

Clinical Experience-Based Chronicle of the Use of Colloidal Nano Silver in Indian Patients with Wounds: A Multicentre Surveillance Study

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ABSTRACT

Background: Topical silver therapies and silver-based dressings are being used more frequently for localized wound care; however, the supporting evidence for their effectiveness remains unclear. Therefore, this study aimed to capture the clinical use, outcomes, and perceptions of healthcare professionals (HCPs) regarding colloidal nano silver in Indian patients with wounds.

Methods: This questionnaire-based study was designed to assess the use of colloidal nano silver in wounds within the Indian real-world settings. A questionnaire comprising 18 questions focusing on wound etiology, wound size, prior treatment history, clinical response to colloidal silver gel, pathogen identification, and treatment outcomes.

Results: A total 87 HCPs were enrolled in the study. According to 72.41% of HCPs, diabetic foot ulcer (DFU) was the most common etiology of wounds in patients treated with colloidal silver gel. About 54% of HCPs reported that >3 out of 10 patients had been previously treated with topical mupirocin dressings but had failed to heal. According to 55.17% of HCPs, >7 out of 10 patients treated with colloidal silver gel showed a 50% reduction in ulcer size by day 14. The majority of HCPs (33.33%) reported that 5 out of 10 patients treated with colloidal silver gel showed complete ulcer healing. About 67% of HCPs reported that patients with DFU had complete wound healing. *Staphylococcus aureus* (41.38%) was the most reported pathogens identified in patients with DFU.

Conclusion: This study demonstrates that colloidal nano silver gel is a safe, effective, and well-tolerated option for wound care, promoting faster healing and strong antimicrobial activity, especially in DFU.

Keywords: Colloidal nano silver, wound healing, diabetic foot ulcer, healthcare professionals

INTRODUCTION

The skin, the largest organ of the human body, plays a vital role in maintaining hydration, protecting against harmful

chemicals and pathogens, initiating vitamin D synthesis, enabling excretion, and regulating body temperature. Consequently, extensive skin damage can lead to serious,

potentially life-threatening complications [1]. Wound healing is a critical physiological process that ensures tissue repair and regeneration while minimizing the risk of infections and other related issues. This complex process involves a remarkable and highly coordinated sequence of cellular activities. In recent years, considerable attention has been directed toward developing sustainable and effective strategies to support and accelerate wound healing [2].

Wound infections are common complications in both acute and surgical wounds, with bacterial colonization and biofilm formation frequently observed in non-healing cases. As a result, effective wound healing often requires the use of antimicrobial therapies [3]. In this context, silver-based biomaterials, including silver nanoparticles, are increasingly being explored in both experimental studies and clinical trials for use as wound dressings [3]. Silver-based products offer an effective option for managing chronic wounds, infected wounds, and fresh wounds at risk of infection. Additionally, extensive superficial wounds typically respond well to non-occlusive dressings, and the application of silver-based gel formulations can provide added antimicrobial protection to support the healing process [4].

Given the growing interest in silver-based products for wound management, particularly in diverse clinical settings, there is a need to document real-world experiences with colloidal nano silver in the Indian patient population. This study aimed to capture the clinical use, outcomes, and perceptions of healthcare professionals (HCPs) regarding colloidal nano silver in Indian patients with wounds. By collecting data across multiple centers, this study provides valuable insights into its practical effectiveness, safety, and role in wound healing within routine clinical practice.

METHODS

Study design

This questionnaire-based study was designed to assess the use of colloidal nano silver in wounds within the Indian real-world settings. Participation in the study was completely voluntary. All study-related information, including the questionnaire, was thoroughly explained to participants and verbal consent was obtained before participation. The study process, along with the data analysis, ensured the confidentiality and anonymity of the HCPs.

Study questionnaire

The study questionnaire was designed based on existing literature, clinical guidelines, and expert opinions. It consisted of 18 questions focusing on wound etiology, wound size, prior treatment history, clinical response to colloidal silver gel, pathogen identification, and treatment outcomes. The questionnaire focused on the last 10 patients with wounds treated using colloidal nano silver gel. The study protocol was approved by the independent ethics committee (ACEAS-Independent Ethics Committee, Ahmedabad, Date of approval: 16 Nov 2024).

Data collection method

Participants in the study were provided with a concise overview of the study's nature and the process for completing the questionnaire. The questionnaire was given to the HCP either in person, via phone calls, or through online platforms, as per the HCP's convenience.

Data analysis

Responses to questions were entered into Microsoft excel. Descriptive analysis was performed and outcome was presented as percentages.

RESULTS

A total 87 HCPs were enrolled in the study. According to 72.41% of HCPs, diabetic foot ulcer (DFU) was the most common etiology of wounds in patients treated with colloidal

silver gel, followed by superficial wounds due to injuries (19.54%) and second degree burn wounds (8.05). The majority of HCPs (57.47%) reported that the wound size in patients treated with colloidal silver gel was greater than 4 cm, followed by 3-4 cm (36.78%) and less than 2 cm (5.75%). About 54% of HCPs reported that more than 3 out of 10 patients had been previously treated with topical mupirocin dressings but had failed to heal. Additionally, 19.54% of HCPs reported that 2 out of 10 patients, 14.94% reported 3 out of 10 patients, and 11.49% reported 1 out of 10 patients had received topical mupirocin treatment without successful healing (Table 1).

According to 55.17% of HCPs, more than 7 out of 10 patients treated with colloidal silver gel showed a 50% reduction in ulcer size by day 14. The majority of HCPs (33.33%) reported that 5 out of 10 patients treated with colloidal silver gel showed complete ulcer healing. The majority of HCPs (66.67%) reported that 5 out of 10 patients had DFU, while 33.33% reported that 6 out of 10 patients had DFU (Figure 1).

About 67% of HCPs reported that patients with DFU had complete wound healing. Around 71% of HCPs reported complete wound healing in patients with wounds of other etiology. The majority of HCPs (87.36%) performed culture of wound fluids

for identification of the pathogens implicated in causing infection. *Staphylococcus aureus* (41.38%) was the most reported pathogens identified in patients with DFU, followed by *Pseudomonas aeruginosa* (26.44%), and *Escherichia coli* (13.79%). *Staphylococcus aureus* (49.43%) was the most reported pathogens identified in patients with non-diabetic wound, followed by *Pseudomonas aeruginosa* (20.69%), and *Streptococcus pyogenes* (9.20%). Fast ulcer healing (54.02%) was the most reported benefits of colloidal silver gel in facilitating wound healing, followed by the fast reduction in ulcer size (27.59%), and strong antibacterial effect (18.39%). Prevention of bacterial biofilm formation (57.47%) was the most reported key attributes of colloidal silver gel that promote faster wound healing, followed potent antibacterial effect (26.44%), and potent antioxidant effect (16.09%). In observations with the saline wound dressings, the majority of HCP's (98.85%) reported that the last 10 patients treated with colloidal silver gel experienced faster wound healing. Faster ulcer healing (40.23%) was the most commonly reported reason for preferring colloidal silver gel over topic mupirocin, followed by faster ulcer size reduction (32.18%), and potent antibacterial effect even against pathogens resistant to mupirocin (20.69%) (Table 1).

Table 1: Response of HCPs on clinical use and benefits of colloidal silver gel in wound management

Options	Response of HCPs (N=87)
Etiology of wounds in patients treated with colloidal silver gel	
DFU	63 (72.41)
Superficial wounds due to injuries	17 (19.54)
Second degree burn wounds	7 (8.05)
Wound size in patients treated with colloidal silver gel	
Less than 2 cm	5 (5.75)
3-4 cm	32 (36.78)
Greater than 4 cm	50 (57.47)
Previous use of topical mupirocin and non-response cases	
1/10 patients	10 (11.49)
2/10 patients	17 (19.54)
3/10 patients	13 (14.94)
Greater than 3 /10 patients	47 (54.02)
Complete wound healing in patients with diabetic foot ulcers	58 (66.67)
Complete wound healing in patients with wounds of other etiology	62 (71.26)
Culture of wound fluids to identify the pathogens implicated in causing infection	76 (87.36)

Pathogens identified in diabetic foot ulcer	
<i>Staphylococcus aureus</i>	36 (41.38)
<i>Pseudomonas aeruginosa</i>	23 (26.44)
<i>Escherichia coli</i>	12 (13.79)
MRSA	9 (10.34)
<i>Streptococcus pyogenes</i>	5 (5.75)
MSSA	2 (2.30)
VRE	0
Pathogens identified in non-diabetic wounds	
<i>Staphylococcus aureus</i>	43 (49.43)
<i>Pseudomonas aeruginosa</i>	18 (20.69)
<i>Streptococcus pyogenes</i>	8 (9.20)
MRSA	7 (8.05)
<i>Escherichia coli</i>	7 (8.05)
MSSA	3 (3.45)
VRE	1 (1.15)
Key benefits of colloidal silver gel in facilitating wound healing	
Fast ulcer healing	47 (54.02)
Fast reduction in ulcer size	24 (27.59)
Strong antibacterial effect	16 (18.39)
Key attributes of colloidal silver gel that promote faster wound healing	
Prevention of bacterial biofilm formation	50 (57.47)
Potent antibacterial effect	23 (26.44)
Potent anti-oxidant effect	14 (16.09)
Wound healing with colloidal silver gel vs. saline dressing	86 (98.85)
Reasons for preferring colloidal silver gel over topical mupirocin	
Faster ulcer healing	35 (40.23)
Faster ulcer size reduction	28 (32.18)
Potent antibacterial effect even against pathogens resistant to mupirocin	18 (20.69)
Good patient adherence	4 (4.60)
Well tolerated	2 (2.30)
Data presented as n (%).	
DFU, diabetic foot ulcer; HCPs, healthcare professionals; MRSA, methicillin-resistant <i>staphylococcus aureus</i> ; MSSA, methicillin-susceptible <i>staphylococcus aureus</i> ; VRE, vancomycin-resistant enterococci.	

Figure 1: Extent of ulcer reduction and healing in patients treated with colloidal silver gel

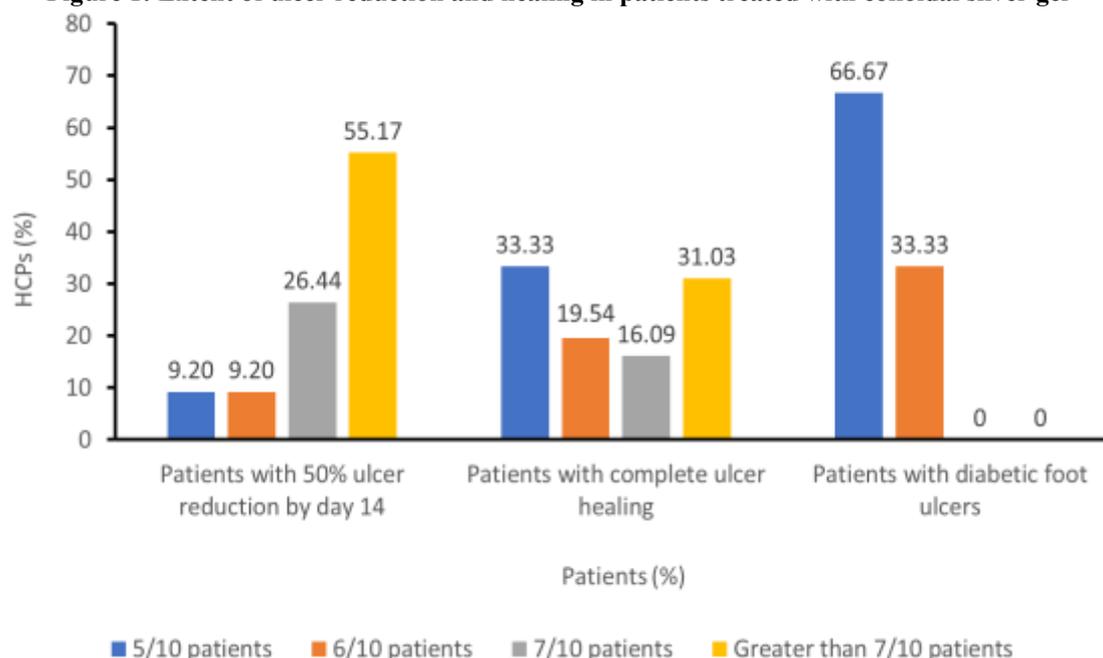
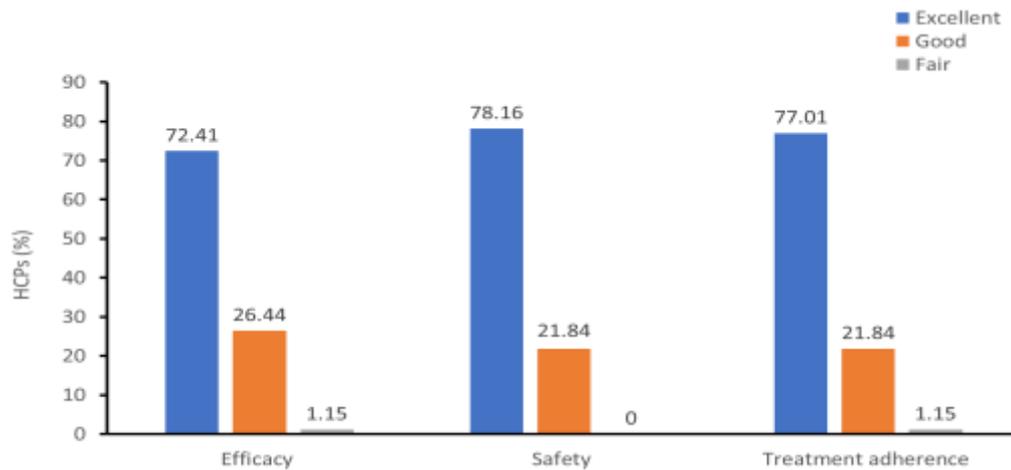


Figure 2: HCP ratings of efficacy, safety, and treatment adherence for colloidal silver gel in wound healing

HCPs, healthcare professionals.

The majority of HCPs rated the efficacy (98.85%), safety (100%), and treatment adherence (98.85%) of colloidal silver gel in wound healing as good to excellent (Figure 2).

DISCUSSION

An effective dressing is essential for smooth and uncomplicated wound healing, particularly in cases where the wound is contaminated with foreign particles. A wide range of dressing formulations is available, each varying in chemical composition and therapeutic effectiveness. Silver is a well-established agent known for its antimicrobial and wound-healing properties, and in recent years, there has been a notable rise in the use of silver-based dressings as supportive treatments [4]. Therefore, this multicenter observational study aimed to capture real-world clinical experience and perceptions of HCPs on the use of colloidal nano silver gel in wound care among Indian patients.

In the present study, the DFU was the most common wound type treated with colloidal silver gel, with 72.41% of HCPs identifying it as the primary etiology. This reflects the significant burden of DFU in clinical practice and highlights the need for effective wound care solutions in this population [5]. According to the majority of HCPs, the wound size in patients treated with colloidal

silver gel was greater than 4 cm. The average wound size was estimated to be 4.3 cm² using the length × width method and 3 cm² based on total area calculation, indicating that colloidal silver gel was commonly used in moderate to large wounds [6].

In the current study, the majority of HCPs reported that more than 3 out of 10 patients had been previously treated with topical mupirocin dressings but had failed to heal. This suggests a clinical gap in the efficacy of traditional topical agents and supports the transition toward advanced wound care products like colloidal silver gel [7]. In the present study, more than half of the patients treated with colloidal silver gel demonstrated a 50% reduction in ulcer size by day 14. This observation is consistent with findings from a previous study, which also reported greater ulcer area reduction in the colloidal silver group by day 14 [8]. In the present study, according to the majority of HCPs, patients treated with colloidal silver gel showed complete ulcer healing. This aligns with earlier findings that highlight the potential of colloidal silver to support wound healing through its anti-inflammatory effects and ability to stimulate tissue regeneration. The effectiveness of colloidal silver may be attributed to its nano-sized particles, which offer a larger surface area for sustained silver ion release.

Importantly, the release rate of these ions remains well below levels associated with systemic toxicity, enhancing both safety and therapeutic efficacy in wound management [8]. Among non-diabetic wound infection cases, *Staphylococcus aureus* was the most commonly isolated organism [9]. Consistent with previous studies, the present study reported similar findings. Silver-based dressings promote more rapid wound healing [8]. Similarly, in the present study, fast ulcer healing (54.02%) was the most reported benefits of colloidal silver gel in facilitating wound healing. The development of biofilms is a major factor contributing to the progression of chronic wounds [10]. In the present study, the prevention of bacterial biofilm formation was the most commonly reported attribute of colloidal silver gel, contributing to its effectiveness in promoting faster wound healing.

CONCLUSION

This study highlights the positive clinical experience and outcomes associated with the use of colloidal nano silver gel in wound management among Indian patients. Healthcare professionals reported high efficacy, safety, and treatment adherence, particularly in cases of DFU and wounds unresponsive to conventional treatments like mupirocin. The ability of colloidal nano silver gel to promote faster healing, reduce ulcer size, and prevent biofilm formation underscores its potential as an effective and reliable wound care option in real-world settings.

Declaration by Authors

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Conflict of Interest: All authors have no conflict of interest to declare.

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