology was RTA in 52, machinery injury in 15 and fall from height in 7 cases. Gustilo Anderson classification grade III b was seen in 41, grade IIIc in 25, grade IIIa in 5 and grade II in 3 cases. Bacterial growth on day 0 was seen in 74, on day 4 in 56 and on day 8 in 28 patients. The difference was significant (P< 0.05).

Graph I: Assessment of parameters



DISCUSSION

Normal dermal healing in healthy subjects restores the functional integrity of the skin. However, in some patients the healing process may be compromised by extensive tissue loss, co-morbidities, concomitant medication or other factors such as smoking, poor

nutrition, or ageing.⁷ In recent years our understanding of both the healing process and the defects that occur in delayed healing has allowed the development of a number of new treatments for difficult-to-heal wounds. VAC is the name adopted for a commercially available system that applies

topical negative pressure to promote wound healing.⁸ This is achieved by applying a reticulated, open-pore structured, polyurethane foam to the wound. After removal of necrotic tissue from the wound, the foam is cut to shape and used as a wound contact dressing and to pack any sinus or cavity. The whole wound area is then sealed with a semipermeable film drape to effectively convert the wound to a closed system.⁹ The foam is attached via a vacuum line to a disposable container that collects exudate and to which a negative pressure is applied from a VAC pump. The pump may be set to deliver continuous or intermittent negative pressure from 50–200mmHg although it has been established that 125mmHg applied in cycles of 5 minutes on, alternating with 2 minutes off, usually gives maximum benefit.¹⁰ The present study was conducted to assess the role of vacuum assisted closure therapy in chronic wounds.

We found that out of 74 patients, males were 30 and females were 44. Gupta et al¹¹ evaluated the results of vacuum assisted wound therapy in patients with chronic non healing ulcer. Out of 10 wounds taken in the study, 7 wounds reduced in area & were resurfaced with split thickness skin grafting and 3 wounds showed reduction in area & were subjected to secondary closure.

We found that size of wound was 1-4.9 mm in 20, 5-9.9 mm in 35 and >10 mm in 19 patients. Etiology was RTA in 52, machinery injury in 15 and fall from height in 7 cases. Gustilo Anderson classification grade IIIB was seen in 41, grade IIIC in 25, grade IIIA in 5 and grade II in 3 cases. Bacterial growth on day 0 was seen in 74, on day 4 in 56 and on day 8 in 28 patients. Morykwas et al¹² in their study three hundred wounds were treated- 175 chronic wounds, 94 subacute wounds, and 31 acute wounds. Two hundred ninety-six wounds responded favorably to sub-atmospheric pressure treatment, with an increased rate of granulation tissue formation. Wounds were treated until completely closed, were covered with a split-thickness skin graft, or a flap was rotated into the healthy, granulating wound bed. The technique removes chronic edema, leading to increased localized blood flow, and the applied forces result in the enhanced formation of granulation tissue. Vacuum-assisted closure is an extremely efficacious modality for treating chronic and difficult wounds.

Vikatmaa et al¹³ studied 14 RCTs and reported that in all trials, NPWT was at least as effective, and in some cases, more effective than the control treatment. Smith et al¹⁴ in a retrospective review of open abdomen management and temporary abdominal closure, suggested the use of VAC as the treatment method of choice.

The limitation the study is small sample size.

CONCLUSION

Authors found that vacuum assisted closure therapy is treatment of choice in infected / non – healing wounds. It prepares wounds for closure via split

thickness skin grafting or secondary closure in lesser time leading to less overall morbidity with decreased hospital stay.

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