



Original Research Article

Compare efficacy of phenytoin dressing in diabetic ulcers with conventional povidone iodine dressing

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INTRODUCTION

Diabetes mellitus is a chronic health issue which is affecting all age groups without gender discrimination in all countries globally. The current frequency of type 2 diabetes mellitus in Pakistan is 11.77%.⁽¹⁾ A current study demonstrated that prevalence of diabetic foot syndrome is 13.9% in patients with Type 2 Diabetes Mellitus in Pakistan.⁽²⁾

Different modalities employed to treat diabetic foot

Abstract: Background: Diabetes mellitus is a chronic health problem which is affecting all age groups without gender discrimination in all countries globally. Severe complication of diabetes is diabetic ulcers, that leads to increased total morbidity in people. Diabetes related ulcers require a multi-disciplinary assessment, that by diabetes specialist nurse, a tissue viability nurse, podiatrists, diabetes specialists & surgeons. **Objective:** To compare efficacy of phenytoin dressing in diabetic ulcers with conventional povidone iodine dressing. **Methodology** Design of the study: Randomized control trial Setting: General Surgery Department, Ghurki Trust Hospital, Lahore Data Collection: After meeting the inclusion criteria 60 (30 in each group) patients were enrolled. Informed consent and demographic information was taken. Upon presentation complete history and general physical examination was done. After surgery, upon presentation complete history & examination was also done. Clinical examination for the wound area along with peripheral vascular status & peripheral neuropathic changes in lower extremities was carried out. The patients would be followed up after 04 week in both study and control groups. Primary outcome variables efficacy measured.

Results: The mean age was 41.27±14.04 years, there were 31(51.67%) were male and 29(48.33%) were females. The efficacy was achieved in 31(51.67%) patients. In group A the efficacy was achieved in 22(73.3%) patients whereas in group B the efficacy was achieved in 9(30%) patients (p-value=0.001) **Conclusion:** This study concluded that the use of topical Phenytoin for healing of Diabetic ulcer is suitable for alternative to conventional process and showed significantly better out come in terms of efficacy. It's safe, available, easily apply and in expensive

Keywords: Topical Phenytoin Dressing, Conventional Dressing, Diabetic Ulcer

ulcers include offloading the wound by using appropriate therapeutic footwear, saline or similar dressings on a daily basis, if necessary, debridement, If you have osteomyelitis or cellulitis, you should take antibiotics, optimal control of blood glucose & correction of peripheral arterial deficiency.⁽³⁾

Dressings are used in combination with other modalities to provide optimum conditions for wound healing and are required to be cost effective, minimal potential for iatrogenic injuries and effective for exudative wound management.⁽⁴⁾ Povidone iodine

solution dressings are found to be effective in sutured wounds to control further granulation but there are reservations on its use in granulating or epithelializing wounds because it hampers the healing process and is cytotoxic to keratinocytes and fibroblasts.(5)

Phenytoin is used as a topical application in many studies on diabetic foot ulcers, and it causes the formation of granulation tissue within a week by promoting collagen formation, fibroblast proliferation, inhibiting collagenase action and antibacterial activity against *S.aureus*, *E.coli*, *Klasiella* and *Pseudomonas*.(6)

In one study with Phenytoin group, the healthy granulation tissue formation was 60.71% while the Betadine group (Povidone-Iodine) showed the granulation tissue rate as percentage of ulcer surface area was 11%.(7) In another study, the granulation tissue mean ulcer surface area taken as percentage is 42.51% in phenytoin dressing group. The mean control group shows the rate of formation of granulation tissue 36.67%.(8)

Due to limited data available in Pakistan, I want to evaluate the effects of phenytoin dressings in diabetic ulcers in our population. My study would help us to choose the better intervention in cases of diabetic ulcers, which would decrease the morbidity in patients.

Methodology:

This randomized control trial was conducted from Jan 2018 to June 2018 General Surgery department, Ghurki Trust Hospital, Lahore. Informed written consent was taken from patients. A total of 60 sample size was calculated with 5% level of significance or 80% power of by taking expecting population 1 (60.71%) and population 2(11%) of diabetes mellitus, required sample size was 30 for each group.

All patients present with 18-65 years with Grade I & II diabetic foot ulcers, according to Meggit- Wagner classification. Diabetes control with oral

hypoglycemics or insulin based on fasting sugar of 110-130 mg / dl patients were included from the study. Patients with chronic ulcers of other aetiology, comorbid like kidney failure, generalized debility which badly affect wound healing, allergic patients with phenytoin were excluded from the study.

A total of 60 (30 in each group), subjects fulfilling the inclusion and exclusion criteria was selected from the outpatient and emergency department. Upon presentation complete history and general physical examination was done.

In both groups wound ulcer was cleaned with saline water initially. Surgical debridement was carried out if needed. The surgical debridement was carried out in aseptic conditions under local anaesthesia. On the first day of therapy, the area of the ulcer was measured by drawing the ulcer size on a transparent piece of paper & then shifting it to a graph paper for measuring of area by addition of squares within specified lines. After initial wound management the subjects were assigned into group A (phenytoin dressing) and group B (conventional dressing) through lottery method. The patients would be followed up after 04 week in both study and control groups. Primary outcome variables efficacy measured in terms of area of the wound measured using tracing graph paper & healing percentage was calculated after 4 months & recorded on Performa.

Data Analysis:

Data was analyzed in SPSS. Age & area at baseline and after 4 weeks were presented as mean &SD. Gender was presented as percentage & frequency. Chi Square test was used to compare the efficacy between two groups. Data was also stratified for age, gender, grade of ulcer I/II, size of Ulcer and duration of diabetes mellitus. post stratification chi-square test will be used taking P value was less than 0.05 as significant.

RESULTS

Total 60 patients were included. The mean age was 41.27 ± 14.04 years. In group A, the mean age was 40.30 ± 16.024 years while in group B the mean age of the patients was 42.23 ± 11.93 years. Among 60 patients there were 31(51.67%) were male & 29(48.33%) were females. In group A there were 18(60%) were male and in group B 13(43.3%) were male. Similarly, in group A there were 12(40%) patients were female and in group B 17(56.7%) patients were female. table: 1

In group A, the mean duration was 4.10 ± 2.38 weeks while in group B, the duration was 4.23 ± 2.14 weeks. In group A grade I ulcer was found in 9(30%) patients whereas in group B grade I ulcer was found in 14(46.7%) patients. Similarly, In group A grade II ulcer was found in 21(70%) patients whereas in group B grade II ulcer was found in 16(53.3%) patients. table: 2

In group A the mean surface area at baseline was 32.37 ± 8.834 mm while in group B 35.83 ± 8.71 mm. This difference was insignificant. At 4th week: In group A, the mean surface area was 14.07 ± 4.83 mm while in group B, 19.60 ± 5.757 mm. This difference was significant. In group A, the mean healing in percentage of the wound was 54.92 ± 14.75 and in group B the mean healing in percentage was 44.78 ± 12.713 . There was significant difference

statistically p value < 0.05 table: 3

In group A, the efficacy was achieved in 22(73.3%) patients whereas in group B the efficacy was achieved in 9(30%) patients. This difference was significant statistically. i.e. p – value = 0.001. fig: 1

The patients having age ≤45 years, in group A, the efficacy was achieved in 13(72.2%) patients whereas in group B the efficacy was achieved in 7(38.9%) patients (p-value=0.044). Similarly, in patients having age >45 years In group A the efficacy was achieved in 9(75%) patients whereas in group B the efficacy was achieved in 2(16.7%) patients (p-value=0.004). **table:4**

The patients having ulcer grade I, In group A the efficacy was achieved in 8(88.9%) patients whereas in group B the efficacy was achieved in 5(35.97%) patients (p-value=0.012). Similarly in patients having ulcer grade II, In group A the efficacy was achieved in 14(66.7%) patients. **table:4**

Table: 1 Descriptive of Age & Gender

	Mean ± SD	Group I (Topical Phenytoin Dressing) Mean ± SD	Group II (Conventional Dressing) Mean ± SD
Age	41.27± 14.04	40.30± 16.02	42.23± 11.93
Gender	Male	31(52.67%)	13(43.3%)
	Female	29(48.33%)	17(56.7%)

Table: 2 Distribution of ulcer grade between study group

Ulcer Grade	Group I (Topical Phenytoin Dressing)	Group II (Conventional Dressing)
Grade I	9(30%)	14(46.7%)
Grade II	21(70%)	16(53.3%)

Table: 3 Comparison of surface area at baseline, 4th week between study groups

	Group I (Topical Phenytoin Dressing)	Group II (Conventional Dressing)	P value
SA at baseline	32.37±8.83	35.83±8.71	0.131
SA 4 th week	14.07±4.83	19.60±5.75	0.0001
Healing Percentage	54.92±14.75	44.78±12.71	0.006

Efficacy

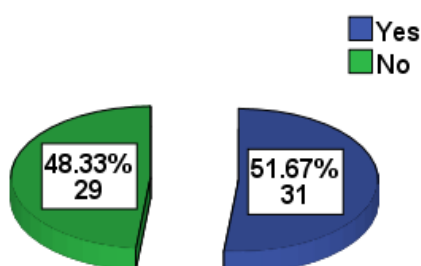


Figure: 1

Table: 4 Comparison of efficacy between study groups

Efficacy	Group I (Topical Phenytoin Dressing)	Group II (Conventional Dressing)	P value
Yes	22(73.3%)	9(30%)	0.001
No	8(26.7%)	21(70%)	

Table: 5 Comparison of efficacy between study groups stratified by age groups, Ulcer Grade

		Efficacy	Group I (Topical Phenytoin Dressing)	Group II (Conventional Dressing)	P value
Age(years)	≤45	Yes	13	7	0.044
		No	5	11	
	>45	Yes	9	2	0.004
		No	3	10	
Ulcer Grade	I	Yes	8	5	0.012
		No	1	9	
	II	Yes	14	4	0.020
		No	7	12	

DISCUSSION

Diabetic people are more likely to develop foot ulcers, which have a frequency of 25% & cause significant mortality in society. Since 1937, phenytoin has been widely used to treat epilepsy. It's been used to treatment a variety of disease. Negative side effects such as allergies, there has been a report of a proliferative idiosyncratic cutaneous lesion. Phenytoin is also used to treat ulcers that do not heal, such as decubitus ulcers.(9)

In this study the overall efficacy was achieved in 31(51.67%) patients. In topical phenytoin Dressing group the efficacy was achieved in 22(73.3%) patients whereas in conventional group the efficacy was achieved in 9(30%) patients (p-value=0.001). Some studies are discussed below which present the results in favor of our study as.

A study conducted by A. Silodia et al. found that there was a difference significant between the 2.0 groups across all three parameters studied, favoring the study group. On Day 14, the presence of HGT was 86.89 % versus 48.0% (p <0.05). On days 7 & 14, the average decrease in ulcer area was 41.29 & 68.12 versus 24.48 & 47.78 (p < 0.05). On Day 14, there was a 50.0 % reduction in ulcer area: 62.0 / 38.0. (p < 0.05). Phenytoin for DFU healing is a suitable alternative to conventional process.(10)

Pankaj B. Bharadva et al(7) also showed results in favor of Phenytoin dressing. They reported in their study that Phenytoin group, the mean of healthy granulation formation of tissue was 60.72%, and average stay in hospital was 23.96 days with negative culture sensitivity was 54.0%.

Another study was done in 2015, to compare the uses of topical phenytoin vs control therapy in 100.0

diabetes related ulcer patients in a prospective, controlled trial.(11) A sterile occlusive bandage was given daily to the control group.(12) Phenytoin powder was put in a "light coating" to ulcer surface in the phenytoin group,(13) and later a dry dressing was daily applied. The phenytoin group has taken 21 days to heal compared to 45 days in the control group p < 0.05%.

Game, FL et al, found that topical phenytoin resulted in good granulation tissue.(14) Vijay Gunasekaran et al (9) stated that Phenytoin dressing is actually effective in increasing the granulation tissue rate by virtue of its action on encouraging fibro-blast proliferation & collagenase movement decrease. In the phenytoin group, the granulation tissue was 90.35%, that was significant statistically (p =0.011) compared to 82.02% in control group.

In another study, the mean of granulation tissue as ulcer surface area taken as percentage is 42.50% in phenytoin dressing group. The average of granulation tissue formation in the control group is 36.67%.(8) By the end of their trial, Tauro, et al, Raj, et al, and Kodela, et al found that phenytoin increased the formation of granulation tissue rate in the study group to 87.0%, compared to 72.0% in the control group.(15-17)

In this study the average age was 41.27±14.04 years, among patients there were 31(51.67%) male & 29(48.33%) were females. Diabetes mellitus was shown to be more common in males (74.0%) than females in a study conducted by Vijaya Patil et al. The average age in group A was 48.4±12.48 years, while the group B was 49.64±10.8 years.(18) One study conducted by Tauro, et al included 200.0 patients was divided in two group.(19)The average of group A was 50.11±13 & in group B was 51.42±13.4

years.

Conclusion:

This study concluded that the use of topical Phenytoin for healing of Diabetic ulcer is suitable for alternative to conventional process and showed significantly better outcome in terms of efficacy. It is safe, available easily and simple to apply.

References:

1. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 diabetes mellitus in Pakistan: Current prevalence and future forecast. *JPMA The Journal of the Pakistan Medical Association*. 2016;66(12):1637-42.
2. Khan A, Junaid N. Prevalence of diabetic foot syndrome amongst population with type 2 diabetes in Pakistan in primary care settings. *JPMA*. 2017;67(1818).
3. Rowe VL. Diabetic ulcers. 2018.
4. Lavery LA, Davis KE, Berriman SJ, Braun L, Nichols A, Kim PJ, et al. WHS guidelines update: diabetic foot ulcer treatment guidelines. Wound repair and regeneration: official publication of the Wound Healing Society [and] the European Tissue Repair Society. 2016;24(1):112-26.
5. Kavitha KV, Tiwari S, Purandare VB, Khedkar S, Bhosale SS, Unnikrishnan AG. Choice of wound care in diabetic foot ulcer: a practical approach. *World journal of diabetes*. 2014;5(4):546.
6. Jayalal J, Kumar SJ, Dhinesh TD, Kadar JMA. Efficiency of topical phenytoin on healing in diabetic foot ulcer: a randomized controlled trial. *Int J Sci Stud*. 2015;3(3):84-9.
7. Bharadva PB, Choksi DB, Damor S, Shah J. Topical phenytoin dressing versus conventional dressing in diabetic ulcers. *International Surgery Journal*. 2017;4(5):1682-6.
8. Prasad S, Prakash A, Patel S, Lunawat A, Mahore D. A comparative analysis of the efficacy of topical phenytoin with conventional wound dressing in healing of diabetic foot ulcers. *International Surgery Journal*. 2017;4(4):1389-93.
9. Gunasekaran V, Subbaraj S, Aroul T. The efficacy of phenytoin dressing in healing of diabetic ulcer: a randomized control study. *International Surgery Journal*. 2017;4(10):3311-6.
10. Silodia A, Narnoli S, Damde H. A Prospective Comparative Study of Topical Phenytoin v/s Conventional Dressing for Diabetic Foot Ulcers. *infection*. 6:8.
11. Tsang K-K, Kwong EW-Y, Woo KY, To TS-S, Chung JW-Y, Wong TK-S. The anti-inflammatory and antibacterial action of nanocrystalline silver and manuka honey on the molecular alternation of diabetic foot ulcer: a comprehensive literature review. *Evidence-Based Complementary and Alternative Medicine*. 2015;2015.
12. Yazdanpanah L, Nasiri M, Adarvishi S. Literature review on the management of diabetic foot ulcer. *World journal of diabetes*. 2015;6(1):37.
13. Saco M, Howe N, Nathoo R, Cherpelis B. Comparing the efficacies of alginate, foam, hydrocolloid, hydrofiber, and hydrogel dressings in the management of diabetic foot ulcers and venous leg ulcers: a systematic review and meta-analysis examining how to dress for success. *Dermatology online journal*. 2016;22(8).
14. Game F, Apelqvist J, Attinger C, et al., Hartemann A, Hinchliffe R, et al. Effectiveness of interventions to enhance healing of chronic ulcers of the foot in diabetes: a systematic review. *Diabetes/metabolism research and reviews*. 2016;32:154-68.
15. Calhoun JH, Overgaard KA, Stevens CM, Dowling JP, Mader JT. Diabetic foot ulcers and infections: current concepts. *Advances in Skin & Wound Care*. 2002;15(1):31-42.
16. Younes N, Albsoul A, Badran D, Obedi S. Wound bed preparation with 10-percent phenytoin ointment increases the take of split-thickness skin graft in large diabetic ulcers. *Dermatol Online J*. 2006;12(6):5.
17. Rituraj AS, Chatterjee S. Topical phenytoin: role in diabetic ulcer care. *IJIMS*. 2015;2(6):93-7.
18. Patil V, Patil R, Kariholu P, Patil L, Shahapur P. Topical phenytoin application in grade i and ii diabetic foot ulcers: a prospective study. *Journal of clinical and diagnostic research: JCDR*. 2013;7(10):2238.
19. Tauro LF, Shetty P, Dsouza NT, Mohammed S, Sucharitha S. A comparative study of efficacy of topical phenytoin vs conventional wound care in diabetic ulcers. *International Journal of Molecular Medical Science*. 2013;3(1).