



COMPARATIVE EFFECTIVENESS OF PAPAIN-UREA PREPARATION AND SUPEROXIDIZED SOLUTION FOR GRADE 2 DIABETIC FOOT ULCERS

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Conflicts of Interest: Nil

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ABSTRACT

Diabetic foot ulcers (DFUs) represent a significant complication of diabetes, often leading to infections and amputations. This study compares the effectiveness of papain-urea-based preparations and superoxidized solutions in treating grade 2 diabetic foot ulcers. A total of 100 patients with grade 2 DFUs were randomly assigned to receive either papain-urea or superoxidized solution treatment over six weeks. Outcomes measured included wound healing time, reduction in ulcer size, and pain levels assessed via Visual Analog Scale (VAS). Results showed that both treatments significantly improved wound healing, but papain-urea exhibited a faster rate of healing and greater reduction in ulcer size compared to superoxidized solution. Pain levels also decreased more significantly in the papain-urea group. This study suggests that papain-urea-based preparation may be a more effective treatment option for managing grade 2 diabetic foot ulcers.

Keywords: Diabetic foot ulcer, papain-urea, superoxidized solution, wound healing, treatment comparison.

Introduction

Diabetic foot ulcers (DFUs) are a prevalent complication of diabetes mellitus, affecting up to 25% of diabetic patients during their lifetime. They arise from a combination of factors including peripheral neuropathy, ischemia, and infection, leading to significant morbidity and, in severe cases, amputation (1,2). The management of DFUs requires a multifaceted approach, including debridement, infection control, and appropriate wound dressings (3).

Papain-urea preparations combine the enzymatic action of papain, a proteolytic enzyme derived from papaya, with urea, which acts as a keratolytic agent. This combination is known to enhance the debridement of necrotic tissue and promote granulation tissue formation, making it suitable for treating ulcers (4). On the other hand, superoxidized solutions are antimicrobial agents generated through electrolysis of saline and are effective against a broad spectrum of pathogens, thus reducing the risk of infection (5).

Despite the established efficacy of both treatments, comparative studies examining their effectiveness in managing grade 2 DFUs are

limited. This study aims to evaluate and compare the outcomes of papain-urea-based preparation and superoxidized solution in the treatment of grade 2 diabetic foot ulcers.

Aim

To compare the effectiveness of papain-urea-based preparation versus superoxidized solution in the management of grade 2 diabetic foot ulcers.

Objectives

1. To assess wound healing time in patients receiving papain-urea preparation versus those receiving superoxidized solution.
2. To evaluate the reduction in ulcer size and pain levels in both treatment groups.

Materials and Methods

This prospective, randomized controlled trial included 100 patients diagnosed with grade 2 diabetic foot ulcers, enrolled from a tertiary care hospital over six months. Patients were randomly assigned to two groups: Group A (papain-urea preparation) and Group B (superoxidized solution).

Inclusion Criteria:

- Patients aged 18-75 years
- Diagnosis of grade 2 diabetic foot ulcers
- Ability to provide informed consent

Exclusion Criteria:

- Presence of osteomyelitis
- Other systemic infections
- Non-compliance with treatment protocol

The treatment regimen for Group A involved the application of papain-urea-based preparation daily, while Group B received superoxidized solution treatment. The primary outcomes measured included wound healing time (measured in days) and ulcer size reduction (measured in square centimeters), assessed weekly. Pain levels were evaluated using a Visual Analog Scale (VAS) at baseline and after treatment.

Results**Table 1: Comparison of Wound Healing Time**

Treatment Group	Mean Healing Time (Days)	p-value
Papain-Urea Preparation	28 ± 5	<0.001
Superoxidized Solution	35 ± 7	

Table 2: Ulcer Size Reduction

Treatment Group	Mean Ulcer Size Reduction (cm ²)	p-value
Papain-Urea Preparation	8.5 ± 1.2	<0.01
Superoxidized Solution	5.2 ± 1.5	

Discussion

The results indicate that both papain-urea-based preparation and superoxidized solution effectively facilitate healing in grade 2 diabetic foot ulcers. However, papain-urea demonstrated superior efficacy, with a significantly shorter healing time and greater reduction in ulcer size. The enzymatic activity of papain enhances the debridement of necrotic tissue while promoting granulation tissue formation, which may explain its more rapid action (6,7).

Furthermore, the analgesic effects observed in the papain-urea group could contribute to improved patient comfort and adherence to treatment (8). Conversely, superoxidized solutions primarily provide antimicrobial action, which is crucial in preventing infection but may not promote tissue healing to the same extent as enzymatic preparations (9,10).

Overall, while both treatments are viable options, the papain-urea-based preparation could be recommended as a first-line treatment for managing grade 2 diabetic foot ulcers,

considering its dual benefits of enhanced healing and reduced pain (11).

Conclusion

In conclusion, papain-urea-based preparation is more effective than superoxidized solution in managing grade 2 diabetic foot ulcers, as evidenced by faster healing times and better ulcer size reduction. These findings underscore the importance of selecting appropriate treatment modalities tailored to the needs of patients with diabetic foot ulcers.

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