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Efficacy of negative pressure wound therapy when compared to gauze dressings in the management of bedsores

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Abstract
Introduction: Bedsores contribute to the morbidity of bedridden patients and pose challenge for their rehabilitation. Newer methods are being practised and one among them is negative pressure wound therapy. This study was designed to evaluate its efficacy when compared to gauze dressings.
Objectives: To study the effectiveness of negative pressure wound dressings over gauze dressings with respect to rate of wound healing.
Materials and Methods: A prospective study was done on patients presenting with bedsores to surgery OPD at Narayana medical college. Patients were divided into two groups by random allocation wherein one group had gauze dressings and the other group underwent negative pressure wound therapy. From the time of initiation of treatment once in every week wound size and depth were measured for 6 consecutive weeks. Results were analysed.
Results: There was significant improvement in patients treated with negative pressure wound therapy with respect to wound depth and area.
Conclusion: Negative pressure wound therapy is an effective method in the management of bedsores.

Keywords: Negative pressure wood therapy, bedsores, gauze dressings

Introduction
Bedsores pose a serious challenge in management of bedridden patients contributing to morbidity and mortality in them [1]. Bedsores are the result of improper positioning which results in Ischaemia and pressure necrosis at the site of bony prominences. Elderly age, debilitating diseases like diabetes mellitus, paralysis, immunosuppressive conditions etc. aggravate bedsores [2]. Common sites are lumbosacral area, Ischial prominence, shoulder blades, occiput and heel prominence. Frequent change of position, alpha beds, frequent dressing change have been the standard methods of wound care in bedsores. Severl recent methods like alginate dressings, hydrocolloid dressings, foam dressings etc. are being tried with reports of varied success rate. Negative pressure wound therapy (NPWT) [3] has been showing promising results in several recent studies.by continuously sucking out exudates and providing a mechanical strain (contracting force) on the cells due to negative pressure [4], NPWT enhances wound healing. Cost wise also NPWT is very much affordable.

Materials and Methods
A prospective study was conducted during the period April 2018 to May 2019 on 50 patients who got admitted for management of bedsores at general surgery department, Narayana Medical College, Nellore, A.P., India. Patients suffering from advanced cancers, coronary artery disease, connective tissue disorders, liver failure were excluded from the study. By simple randomization patients were divided into two groups of 25 each group A patients received NPWT whereas group B patients received regular gauze dressings. In both the groups strict glycaemic control was maintained antibiotics were started based on weekly wound pus culture & sensitivity reports underlying anaemia and hypoproteinaemia were corrected. all patients were nursed on alpha beds with frequent change of position wound depth was measured with Vernier calipers and wound area was measured for average diameter baseline readings were recorded and after that

once in a week measurements were taken for 6 consecutive weeks. Informed consent was taken from all patients and ethics committee approval was obtained prior to study.

Statistical analysis: Latest version SPSS was used to compute numerical data and expressed as mean+/-standard deviation (SD). Ulcer area was calculated along average diameter and ulcer depth measured by vernier calipers as mentioned above in methodology. Both the readings were taken for six consecutive weeks and analysed for both the groups in comparison. P value less than 0.05 was considered statistically significant.

Results

Results were analyzed between group A (NPWT) and group B (gauze dressings).male preponderance was noticed in our study. Most common site of bedsore was on sacral area. Type 2 diabetes was the common medical complication in both the groups. Average age of presentation was 65years in males and 76 years in females in this study. Demographic variables of the study are tabulated below.

Table 1: The negative pressure and gauze dressing group

	Negative pressure wound therapy group count	Negative pressure wound therapy group percent	Gauze dressing group count	Gauze dressing group percent
a. male	16	64%	17	68%
b. female	9	36%	8	32%
type 1 diabetes	1	4%	0	0%
Type 2 diabetes	24	96%	25	100%
sacrum	20	80%	18	72%
Ischial tuberosities	5	20%	7	28%
average size of ulcer	9.2cm2		8.6cm2	
average depth of ulcer	8mm		7.1mm	

Before start of treatment the average size of the ulcer was 9.2cm2 in NPWT group and it was 8.6cm2 in gauze dressing group. After treatment it was 2.4cm2 and 5.8cm2 respectively. statistically significant difference was noticed between the two groups ($p< 0.05$) after 6 weeks of treatment.

Table 2: Show the before and after treatment

Size of ulcer	NPWT group	Gauze dressing group
Before treatment	9.2 cm2	8.6 cm2
After treatment	2.4cm2	5.8cm2

The average depth of ulcer in NPWT group and Gauze dressing was 8mm & 7.1mm respectively. After treatment it was 1.8mm and 5.4mm in that order. There was statistically significant difference between the two groups ($p< 0.05$) in the improvement of ulcer depth wise after treatment.

Table 3: The depth NPWT and gauze group

Depth of ulcer	NPWT group	Gauze dressing group
Before treatment	8mm	7.1mm
After treatment	1.8mm	5.4mm

Discussion

Chronic diabetic foot ulcers bring lot of morbidity to the patient by curtailing his quality life and also pose a financial burden [5] to the patient by hampering his work hours. Loss of limb is a traumatic experience to the patient psychologically. Among the newer methods of wound healing like hyperbaric therapy [6], honey dressings [7], low voltage electrical stimulation [8], topical insulin therapy [9] etc. negative pressure wound therapy (NPWT) is showing promising results in studies conducted at several centres. Jacobs S *et al.* [10] in their rodent models experimented usage of negative pressure dressings Mc callon SK *et al.* [11] in their study established the effectiveness of vacuum assisted closure the same results were obtained by Eginton MT *et al.* [12] in their prospective randomized Trail. Plastic reconstruction of ulcers was detailed in Orgill DP [13] reconstructive surgery abstracts.

Conclusion

Negative pressure wound therapy (NPWT) can be considered as an effective method in the management of bedsores when compared to traditional gauze dressings.

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