

## ORIGINAL ARTICLE

# EFFICACY OF VACUUM ASSISTED CLOSURE DRESSINGS WHEN COMPARED TO MOIST WOUND DRESSINGS IN THE MANAGEMENT OF DIABETIC FOOT ULCERS: A PROSPECTIVE COMPARATIVE STUDY

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**ABSTRACT: INTRODUCTION:** Foot ulceration is mainly responsible for the morbidity of diabetes mellitus. They deprive the patient of quality working days and add to his financial burden. Several novel methods of wound healing came to vogue among which vacuum assisted dressing is becoming quite popular. Present study aims to evaluate its efficacy when compared to regular moist wound dressings. **OBJECTIVES:** To study the effectiveness of vacuum assisted dressings in terms of Rate of wound healing. **MATERIALS AND METHODS:** we carried out a prospective study at Narayana medical college hospital on two groups (group A and group B) of diabetic foot ulcer patients, whom we selected randomly after considering inclusion and exclusion criteria. Vacuum assisted dressings were done in group A patients and normal moist wound dressings in group B. At the start of the treatment and every week thereafter, size and depth of ulcers were recorded and results were compared at complete wound healing or at the end of 12 weeks of treatment whichever is earlier. Strict glycaemic control was maintained throughout the treatment period. **RESULTS:** significant healing was noticed in group A patients (vacuum assisted dressings group) both in terms of ulcer size and depth. Wounds appeared more-healthy i.e. with less slough and more red granulation tissue in group A patients. **CONCLUSION:** vacuum assisted dressing is an efficacious method in the treatment of diabetic foot ulcers with significantly reduced hospital stay.

**KEYWORDS:** vacuum assisted dressing, Diabetes Mellitus, foot Ulcers.

**INTRODUCTION:** Diabetic foot ulcers are because of angiopathy and neuropathy produced by the disease and gets aggravated by poor glycaemic control and secondary infections. angiopathy decreases blood supply to the foot and neuropathy -sensory, motor and autonomic precipitate ulcer formation by means of decreased sensation, altered foot arch mechanism and dryness of skin respectively. Diabetic foot ulcers respond poorly to conventional moist wound dressings thus increasing length of hospital stay depriving the patient of quality working days, increasing hospital expenses and increasing morbidity. Vacuum assisted dressings are shown to enhance wound healing by suctioning out slough,<sup>(1)</sup> debris and exudates from the wound continuously and also by enabling wound contracture from all sides and depth in several studies conducted previously.<sup>(2)(3)</sup> We have done this randomized prospective study to concur the above view.

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**MATERIALS AND METHODS:** we conducted this study at general surgery department, Narayana Medical College and Hospital, Nellore during the period June 2014 to July 2015. Patients were selected among the consecutive admissions going on in the general surgery department. Patients with diabetic foot ulcers were included in the study. Patients with debilitating comorbidities like chronic renal failure, cirrhosis of liver, advanced cancers, coronary artery disease, severe malnutrition, peripheral vascular disease etc. were excluded from the study. About 100 patients were selected and by simple randomization they were assigned to two groups 50 each. Vacuum assisted dressings were done to group A patients and moist wound dressings were done to group B patients. Strict glycaemic control was achieved in both the groups before start of treatment and also during treatment. Also weekly pus culture and sensitivity samples were taken from the wounds in both groups and antibiotics were given based on sensitivity. Underlying anaemia, hypoproteinaemia were corrected in all patients for vacuum assisted dressings the wound was covered with sponge wedges over which tubings placed which are connected to a suction apparatus <sup>(4)(5)</sup> which can generate a negative pressure of 100 to 120mmhg.<sup>(6)</sup> The entire wound-sponge-tubing was draped with an ioban cover to isolate and lock it airtight.<sup>(7)</sup> Before the start of the treatment and once in a week thereafter, depth and size of the wounds were recorded. The recordings were carried for a period of 12 weeks or till the healing of ulcer whichever is earlier. Vernier calipers were used to measure ulcer depth and ulcer area was calculated for the average diameter. All patients participating in the study were informed and their consent taken approval for study was obtained from ethics committee.

**STATISTICAL ANALYSIS:** SPSS latest version 2015 was used to analyze numerical data and expressed as mean+/-standard deviation (SD). Ulcer area was calculated along average diameter and ulcer depth measured by vernier calipers. Both readings were compared between the two groups before and after treatment. P value less than 0.05 was considered statistically significant.

**RESULTS:** Results were analyzed between group A (vacuum assisted dressings) and group B (moist dressings). Maximum frequency of diabetic foot ulcers were seen in male patients. Most common site of ulcer was right forefoot over ball of great toe. It was type 2 diabetes which was more common in both males and females.<sup>(8)</sup> The average age of diabetic foot presentation was 48years in males and 57 years in females. Demographics of the study are tabulated below.

	<b>Vacuum assisted dressing group count</b>	<b>Vacuum assisted dressing group percent</b>	<b>Moist dressing group count</b>	<b>Moist dressing group percent</b>
1. a. male	31	62%	33	66%
b. female	19	38%	17	34%
2. Type 1 diabetes	2	4%	1	2%
Type 2 diabetes	48	96%	49	98%
3. Right foot	35	70%	29	58%
Left foot	15	30%	21	42%

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4. Average size of ulcer	5.3cm <sup>2</sup>		5.5cm <sup>2</sup>	
5. Average depth of ulcer	7mm		6.8mm	

Table 1

Before start of treatment the average size of the ulcer was 5.3cm<sup>2</sup> in vacuum assisted dressing group and it was 5.5cm<sup>2</sup> in saline group. After treatment it was 1.7cm<sup>2</sup> and 4.1cm<sup>2</sup> respectively. There was statistically significant difference between the two groups ( $p < 0.05$ ) in the improvement of ulcer area wise after treatment.

Size of ulcer	Vacuum assisted dressing group	Moist dressing group
Before treatment	5.3 cm <sup>2</sup>	5.5 cm <sup>2</sup>
After treatment	1.7cm <sup>2</sup>	4.1cm <sup>2</sup>

Table 2

The average depth of ulcer in vacuum assisted dressing group was 7mm before start of treatment whereas it was 6.8mm in moist dressing group. After treatment it was 2.6mm and 5.2mm respectively. There was statistically significant difference between the two groups ( $p < 0.05$ ) in the improvement of ulcer depth wise after treatment.

Depth of ulcer	Vacuum assisted dressing group	Moist dressing group
Before treatment	7mm	6.8mm
After treatment	2.6mm	5.2mm

Table 3

**DISCUSSION:** Diabetic foot ulcers by virtue of their poor healing nature become chronic and add lot of morbidity to the disease.<sup>(9)(10)</sup> They deprive the patient from early return to work thus bringing financial loss to the patient. Several new methods of wound care like vacuum assisted dressings, topical insulin therapy, low voltage electrical stimulation, hyperbaric therapy etc.<sup>(11)</sup> Have come into vogue. Among these vacuum assisted dressings are easy to do at low cost. Its efficacy was established in several studies conducted earlier at different centers.<sup>(12)(13)</sup> Our study also concurred with their results. We observed a statistically significant difference in the improvement of ulcer area wise and depth wise in the patients treated with vacuum assisted dressings when compared to moist wound dressings.

**CONCLUSION:** It appears that vacuum assisted dressings are an effective method in the management of diabetic foot ulcers and they significantly reduce hospital stay.

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