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Research Article

COMPARATIVE STUDY OF OCTENIDINE GEL DRESSING AND CONVENTIONAL POVIDONE-IODINE DRESSING IN CHRONIC DIABETIC FOOT ULCERS

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Abstract: ***Introduction:*** Chronic diabetic foot ulcers are a major cause of morbidity among diabetic patients. Octenidine wound gel has emerged as a newer antimicrobial dressing agent with favorable wound healing properties, while povidone-iodine remains a widely used conventional antiseptic dressing in clinical practice.**Aims:** To compare the effectiveness of octenidine wound gel dressing and povidone-iodine dressing in the healing of chronic diabetic foot ulcers **Materials and Methods:** This prospective comparative study was conducted in the Department of General Surgery at Sree Mookambika Institute of Medical Sciences over a duration of 12 months. A total of 64 patients with chronic diabetic foot ulcers were included in the study and divided into two groups of 32 patients each. Group O received octenidine wound gel dressing, while Group P received povidone-iodine dressing. Dressings were performed at regular intervals, and patients were followed until significant wound healing or discharge. Parameters assessed included reduction in ulcer size, granulation tissue formation, infection control, duration of hospital stay, and need for surgical intervention. Statistical analysis was performed using SPSS software version 25. A p-value less than 0.05 was considered statistically significant.**Results:** The majority of patients belonged to the age group of 51–60 years, with male predominance observed in both groups. Mean reduction in ulcer size was significantly greater in the octenidine group compared to the povidone-iodine group (68.4% vs 49.7%, p <0.001). Healthy granulation tissue formation was observed earlier among patients treated with octenidine dressing. Infection clearance was achieved in 27 (84.4%) patients in the octenidine group compared to 19 (59.4%) patients in the povidone-iodine group. Mean duration of hospital stay was shorter in the octenidine group (11.2 ± 2.8 days) compared to the povidone-iodine group (15.6 ± 3.4 days). Requirement for secondary surgical procedures was lower in patients receiving octenidine wound gel dressing.**Conclusion**: Octenidine wound gel dressing demonstrated superior wound healing efficacy compared to povidone-iodine dressing in chronic diabetic foot ulcers. Early use of octenidine wound gel may improve healing outcomes and reduce complications associated with chronic diabetic foot ulcers.

Keywords: Chronic ulcer, Diabetic foot ulcer, Granulation tissue, Octenidine wound gel, Povidone-iodine dressing, Wound healing

INTRODUCTION

Diabetes mellitus is one of the most common chronic metabolic disorders worldwide and is associated with several debilitating complications affecting multiple organ systems.[1] Among these complications, diabetic foot ulcer is considered one of the most serious and economically burdensome conditions due to its chronicity, recurrent infection, prolonged hospitalization, and risk of lower limb amputation. These ulcers significantly reduce quality of life and increase morbidity and mortality among diabetic patients.[2,3]

Chronic diabetic foot ulcers are characterized by delayed healing, persistent inflammation, bacterial colonization, and tissue necrosis. The presence of infection further complicates the healing process by increasing tissue destruction and impairing granulation tissue formation.[4] Effective wound management therefore plays a crucial role in reducing complications, promoting healing, and preventing amputations.[5] Standard treatment includes glycemic control, surgical debridement, infection management, pressure offloading, and regular wound dressing.[6]

Povidone-iodine dressing has been widely used for many years because of its broad-spectrum antimicrobial activity and easy availability. However, prolonged use of povidone-iodine may produce cytotoxic effects on fibroblasts and keratinocytes, which can interfere with wound healing. Delayed epithelialization and local tissue irritation have also been reported with repeated application in chronic wounds.[7, 8]

Octenidine wound gel is a newer antiseptic dressing agent that has gained increasing clinical attention in

wound management. It possesses broad antimicrobial activity against gram-positive bacteria, gram-negative bacteria, fungi, and multidrug-resistant organisms.[9] In addition to its antimicrobial action, octenidine helps maintain a moist wound environment and demonstrates lower tissue toxicity compared to conventional antiseptics. These properties may contribute to improved granulation tissue formation, enhanced wound contraction, and faster healing in chronic diabetic ulcers.[10]

Assessment of wound healing outcomes using newer dressing materials is important in improving diabetic foot care and reducing long-term complications. Identification of a more effective dressing modality can help reduce hospital stay, need for repeated surgical procedures, and risk of amputation.[11]
Although several antiseptic dressings are currently available, evidence comparing octenidine wound gel with conventional povidone-iodine dressing in chronic diabetic foot ulcers remains limited, particularly in the Indian population. Hence, this study was undertaken to evaluate and compare the healing efficacy of octenidine wound gel dressing and povidone-iodine dressing in patients with chronic diabetic foot ulcers.

AIMS AND OBJECTIVES

- To compare the effectiveness of octenidine wound gel dressing and povidone-iodine dressing in the healing of chronic diabetic foot ulcers

MATERIALS AND METHODS

This prospective comparative study was conducted in the Department of General Surgery at Sree Mookambika Institute of Medical Sciences over a period of 12 months from January 2025 to December 2025. Written informed consent was obtained from all patients prior to participation in the study.

Inclusion Criteria

- Patients aged more than 18 years.
- Patients with type 1 or type 2 diabetes mellitus.
- Patients with chronic diabetic foot ulcers of more than 4 weeks duration.
- Patients with Wagner grade I and II diabetic foot ulcers.
- Patients willing to participate in the study and provide informed consent.

Exclusion Criteria

- Patients with Wagner grade III, IV, and V ulcers.
- Patients with peripheral arterial disease causing critical limb ischemia.
- Patients with osteomyelitis or gangrene.
- Patients with severe renal, hepatic, or cardiac disease.
- Patients receiving immunosuppressive therapy.
- Patients unwilling to participate in the study.

A total of 64 patients diagnosed with chronic diabetic foot ulcers were included in the study. Patients were divided into two groups consisting of 32 patients each. Group O received octenidine wound gel dressing, while Group P received povidone-iodine dressing. Patients were selected based on clinical history, physical examination, laboratory investigations, and wound assessment findings. Detailed demographic data including age, sex, duration of diabetes mellitus, glycemic status, ulcer duration, ulcer size, and associated comorbidities were recorded using a structured proforma.

All patients underwent routine hematological and biochemical investigations including complete blood count, fasting blood sugar, postprandial blood sugar, HbA1c, renal function tests, and wound culture sensitivity testing. Ulcer grading was assessed clinically using Wagner's classification system. Surgical debridement was performed wherever necessary before initiation of dressing. Wound dressings were carried out under aseptic precautions at regular intervals according to the assigned treatment group. Patients were followed during hospital stay and wound progress was assessed periodically for reduction in ulcer size, granulation tissue formation, infection clearance, wound discharge, and need for secondary surgical procedures.

Ulcer dimensions were measured using sterile measuring scale and percentage reduction in wound size was calculated during follow-up. The presence of healthy granulation tissue, reduction in slough, local infection control, duration of hospital stay, and complications were documented and compared between the two groups. Final outcome assessment was based on wound healing response and clinical improvement.

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software version 25. Quantitative variables were expressed as mean ± standard deviation, while qualitative variables were expressed as frequency and percentage. Student's t-test and Chi-square test were used for comparison between the two groups. A p-value less than 0.05 was considered statistically significant.

RESULTS

Both study groups were comparable with respect to age, gender distribution, and duration of diabetes mellitus. No statistically significant difference was observed between the two groups, indicating uniform baseline demographic characteristics.

Variable	Group O (n=32)	Group P (n=32)	p-value
Mean age (years)	56.4 ± 8.2	57.1 ± 7.9	0.72
Male n (%)	22 (68.8%)	21 (65.6%)	0.79
Female n (%)	10 (31.2%)	11 (34.4%)	
Mean duration of diabetes (years)	9.6 ± 3.4	10.1 ± 3.7	0.58

Table 1: Demographic profile of study population (n = 64)

Grade I ulcers were more common than Grade II ulcers in both groups. The distribution of ulcer grades was comparable between the groups without statistically significant difference.

Wagner grade	Group O n (%)	Group P n (%)	p-value
Grade I	18 (56.2%)	17 (53.1%)	0.80
Grade II	14 (43.8%)	15 (46.9%)	

Table 2: Distribution of Wagner grade of diabetic foot ulcers

Patients treated with octenidine wound gel demonstrated significantly greater reduction in ulcer size and earlier granulation tissue formation compared to the povidone-iodine group. Hospital stay was also significantly shorter in the octenidine group, indicating faster wound healing and recovery.

Parameter	Group O	Group P	p-value
Mean reduction in ulcer size (%)	68.4 ± 11.2	49.7 ± 10.5	<0.001
Healthy granulation tissue formation (days)	8.1 ± 1.9	12.4 ± 2.6	<0.001
Mean duration of hospital stay (days)	11.2 ± 2.8	15.6 ± 3.4	<0.001

Table 3: Comparison of wound healing parameters

Octenidine dressing showed significantly better infection control and wound culture clearance compared to povidone-iodine dressing. Persistent wound discharge and residual infection were more common in the povidone-iodine group.

Outcome	Group O n (%)	Group P n (%)	p-value
Infection clearance achieved	27 (84.4%)	19 (59.4%)	0.02
Persistent wound discharge	5 (15.6%)	13 (40.6%)	0.02
Positive wound culture after treatment	4 (12.5%)	11 (34.4%)	0.03

Table 4: Comparison of infection control and wound culture clearance

Patients in the octenidine group required fewer secondary surgical procedures including skin grafting and minor amputations. Although the differences were not statistically significant, better wound progression was observed with octenidine dressing.

Surgical intervention	Group O n (%)	Group P n (%)	p-value
Debridement only	26 (81.2%)	20 (62.5%)	0.09
Skin grafting required	4 (12.5%)	8 (25.0%)	0.19
Minor amputation	2 (6.3%)	4 (12.5%)	0.39

Table 5: Requirement of secondary surgical procedures

Complete wound healing was significantly higher among patients treated with octenidine wound gel dressing compared to povidone-iodine dressing. Poor or delayed healing was more frequently observed in the povidone-iodine group, supporting the superior efficacy of octenidine dressing in chronic diabetic foot ulcers.

Outcome	Group O n (%)	Group P n (%)	p-value
Complete healing	24 (75.0%)	16 (50.0%)	0.03
Partial healing	6 (18.8%)	10 (31.2%)	
Poor healing/non-healing	2 (6.2%)	6 (18.8%)	

Table 6: Overall treatment outcome comparison

DISCUSSION

A total of 64 patients with chronic diabetic foot ulcers were included in the study, with 32 patients each allocated to the octenidine wound gel dressing group and the povidone-iodine dressing group. The mean age of patients was comparable between the groups, with a predominance of male patients, reflecting the higher burden of diabetic foot ulceration among older individuals with long-standing diabetes mellitus. Similar demographic findings were reported by Guddety SR et al.[12] who observed that 68.8% of patients were males and the majority were above 55 years of age. Likewise, Maharini I et al.[13] reported a mean age of 55.19 ± 9.36 years among patients with diabetic foot ulcers, highlighting the association between advancing age, poor glycemic control, and chronic ulcer formation.

Majority of ulcers in the present study were Wagner grade I and II lesions, with a comparable distribution

between the two groups. This ensured uniform baseline wound severity and facilitated reliable comparison of healing outcomes. Similar observations were reported by Guddety SR et al.[12] who found no significant difference in baseline ulcer characteristics between patients treated with octenidine and povidone-iodine dressings.

Assessment of wound healing demonstrated significantly superior outcomes with octenidine wound gel dressing. The mean reduction in ulcer size was considerably greater in the octenidine group than in the povidone-iodine group, indicating enhanced wound contraction and tissue regeneration. Comparable findings were reported by Cwajda-Białasik J et al.[14] who observed significantly greater ulcer area reduction with octenidine dressing compared to povidone-iodine dressing (25.51 ± 9.26 vs. 14.48 ± 6.54; $p<0.001$). Similarly, Guddety SR et al.[12] demonstrated significantly improved wound healing and greater ulcer size reduction among patients treated with octenidine wound gel.

Early granulation tissue formation was another notable finding among patients receiving octenidine dressing. Faster development of healthy granulation tissue reflects improved wound bed preparation and enhanced tissue repair. Supporting these observations, Venkatesan J et al.[15] reported significantly greater reduction in wound surface area among patients treated with octenidine dihydrochloride dressing compared with saline dressing over a six-week period. Furthermore, Rojczyk E et al.[16] demonstrated significant improvements in wound bed tissue quality, wound size reduction, and infection control among patients receiving octenidine gel-based therapy.

Infection control was markedly superior in the octenidine group, with a greater proportion of patients achieving infection clearance and fewer patients demonstrating persistent wound discharge or positive wound cultures. Similar findings were reported by Guddety SR et al.[12] where only 15% of patients treated with octenidine had persistent bacterial growth compared to 32.5% in the povidone-iodine group. Stryja J et al.[17] also demonstrated that octenidine-based wound therapy significantly reduced wound size, slough burden, and surrounding skin inflammation while improving granulation and epithelialization.

The shorter duration of hospital stay observed among patients receiving octenidine dressing suggests faster clinical recovery and improved wound healing. Similar benefits have been reported by Hämmerle G et al.[18] who demonstrated significantly greater wound size reduction and earlier healing with octenidine wound gel compared with conventional wound dressings. Additionally, Pavlík V et al.[19] reported accelerated wound healing, reduced slough formation, and enhanced collagen maturation with octenidine-based wound therapy. Complete wound healing was achieved in a substantially higher proportion of patients treated with octenidine dressing compared with povidone-iodine dressing. The need for secondary surgical procedures, including skin grafting and minor amputations, was also lower among patients receiving octenidine.

CONCLUSION

Octenidine wound gel dressing demonstrated superior efficacy compared to povidone-iodine dressing in the management of chronic diabetic foot ulcers. Patients treated with octenidine showed greater reduction in ulcer size, earlier granulation tissue formation, improved infection clearance, and shorter hospital stay. Complete wound healing was achieved more frequently with octenidine dressing, while persistent infection and delayed healing were more common with povidone-iodine dressing. The findings indicate that octenidine wound gel provides better wound healing outcomes and may reduce the need for secondary surgical procedures. Early use of octenidine dressing can improve clinical recovery and minimize complications associated with chronic diabetic foot ulcers.

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CONFLICTS OF INTEREST

There are no conflicts of interest

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