Colloidal Silver Cream in Diabetic Foot Ulcer Management: A Case Report on Infection Control and Healing Outcomes

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INTRODUCTION

The increasing global demand for high-quality healthcare is driven by rising educational attainment, improved economic capacity, and expanding access to digital technologies (Vas & Chockalingam, 2023). These factors have raised public expectations for both private and public healthcare services, particularly in developing countries like Indonesia, where the demand for accessible and effective medical care continues to grow.

The International Diabetes Foundation estimates that 537 million adults aged 20 to 79 years worldwide were living with diabetes in 2021 (Magliono & Boyko, 2021) . In 2 019, Indonesia ranked as the seventh country with the highest number of people with diabetes globally (Oktoro et al.,2022). The rising prevalence of diabetes mellitus has been linked to increased morbidity and mortality rates, particularly in cases involving diabetic foot ulcers (DFU) (Stancu et al., 2022). Chronic wounds, affecting approximately 1–2% of the global population, represent a significant public health burden due to their prolonged healing times, high risk of complications, and increased healthcare costs (Soeatmadji et al., 2023) . Diabetic patients frequently suffer from foot related disorders such as gangrene, infections, and ulcerations. DFUs account for nearly 90% of the wounds treated at private nursing clinics in Indonesia (gitarja et al., 2018). However, advanced wound dressings provide substantial therapeutic advantages, including moisture regulation, antimicrobial properties, and accelerated healing (Sahputra et al., 2021).

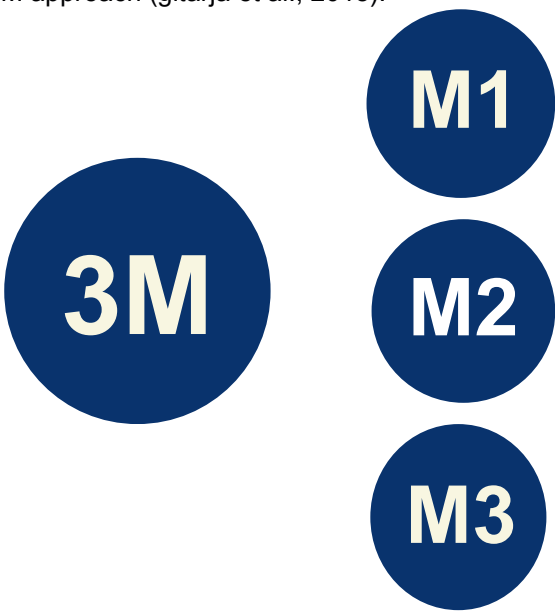
Wound care quality (QoC) is a multifaceted concept influenced by clinician expertise, evidence-based decision-making, and external systemic factors. In Indonesia, wound clinicians are critical in optimising patient outcomes by implementing appropriate wound management strategies, including advanced wound dressings. Key barriers include financial constraints, regulatory limitations, and unequal access to specialised wound care products, all of which can impact treatment efficacy (Falcone et al., 2021). This study evaluates the effectiveness of Colloidal Silver Cream in promoting wound healing by measuring reductions in wound size as well as changes in the WINNERS scale. Additionally, it investigates the efficacy of Colloidal Silver Cream in managing diabetic foot ulcer (DFU) infections by analysing reductions in the NERDS score and WIFI scale, which assess the classification of limb-threatening diabetic foot disease based on factors such as wound status, ischemia, and foot infection, along with tissue loss, ischemia, and infection.

CASE PRESENTATION

A 48-year-old woman with a 5-year history of diabetes and a post-Ray amputation of the second and fourth toes from a year ago presented to the Wound, Ostomy, and Continence Care Department at WOCARE Indonesia in Bogor with an infected diabetic foot ulcer. The wound developed six weeks earlier due to an abrasion from a callus on the plantar aspect of the left third toe. She was taking Glimepiride 2 mg daily. During the physical examination, the patient was alert and appeared well. Her vital signs were within normal limits; however, her blood sugar was 199 mg/dL. The Ankle-Brachial Pressure Index (ABPI) score was 0.9.

The wound is initially classified as unstageable due to the presence of 100% slough tissue covering the entire wound bed. Additionally, there is erythema and oedema in the wound area, as well as moderate serous exudate. The wound emits an odour detectable within a distance of less than one meter. Based on the NERDS score, the wound is classified as having a score of 4, which may

suggest the presence of local infection Sibbald et al.,2006). Wound assessment was carried out using the TIMES concept (Colwell et al., 2017). Initially, dressing changes were performed every other day, then every three to four days, and finally weekly. Wound management followed the 3M approach (gitarja et al., 2018).



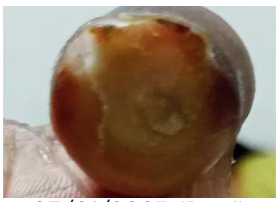
M1: **Step M1.** The wound was cleaned using 1 liter of wound wash solution and antibacterial soap. Afterward, it was dried with sterile gauze and treated with ozonation and infrared therapy for 15 minutes.

M2: M2. The slough was removed using autolytic and mechanical debridement techniques, specifically conservative sharp wound debridement (CSWD).

M3: **M2**. Using Colloidal Silver cream and alginate, an appropriate dressing was applied.

The secondary dressing consisted of sterile gauze, orthopaedic wool, and a crepe bandage. Wound progress was regularly monitored using the TIMES assessment and Winner scoring, while wound infection was evaluated with the NERDS instrument. On day 29, the primary dressing was changed to zinc cream– chitosan. The treatment regimen continued until complete wound healing was achieved.

WOUND PROGRESSION


07/01/2025 (Day1)
Size: 1.5x1,5 cm


09/01/2025 (Day 3)
Size: 1,8x1,8 cm


13/01/2025 (Day 7)
Size: 2x2 cm


27/01/2025 (Day21)
Size: 1.5x1,5 cm

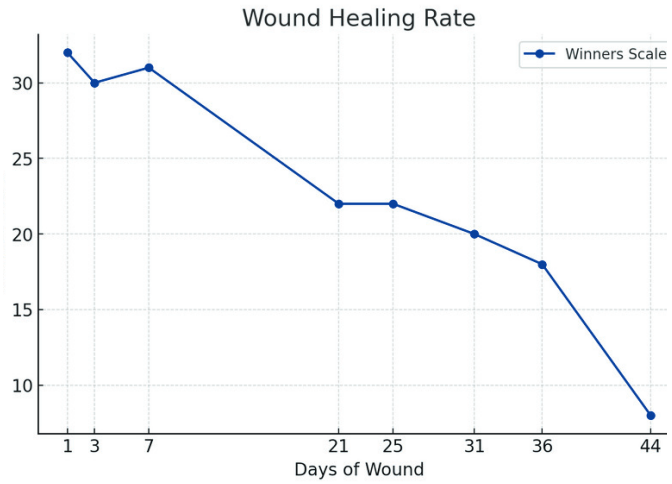

31/01/2025 (Day 25)
Size: 1x1,2 cm


06/02/2025 (Day 31)
Size: 0.5x1 cm


11/02/2025 (Size 36)
Size: 0.2x0,5 cm


19/02/2025 (Day 44)
Healing wound

Wound Healing Rate



DISCUSSION

Foot ulceration is a common and debilitating complication of diabetes, often resulting in leg amputation (Jeffcoate & Harding, 2003). Like this patient, she already had a history of ray amputation of the 2nd and 4th toes on the right foot one year ago and has now presented with a new ulcer on the 3rd right toe. Proper treatment is essential to prevent further amputation.

Chronic wounds, including leg ulcers and pressure ulcers, often heal slowly. One factor contributing to delayed healing is the presence of microorganisms in the wound (Dowsett, 2004). Based on the 2023 International Working Group on the Diabetic Foot (IWGDF) guidelines on the diagnosis and treatment of diabetes-related foot infections, this patient is classified as having a moderate DFU infection, evidenced by local swelling, pain, and erythema extending ≥2 cm from the wound margin (Senneville et al., 2004). Silver-based dressings are a common approach for treating and preventing bacterial colonisation (Dowsett, 2004).

Silver-based dressings are effective against various pathogens, including methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant Enterococci (VRE), and multiple yeasts, fungi, and viruses (Dowsett, 2004). Zinc is an ion with anti-inflammatory and antimicrobial properties. It has been demonstrated that zinc can also be used in diabetic wounds (Ahmed et al., 2018). Applying zinc directly to the skin is more effective than taking it orally because it helps prevent infections, removes dead tissue, boosts local defences, and promotes wound healing by steadily releasing zinc ions (Lansdown et al., 2007).

Thus, combining zinc cream and colloidal silver is an ideal primary dressing for managing infections related to diabetic foot ulcers. Fortunately, WOCARE Centre's innovative formulation of a single cream paste can effectively manage this condition. The primary objectives in chronic wound management are minimising wound size, eradicating infection, and ensuring effective pain control (Wound Care Manual Ministry Of Health Malaysia, 2023)

The findings of this study showed a significant reduction in wound size area by 77.7% within 31 days. This study showed that colloidal silver cream dressings significantly accelerated healing, as indicated by the absence of infection, the presence of granulation tissue, a reduction in wound size, and decreased pain (Frykberg & Banks, 2015). According to the Winners Scale, this patient's anticipated wound healing time is approximately seven weeks. However, this case exhibits a speedy healing rate, as evidenced by the reduction of the Winners Scale from 32 to 8 within 44 days (around six weeks), significantly surpassing expectations.

The efficacy of a zinc cream–colloidal silver formulation in managing local infections in diabetic foot ulcers can be evaluated by comparing the NERDS instrument and the WIFI scale before and after treatment. Initially, the patient's NERDS score was 4, indicating signs of infection, but it decreased to 1 by day 21 of treatment. According to the Wound, Ischemia, and Foot Infection (WIFI) classification system, which assesses the severity of diabetic foot complications, the patient's initial score of 3 suggested a 25% risk of significant amputation within one year and a moderate benefit from revascularization (Williams et al., 2022). After 21 days of treatment, the WIFI score significantly decreased from 3 to 1.

Although no similar studies on the colloidal silver cream formulation are available for comparison, the results align with findings from studies using single silver-based dressings to treat DFU infections, as reported by few studies (Tsang et al., 2017) , (Lazaro-Martinez etal.,2019), (Luo et al., 2022) and (Yi et al., 2025). However, this finding contradicts the study by (Lafontaine et al., 2023), which indicated that Acticoat silver dressings did not enhance wound healing compared to non-silver dressings.

CONCLUSION

This study demonstrated that the Colloidal Silver cream formulation facilitated rapid and effective wound healing. This was evidenced by a significant 77.7% reduction in wound size within 31 days of treatment and a decrease in the Winners Scale from 32 to 8 over 44 days (approximately six weeks). Additionally, the study indicated that this formulation was highly effective in treating DFU infections, as shown by a reduction in the NERDS score from 4 to 1 and the WIFI scale from 3 to 1.

IMPLICATIONS FOR CLINICAL PRACTICE

Therefore, it is advisable to use the colloidal silver cream formulation for treating DFU infections. Comparative studies, such as randomised controlled trials (RCTs), are necessary to further validate these observational findings.

ETHICAL CONSIDERATION

To obtain information regarding this case, written informed consent was secured from the patient. The copies of the patient's consent were available.

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