

Original Research Article

Comparative study of conventional dressing vs. topical heparin dressing in lower limb diabetic ulcers

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Received: 28 October 2022

Revised: 30 November 2022

Accepted: 22 December 2022

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ABSTRACT

Background: Diabetic ulcers are a serious complication of diabetes that results in significant morbidity and mortality, especially lower limb diabetic ulcers are very difficult to treat due to the poor vascularity and brittle granulation tissue formed during the healing phase, so conventional dressings might not be that effective in treating the wound so this study aims to study the effectiveness of topical heparin over conventional dressings for lower limb diabetic foot ulcers
Methods: This is a prospective study done on 100 patients who presented to the surgical outpatient at Trichy SRM medical college hospital and research centre during the period December 2020 to July 2022 and diagnosed to have diabetic foot.

Results: On comparing the patients results of both groups with conventional and topical heparin dressings, the group with topical heparin dressing showed significant reduction in hospital stay and wound healed faster than the group with conventional dressing

Conclusions: Topical heparin dressing showed significant better results by reduction of hospital stay and faster healing of diabetic foot ulcers than wound treated with conventional dressing.

Keywords: Diabetic foot, Heparin dressing, Hospital stay

INTRODUCTION

Diabetic foot ulcers are one of the most common complications of diabetes mellitus and account for significant morbidity, mortality, and healthcare expenditures. It is estimated that 19-34% of patients with diabetes are likely to be affected with a diabetic foot ulcer in their lifetime.¹ Shortly after diabetic foot ulcers were described in the 19th century, the most prevalent treatment approach was prolonged bedrest. Dr. Frederick Treves (1853-1923) revolutionized the management of DFU's when he established three important principles in DFU treatment, which continue to be the basis of modern-day care: sharp debridement, off-loading, and diabetic foot education.² Diabetic ulcers of lower limb are

very difficult to treat and they contribute to a great account of morbidity and expenditure of human resources and manpower. Due to poor vascularity and brittle granulation tissue formed during wound healing phase accounts for this. A novel method is needed to overcome these factors and which promotes healing and lessens the hospital stay and morbidity, dressing the lower limb diabetic ulcers using 200 IU/ml sodium aqueous heparin.³

Objectives

Objectives of current study were to estimate the length of hospital stay and antibiotic requirement among patients with lower limb diabetic foot ulcers, to estimate the length of hospital stay and antibiotic requirement among

patients with diabetic foot ulcers managed with Heparin dressing and to compare the effect of topical heparin dressing over conventional dressing in diabetic foot ulcers

METHODS

A cross-sectional comparative study was done among patients diagnosed with diabetic foot ulcers admitted in the surgical ward of a teaching institution Trichy SRM medical college hospital and research centre in Trichy. The study was conducted over a period of 20 months (December 2020 to July 2022) and the samples were selected using an universal sampling method. A total of around 482 cases visited the surgical OPD with complaints of diabetic foot ulcer of which 143 patients required admission. 43 patients were excluded from the study as they were presenting with sepsis or peripheral vascular disease or didn't consent for the study. Thus, A Total of 100 patients were included in the study and were divided in to two study groups, for Group 1 only conventional dressing was done, for Group 2 topical heparin solution was applied, for both groups glycemic control and antibiotics were added accordingly and monitored. The purpose of the study was explained to the study participants in detail and an informed consent was obtained, the right to withdraw from the study at any point of time without any loss of patient care was explained. All data were collected according to the guidelines of the Institutional ethical committee. The data was entered in MS Excel and the frequencies were analysed.

RESULTS

A total of 100 patients were with lower limb diabetic ulcers were included in the study and were split in to two groups and treated group 1 with conventional dressing and group 2 with topical heparin dressing and outcome regarding length of hospital stay. Antibiotic requirement was compared statistically and found that the group treated with heparin dressing had reduced length of hospital stay and wound healing was better. Majority (80%) of the study participants were male of which 47.5% of the received heparin treatment. Of the 50 participants who received conventional treatment 42 (84%) and 8 (16%) were male and female respectively, while the gender distribution among the group receiving heparin was 38 (76%) and 12 (24%) of male and female respectively. The mean hospital stay was higher in conventional group (approximately 17days) compared to Heparin group (approximately 14 days). Of the total study participants, majority (75%) received empirical sensitive antibiotics while only 25% had the drug revised by culture and sensitivity, of which majority 18 (75%) belonged to the conventional group of treatment. Among those participants receiving conventional method of treatment 32 (64%) were started on empirical sensitive antibiotics while 18 (36%) of the patient's antibiotics were revised by culture and sensitivity. While 43 (86%)

received empirical sensitive antibiotics and 7 (14%) drugs were revised by culture and sensitivity among the group receiving heparin treatment. Of the total study participants only 3% people required amputation or disarticulation and all belonged to the conventional group which contributed to 3 (6%) of participants of conventional group.

Table 1: Sex distribution among the study participants.

Sex	Conventional group N (%)	Heparin group N (%)	Total N (%)
Male	42 (52.5)	38 (47.5)	80 (80)
Female	8 (40)	12 (60)	20 (20)

Table 2: Comparison of mean days of hospital stay.

Group	Mean hospital stay (days)
Conventional group	17.2
Heparin group	13.9

Table 3: Antibiotics distribution among the study participants.

Antibiotics	Conventional group N (%)	Heparin group N (%)	Total N (%)
Empirical sensitive	32 (42)	43 (58)	75 (75)
Drug revised by C&S	18 (75)	7 (25)	25 (25)

Table 4: Analgesic requirement and amputation among study participants.

Characteristics	Conventional group	Heparin group	Total
Analgesics (mean doses/ day)	2.3	2.2	2.3
Amputation/ disarticulation N (%)	3 (6)	0	3 (3)

Though the mean of Bates-Jensen wound healing score was higher in heparin group (28.3) at 0 weeks compared to conventional group (26.4), The score gradually decreased over the period of three weeks. The conventional group had the mean scores of 24.2, 20.3, 15.8 at 1, 2 and 3 weeks respectively. These scores were higher when compared with the mean scores of 24.1, 14.2, 11 at 1, 2 and 3 respectively in the heparin group. Though the mean of Bates-Jensen wound healing score was higher in heparin group (28.3) at 0 weeks compared to conventional group (26.4), The score gradually decreased over the period of three weeks. The conventional group had the mean scores of 24.2, 20.3, 15.8 at 1, 2 and 3 weeks respectively. These scores were

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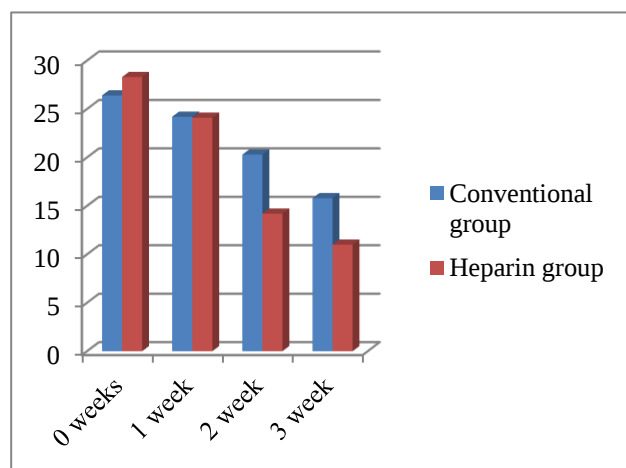


Figure 1: Bates-Jensen wound healing score.

DISCUSSION

Heparin and related substances are glycosaminoglycans that exist naturally inside the cell and in the extracellular matrix.^{4,5} They act by binding selectively to varieties of proteins and pathogens are crucially relevant to many disease processes. These related substances include: low molecular weight heparin (LMWH), chondroitin, heparitin sulphate, hyaluronic acid and keratan sulphate. They have beneficial effects on local tissue microcirculation and oxygenation through the inhibition of thrombin generation and increases in plasma fibrin gel porosity, which may promote vascular perfusion significantly in the peripheral ischemia and healing of chronic ulcers by stimulating production of basic fibroblast growth factor and transforming growth factor-beta 1.⁶⁻⁸ Heparin promotes migration of capillary endothelial cell and produces angiogenesis and thus formation of healthy granulation tissue. It also reduces bacterial translocation and necessary for antibiotics minimized.⁹

Limitations

Limitations of current study were; it was a single institutional study and sample size was small to represent all people with diabetic foot ulcers.

CONCLUSION

Usage of heparin dressing for lower limb diabetic foot ulcers showed reduced hospital stay and reduced need for antibiotics and wound also healed earlier compared to conventional dressings.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Ashok NM, Balamurugan C. Comparative study of conventional dressing vs. topical heparin dressing in lower limb diabetic ulcers. Int Surg J 2023;10:66-8.