



LIMITED ACCESS DRESSING IN WOUND MANAGEMENT

General Surgery

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ABSTRACT

Wound Management remains one of the areas of contention facing modern surgical care. Various new methods hold promise but their efficacy is still untested. Moist dressings are effective in wound healing but their efficacy has been in question as the moist environment leads to explosive bacterial growth in the era of antibiotic resistant microbes. NPWT is an effective and comparatively novel mode of dressing but can be very costly as well as cumbersome to the patient. Hence the need to revisit and constantly innovate this neglected field of modern surgical science by using new modalities of dressing which combined best of both dressing types and leads to satisfactory wound healing and granulation tissue growth and infection control.

Limited Access Dressing helps avoid the discomfort and pain of continuous suction and produces comparable results as NPWT in the wound healing process and is thus cost effective. Limited Access Dressing is cost effective as the materials required for LAD are easily available in all hospitals and low intermittent suction can be administered by an ordinary suction machine. LAD hastens wound healing by granulation tissue deposition through angiogenesis and wound contraction and removes the necrotic exudates without disturbing the proinflammatory mediators necessary for healing during the rest period. LAD renders the surface of the wound with visible qualitative change. LAD does not lead to worsening of the wound milieu and thus safe and effective method wound management.

KEYWORDS

INTRODUCTION

Wound is an interruption in the typical structure and function of the skin architecture. For wound healing, the wound bed must be appropriately vascularized, debrided and cleared of necrotic tissue and infection, and remain moist to avoid desiccation. Wound dressings must eradicate dead space, regulate exudate, reduce bacterial overgrowth and maintain fluid balance, must be cost-efficient, and also be easily manageable and maintainable by the patient and nursing staff.

A variety of topical substances and alternative treatments exist but with lack of definitive recommendations. Wound healing is facilitated by maintaining a moist wound environment. But the risk of reinfection in a moist environment is high. Negative pressure wound therapy has been found to facilitate continuous removal of excessive exudate to prevent reinfection and wound degradation. Side effects such as pain and discomfort due to continuous suction, cost, patient's mobility and removal of proinflammatory cytokines limit the use of NPWT

Limited access dressing combines the beneficial effects of NPWT as well as moist dressings. It can be delivered by a simple suction machine and is very cost effective

Intra LAD ultraconservative debridement occurs in two ways

- Phagocytosis and enzymatic activity in moist environment result in cell proliferation and apoptosis
- Mechanical debridement

METHODS

For applying LAD over the wound a pre-sterilized customized (based on the shape, size and site of the wound) plastic bag was used. 2 plastic bags were used to avoid bag leak and for intermittent vacuum maintenance over 7 days 2 thick nasogastric tubes 18 size (one outlet and another inlet, extra holes if required) are placed in between the bag and wound and are brought out through the polythene bag.

Now for a period of 7 days intermittent suction (1/2 hour suction with a 3 1/2 hour rest period) protocol was followed and once daily wash was given with 0.9% Normal Saline and dressing was removed on Day 7 (250 ml)

- An intermittent pressure of 70-80 mm of Hg was applied

Parameters And Statistics

Wound Contraction: Area estimate of the Wound with a graph

Bates Jensen Wound Assessment Tool (13-65)]

Wound Pictorial data

Systemic response to LAD: Hb, Total WBC count, Platelets

Pain score using Visual Analogue Scale

Wound Surface pH testing

RESULTS

- Lower limb wounds were predominantly evaluated in the present study (93.3%)
- Though the systemic parameters (WBC and Platelet counts, ESR and Haemoglobin) did not show any dramatic improvement, the incorporation of the same was done to prove the safety of LAD in wound care
- LAD lead to a measurable decrease in wound area by 2.5 cm² (p value 0.001)
- Wound pH remained around neutrality, once again proving that LAD is a safer method of wound care
- Bates Jensen Scoring showed a drop of 9.5 (p value 0.001)
- Visual improvement was observed in the wound status

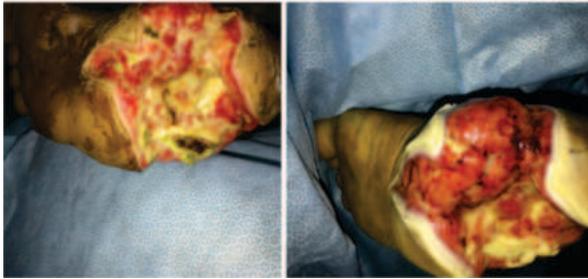
Before And After LAD



Before And After LAD



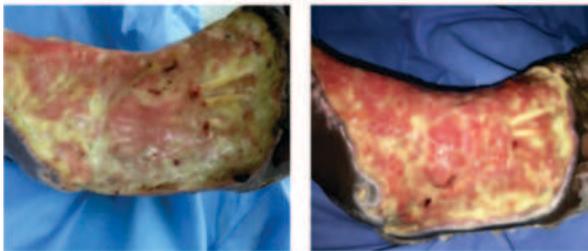
Before And After LAD



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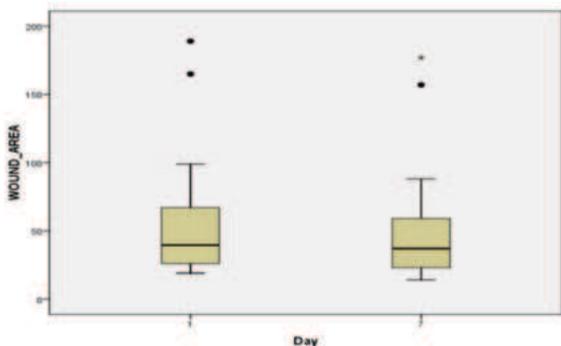
Before And After LAD



DISCUSSION

- The mean area of the wound in the current study was 55.3 (25th to 75th quartile) which indicates that LAD can be applied on smaller as well as mid-sized wounds with similar results and is customisable
- The minimal reduction in the wound size of a difference of 2.5 cm² with a significant p value of 0.001 shows a minimal but conceivable reduction in wound area size after just a single LAD cycle which was similar to the findings of Nain et al in their research on NPWT

Comparison Of Wound Area On Day1 And Day7 Of Treatment



- The wound surface pH was measured using topical samples on a urine dipstick which used colour change as an indicator for pH change
- Though the use of tissue samples would be more appropriate for pH evaluation, the consistent neutral pH (Day 1 mean pH 6.74 and Day 7 mean of pH 7.24) values obtained show the safety of LAD which was similar to findings of a similar study on wound tissue pH by Kumar and Honnegowda
- The baseline WBC count mean of 9840 cells/cumm and mean platelet counts of 5.1 lakhs/cumm remained almost unchanged with day 7 mean WBC count of 8800 cells/cumm and day 7 mean platelet count 4.9 lakhs/cumm
- These unchanged values of systemic investigations with no significance in the normal range point towards safety of LAD and

allow usage of this novel mode of dressing without the risk of wound deterioration

- The haemoglobin values also remained almost unchanged at the end of LAD cycle with the mean values of 9.9 which also refers to the safety of LAD.
- Pain score was found to be consistently higher in pre-LAD setting
- The reduction in the pain score to 2.5 with a significant p value of 0.001 is an overwhelming response of the patient to LAD and this was similar to the findings of Pramod et al
- Mean score of Bates Jensen Wound Assessment tool on Day 1 was found to be 40.2 which indicated extensive necrosis of the wound bed (Max Score 60)

Comparison Of Pain Score And Bates Jensen Score On Day1 And Day7 Of Treatment

Parameter	Day-1 (N=27)		Day-7 (N=27)		p value#
	Mean	SD	Mean	SD	
Pain score	6	1.6	2.5	1.2	<0.001*
Bates Jensen score	40	4.9	31.5	4.6	<0.001*

- The significant (p value 0.001) reduction in bates Jensen score to a mean of 31.5 on day 7 suggests
- Improved wound architecture and augmentation of granulation tissue
- Reduction in wound depth
- Change in the nature of exudate and reduction in wound exudate with healthy edges with decreased necrotic tissue amount
- Reduced edema and erythema in the surrounding region
- The lack of control groups is a major drawback of this study so as to be effectively compared with other research involving NPWT and moist dressings
- More research is required to reassess confounding factors like age, gender, drug resistant microbes, inconsistent antibiotic therapy, micromolecular analysis, co morbidities like diabetes and vascular diseases
- The cost-effective improvements in the design of LAD has been a major achievement of this study

CONCLUSION

- LAD avoids discomfort and pain of continuous suction and produces comparable results as with NPWT
- Limited Access Dressing is cost effective and can be administered by an ordinary suction machine
- LAD hastens wound healing by granulation tissue deposition, removes the necrotic exudates without disturbing the proinflammatory mediators
- LAD renders the surface of the wound with visible qualitative change.
- LAD does not lead to worsening of the wound milieu and is a safe dressing method

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