Annals of Medicine and Medical Sciences (AMMS)
Volume 04, 2025, *Page No.: 109 to 112*
Available at: *http://ammspub.com*

Case Report

OPEN ACCESS

Clinical Outcomes of Theruptor Novo in the Management of Infected Diabetic Foot Wounds: A Case series

Jayanthinathan S

Consultant (Plastic, Cosmetic and Podiatric Surgeon), Department of Plastic, Hand, Burns, Micro & Trauma Reconstructive Surgery, Ahalia Diabetes Hospital, Palakkad, Kerala, India.

*Corresponding author: Jayanthinathan S; *jayanthbhel2013@gmail.com*

Abstract

Diabetic foot infections (DFIs) represent a serious complication of diabetes, often leading to lower extremity amputations and increased morbidity. Standard treatment protocols typically involve wound debridement, infection control, and optimized wound care. This case series examined the efficacy of Theruptor Novo, an antimicrobial wound dressing by Healthium Medtech, Bangalore, India, in treating three patients with chronic infected foot wounds, characterized by exposed bone and necrotic tissue. Weekly applications of the dressing, alongside conventional debridement and irrigation yielded significant wound contraction and complete epithelialization within 5 to 10 weeks for all patients. Theruptor Novo effectively prevented infections, facilitated wound healing, and promoted tissue regeneration, indicating its potential as a valuable adjunct in the management of DFIs, possibly decreasing the necessity for surgical interventions.

Keywords: ***Debridement, Diabetic foot, Infection Control, Osteomyelitis, Wound healing.***

Introduction

The global prevalence of diabetes is 536.6 million with an anticipated increase to 783.2 million by 2045, which correlates with increased foot complications, notably infections. In India, the current prevalence is 74.2 million, estimated to rise to 124.9 million by 2045 [1].

Along with this rise, diabetic foot infections (DFIs) have become a major concern, often leading to hospitalizations, decreased quality of life, and increased morbidity. DFIs frequently result from ulcers commonly developing in heel and metatarsal regions, [2] due to neuropathy, vascular insufficiency, and impaired neutrophil function [3]. They account for over 60% of lower extremity amputations, increasing the risk of minor amputation by 50% as compared to non-infected ulcer cases. While the majority of infections usually start in an open lesion and stay superficial, about 25% of them progress to deeper areas, such as subcutaneous tissues and bones resulting in diabetic foot osteomyelitis, raising amputation risks [2,3].

Diabetic foot ulcers are diagnosed by the evidence of pus discharge and local inflammation indicators like erythema, tenderness, edema, and pain [2]. Infections may also show unpleasant odour, necrosis, and failure to wound healing despite adequate care.

Comprehensive treatment involves surgical debridement, antibiotic therapy, and metabolite correction. An evidence-based strategy is essential for improving infection resolution and mitigating amputation risk. An empiric antibiotic regimen should be guided by infection severity and etiologic agent, while definitive therapy must rely on wound culture, sensitivity testing, and the patient's clinical response [3].

Wound dressings are essential for optimal healing, wound protection, and infection prevention. They create a moist environment and control excess exudation, promoting granulation, autolytic processes, angiogenesis, and epidermal cell migration. Here, we describe case reports of 3 patients who presented with infected diabetic foot wounds and were managed with regular wound dressing using Theruptor Novo (Healthium Medtech, Bangalore, India). Informed consent was obtained from all the participants.

Case Report

Case 1

A middle-aged diabetic male presented with a one-month-old wound on his left foot, compounded by the prior amputation of great and long toe due to gangrene. The surgical intervention, combined with amputation and wound exploration resulted in a wound approximately 12cm x 5.5cm over the medial aspect of plantar surface of the left foot with exposed first metatarsal bone, signs of infection, minimal slough, exudate and macerated edges (**Figure 1A**). The treatment involved regular debridement and irrigation with normal saline, following standard wound care protocols, and regular wound dressing with Theruptor Novo every seven days. The wound began to heal after the first dressing change, reducing to 7cm x 3.2cm without infection by the third week (**Figure 1B**). Complete epithelization was achieved by the end of five weeks (**Figure 1C**).

Received: January 20, 2025; **Revised:** March 12, 2025; **Accepted:** March 16, 2025

Figure 1A: Wound at presentation
Figure 1B: Wound by the end of 3 weeks of treatment with Theruptor Novo showing no signs of infection
Figure 1C: Complete epithelisation at the end of 5 weeks

Case 2

A 55-year-old male with chronic diabetes presented with an infected wound on the plantar aspect of his right foot, following prior small toe, ring toe, and great toe amputations. Upon examination, a 13 cm x 6 cm dry wound was noted, featuring exposed metatarsal and tarsal bones, necrotic tissue, dehydrated edges, and maggot infestation, indicating infection (**Figures 2A and 2B**). Surgical debridement was performed, and Theruptor Novo dressing was applied weekly, as per standard wound care protocols. Initial dressing changes revealed signs of healing, with a reduction in wound size to 5.5 cm x 2.5 cm and the absence of infection by week five (**Figure 2C**). Complete epithelialization occurred by the end of ten weeks (**Figure 2D)**.

Figure 2A: Wound at presentation
Figure 2B: Wound after debridement
Figure 2C: Wound by the end of 5 weeks of treatment with Theruptor Novo showing no signs of infection
Figure 2D: Complete epithelisation at the end of 10 weeks

Case 3

A 54-year-old male with chronic diabetes presented with an infected wound on his heel that had persisted for over two months despite regular treatment at another hospital. Upon examination, an infected wound measuring 3 cm x 2 cm with a depth of 3 cm was noted, indicative of calcaneal osteomyelitis. Signs of infection included minimal slough and macerated edges with the tarsal bones exposed (**Figure 3A**). Treatment involved debridement, followed by regular dressing with Theruptor Novo every five days, as per standard wound care protocols. Within three weeks, the wound size reduced to 1 cm x 1 cm, with a depth of 1 cm with no signs of infection (**Figure 3B**). Complete epithelialization was achieved within five weeks (**Figure 3C**).

Figure 3A: Wound at presentation
Figure 3B: Wound by the end of 3 weeks of treatment with Theruptor Novo showing no signs of infection
Figure 3C: Complete epithelisation at the end of 5 weeks

Discussion

Various polymeric wound dressings aid in preventing surgical site infections while promoting wound healing, reducing infection risks, and enhance the overall healing process.

Gupta et al. (2022), highlighted Theruptor's antimicrobial capabilities, which arise from its unique 3D-knitted hydrocellular textile substrate embedded with dimethyl tetradecyl [3-(trimethoxysilyl) propyl] ammonium chloride (DTAC), a cationic surfactant, enabling effective microbial protection through a physical kill mechanism without leaching from the dressing. This evidence supports Theruptor's effectiveness against a broad spectrum of pathogens [4]. Cost-effectiveness studies, like that of Rodrigues et al. (2024), suggest that Theruptor Novo is more economical than traditional dressings [5].

Case reports further support Theruptor's efficacy in clinical settings. We documented a case of diabetic male with a non-healing superficial partial thickness burn on the left lower limb where treatment with Theruptor Novo led to complete healing by the third week. The dressing effectively prevented infection and managed exudates, establishing it as a viable treatment option [6].

Pavan (2023), also reported success using Theruptor Novo in a diabetic male with an infected wound on the dorsolateral part of his foot. The dressing demonstrated effective exudate management and prevention of secondary infections, resulting in complete healing within 10 weeks [7]. In another case, he treated a middle-aged diabetic male with a non-healing foot wound where Theruptor Novo led to healthy granulation and epithelialization over time with good exudate management and complete wound healing in seven weeks [8].

Kale (2024), described two additional cases of diabetic males with non-healing foot wounds treated with Theruptor Novo, achieving complete healing within two to three weeks. The dressing significantly reduced infection through its unique antimicrobial action [9]. Furthermore, he reported another case of a diabetic male with an infected venous leg ulcer managed with Theruptor Novo and a split-skin graft. The dressing's ability to control infection and manage exudates resulted in complete healing, confirming its role as a primary dressing for venous leg ulcers [10].

Conclusion

The use of Theruptor Novo dressing in managing complex diabetic wounds has demonstrated its effectiveness in promoting healing, preventing infections, and managing exudates. This dressing significantly reduces wound size and achieves complete epithelialization within a relatively short timeframe. As such, Theruptor Novo presents a promising option for treating diabetic foot ulcers and other chronic wounds, offering a valuable addition to the standard wound care protocols.

List of Abbreviations

DFI: Diabetic foot infections
Cm: Centi-meter
DTAC: Dimethyl tetradecyl [3-(trimethoxysilyl) propyl] ammonium chloride

Declarations

Ethical Approval and Consent to participate

Ethical approval is not required since it was an observational study. Consent for patient participation and to publish the patient information was obtained.

Consent for publication

The author gives his consent for the publication of the data.

Availability of supporting data

Can be made available upon request.

Authors' contributions

Collection of data and writing the manuscript.

Funding Statement

No funding was provided for this study.

Conflict of Interest

The author declares no conflict of interest.

References

[1] Sun H, Saeedi P, Karuranga S, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract. 2022; 183:109119. doi: 10.1016/j.diabres.2021.109119

[2] Noor S, Zubair M, Ahmad J. Diabetic foot ulcer-A review on pathophysiology, classification and microbial etiology.

Diabetes Metab Syndr Clin Res Rev. 2015;9(3):192-199. doi: 10.1016/j.dsx.2015.04.007

[3] Bader MS. Diabetic Foot Infection. Am Fam Physician. 2008;78(1):71-79. [Cited 2024 Jan 28]; https://www.aafp.org/pubs/afp/issues/2008/0701/p71.html

[4] Gupta R, Murthy KS, Bhagavan KR, Moharana AK, Rodrigues M, Ts D. Antimicrobial properties of Theruptor 3D-hydrocellular wound dressing: An in vitro study. Int J Surg Open. 2022; 46:100528. doi: 10.1016/j.ijso.2022.100528

[5] Rodrigues M, Varthya S, Sunderasan V, et al. Efficacy, Safety, and Cost-Effectiveness of Healthium Theruptor Versus 3M Tegaderm Versus Plain Gauze Dressing for Wound Dressings Used in Abdominal and Joint Surgeries: A Prospective, Multicentric, Randomized Study. Cureus. 2024;16(2): e53947. doi:10.7759/cureus.53947

[6] Sampath J. Superficial Partial Thickness Burns Treated using Theruptor Novo, a Novel Antimicrobial Dressing: A Case Report. J Clin Diagn Res. Published online 2024. doi:10.7860/JCDR/2024/71052.19715

[7] Pavan B. Theruptor Novo dressing for an infected diabetic foot ulcer: a case study. Int J Sci Rep. 2023;9(12):406-408. doi:10.18203/issn.2454-2156.IntJSciRep20233532

[8] Pavan B. Theruptor novo: wound dressing for diabetic foot ulcer. Int Surg J. 2023;10(12):2010-2012. doi:10.18203/2349-2902.isj20233535

[9] Kale SM. Theruptor Novo, a novel wound dressing in the management of infected diabetic foot ulcer: two case reports. Int J Adv Med. 2024;11(1):43-46. doi:10.18203/2349-3933.ijam20233888

[10] Kale SM. A Case Report on Theruptor Novo: An Antimicrobial Dressing in the Management of Venous Leg Ulcer. J Clin Diagn Res. Published online 2024. doi:10.7860/JCDR/2024/71056.19814