



RESEARCH ARTICLE

A Prospective Interventional Study on the Clinical Effectiveness of Foam dressing with silver Versus Povidone–Iodine–Soaked Gauze in Patient Wound Management

Ekta Srivastava^{1*}, Pradeep Kumar Verma², Amit Gushaiwal³, Ajay Jangir⁴

ABSTRACT

Aim: To compare the clinical outcomes of Foam dressing with silver and Povidone–Iodine–Soaked Gauze dressing in wound management

Material and Method: A prospective randomized interventional study was conducted in Department of General Surgery at JLN Medical College and Hospital, Ajmer, from May 2024 to September 2025, involving 40 patients aged 15–70 years with open surgical or traumatic wounds. Participants were randomly assigned by lottery method to receive either Foam dressing with silver or povidone–iodine gauze dressing. Dressing was changed every third day for up to four weeks or until complete healing. The main outcomes include pain reduction, wound size reduction, exudate control, granulation tissue quality, and any adverse reactions. Group I (n=20): patients with wounds subjected to foam dressing containing silver application. Group II (n=20): patients with wounds subjected to Povidone iodine- soaked gauze application

Results: During dressing removal, mean VAS pain scores dropped by 41% (from 8.85 to 5.25) in the Foam dressing with silver group and by 24% (from 8.25 to 6.35) in the povidone–iodine group compared to the prestudy dressings. Similarly, pain scores at 2 weeks decreased by 88% (from 5.25 to 0.6) with Foam dressing with silver, and by 29% (from 6.35 to 4.55) with povidone–iodine gauze dressing.

Wound evaluation scores showed comparable baseline values between groups, but Foam dressing with silver achieved significantly greater improvement over time. By the fourth week, wounds treated with Foam dressing with silver achieved near-complete resolution, with an average score of 1.00 ± 0.00 , significantly lower than the Povidone-Iodine group's score of 1.40 ± 0.81 ($P < 0.05$)

The mean wound surface area was 174.71 cm^2 in the Foam dressing with silver group and 222.75 cm^2 in the Povidone-Iodine group, statistically insignificant ($P > 0.05$). However, over the 4-week period, progressive reductions in surface area were observed in both groups. By week 4, the mean surface area was reduced to 100.58 cm^2 in the Foam dressing with silver and 98.43 cm^2 in the Povidone-Iodine group, statistically non significant ($P > 0.05$). This shows almost similar wound contraction and epithelial coverage in both groups.

This study ensured demographic parity in age and gender, eliminating potential confounding factors. The mean age and gender distribution between groups were statistically insignificant ($P > 0.05$), supporting the reliability of the comparative outcomes. Randomized group assignment via lottery method also strengthened internal validity.

Conclusion: Clinically, Foam dressing with silver accelerates healing, reduces complications, and lessens healthcare burdens by minimizing dressing frequency. It integrates antimicrobial action, moisture regulation, debridement, and granulation support into one dressing, addressing multiple wound-healing factors.

Keywords: Foam dressing with silver, povidone–iodine gauze dressing, ulcer, painless dressing, silicon adhesive technology

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INTRODUCTION

A wound is defined as a disruption in the continuity of the skin, epithelium, or mucous membrane.[1] Wounds have a substantial impact on patients' health, social well-being, and overall quality of life. In countries like India, wound care strains healthcare resources and finances, causing pain, frequent hospital visits, disability, and income loss, as gauze dressings remain the common treatment.[2]

Gauze dressings, often used for open surgical wounds, can cause pain, tissue injury, and infection risk upon

removal due to trauma to new epithelium.[3,4] Their poor exudate absorption may lead to erythema and maceration. [3,5] Although povidone-iodine gauze offers antimicrobial benefits, it can cause irritation, dermatitis, burns and even ulceration.[6-10]

Advanced wound dressings have been developed to overcome the drawbacks of traditional gauze. Creating a moist healing environment enhances epithelialization, reduces pain, improves exudate management, and lowers infection risk. Foam dressings with silver comprises

¹Resident, Department of General Surgery, J.L.N. Medical College & Associated Group of Hospitals, Ajmer, Rajasthan, India

²Professor, Department of General Surgery, J.L.N. Medical College & Associated Group of Hospitals, Ajmer, Rajasthan, India

³Assistant Professor, Department of General Surgery, J.L.N. Medical College & Associated Group of Hospitals, Ajmer, Rajasthan, India

⁴Resident, Department of General Surgery, J.L.N. Medical College & Associated Group of Hospitals, Ajmer, Rajasthan, India

Corresponding Author: Ekta Srivastava, Resident, Department of General Surgery, J.L.N. Medical College & Associated Group of Hospitals, Ajmer, Rajasthan, India. Email: ekta.srivastavadr@gmail.com

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a wound contact layer, a flexible and absorbent grey polyurethane foam pad impregnated with silver sulphate and activated carbon, and an outer breathable yet waterproof film. absorb and trap exudate and bacteria, supporting moist healing[11-12]. They are comfortable, easy to use, and decrease dressing changes, potentially shortening hospital stays¹². It contains about 1.2% ionic silver, which provides long-lasting antimicrobial protection.

Silicone adhesive technology is intended to minimise patient discomfort and reduce trauma to both intact peri wound skin and the wound bed during dressing changes. Foam dressing with silver is highly conformable, enabling close contact with the wound surface, while effectively absorbing exudate and maintaining a moist environment conducive to wound healing.

The dressing contains silver sulphate at a concentration of Ag 1.2 mg/cm², which provides a sustained antimicrobial effect by forming an effective barrier against microbial penetration. In vitro studies have demonstrated that Foam dressing with silver is capable of inactivating a broad spectrum of wound-related pathogens, including bacteria and fungi.[13] By reducing the microbial load, the dressing may also contribute to the reduction of wound-associated odour. Furthermore, antimicrobial activity has been shown to persist for up to seven days under in vitro conditions.

AIM AND OBJECTIVES

To compare the clinical outcomes of Foam dressing containing silver and Povidone iodine soaked gauze dressing in the management of wounds, specifically in terms of pain reduction, wound size reduction, and trauma during dressing removal.

MATERIAL AND METHODS

This is a prospective randomized interventional study including 40 patients who presented with wounds to be managed at Department of General Surgery, JLN Medical College & Hospital, Ajmer during a period from June 2024 to September 2025. Patients were allocated in two groups by simple random sampling (Lottery Method).

Group I (n=20): patients with wounds subjected to foam dressing containing silver application.

Group II (n=20): patients with wounds subjected to Povidone iodine- soaked gauze application.

Inclusion Criteria

- Patients of both genders aged between 18 and 70 years presenting with open surgical wounds (dehiscenced wound, surgically reopened wounds, incised and drained abscess).
- All patients with acute or chronic open traumatic wounds were included in this study.
- Patients who are able and willing to provide informed consent and comply with study procedures

Exclusion Criteria

- Patients with known sensitivity to either study treatment material
- Patients with severe comorbidity (thyroid dysfunction, impaired renal function, diabetes mellitus)
- Unsuitable Wound Types like Necrotic wounds needing surgical debridement, dry wounds with little exudate, third-degree burns, or chemical burns.
- Pregnant or lactating women, critically ill or unstable patients

Study Parameters and Statistical Analysis

- Patients' age, gender, preoperative workup data, including laboratory investigations (white blood cells, blood urea, serum creatinine) wound size and type of granulation tissue.
- The severity of pain measured using visual analogue scale asking the patient to rate his/her pain at the time of removal of dressing (0= No pain; 5= Distressing pain, 10= Unbearable pain)



Fig. 1: Schematic illustration of measuring the width and length of a wound to calculate the surface area of the wound



Fig.2: Foam dressing containing Silver



Fig. 3: Method of Application of Foam Dressing with silver



Fig. 4: Illustration of patient's wound healing progression after foam dressing with silver: (a) Initial wound, (b) After 1 week, (c) After 2 weeks, (d) After 3 weeks, (e) After 4 weeks.



Fig 5: Illustration of patient's wound healing progression after Povidone Iodine dressing (a) Initial Wound, (b) After 2 week, (c) After 3 week, (d) After 4 week

- Ulcer size was measured at each of 4 visits and calculated systematically by multiplying the greatest width by length
- The wound evaluation score was assessed based on 3 wound parameters i.e. wound size, exudate and granulation tissue

DISCUSSION

This study aimed to compare the outcomes of Foam dressing with silver and povidone iodine soaked gauze dressings in the management of open surgical and traumatic wounds. Foam dressing with silver dressings demonstrated greater

Table 1: Distribution of study groups as per age

Age group (years)	Group		Total
	Foam dressing with silver	Povidone iodine soaked gauge dressing	
≤50	10	8	18
	50%	40%	45%
>50	10	12	22
	50%	60%	55%
Total	20	20	40
	100%	100%	100%
Age (years)	49.62 ± 16.21	45.57 ± 18.09	

p-value > 0.05

Table 2: Distribution as per gender

Gender	Group		Total
	Foam dressing with silver	Povidone iodine soaked gauge dressing	
Female	7	9	16
	35%	45%	40%
Male	13	11	24
	65%	55%	60%
Total	20	20	40
	100%	100%	100%

Table 3: Evaluation of Pain on Visual Analogue Scale

Wound evaluation score	Group	Mean	Sd	p-value
Pre dressing	Foam dressing with silver	8.85	1.34	<i>p</i> -value = 0.17
	Povidone iodine soaked gauge dressing	8.25	1.40	
First dressing	Foam dressing with silver	5.25	±2.76	<i>p</i> -value = 0.13
	Povidone iodine soaked gauge dressing	6.35	±1.59	
Second dressing	Foam dressing with silver	2	±1.68	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	5.3	±1.65	
Week 2	Foam dressing with silver	0.6	±0.99	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	4.55	±1.84	
Week 4	Foam dressing with silver	0	± 0	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	3.55	±1.7	

Table 4: Wound Evaluation Score

Wound evaluation score (%)	Group	Mean	Sd	p-value
Pre dressing	Foam dressing with silver	2.53	1.65	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	2.5	1.6	
First dressing	Foam dressing with silver	2.1	1.6	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	2.37	1.47	
Second dressing	Foam dressing with silver	1.53	0.89	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	2.17	1.34	
Week 2	Foam dressing with silver	1.13	0.51	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	1.6	1.04	
Week 4	Foam dressing with silver	1	0	<i>p</i> -value < 0.05
	Povidone iodine soaked gauge dressing	1.4	0.81	

effectiveness than povidone–iodine gauze in reducing wound pain, enhancing patient comfort, minimizing trauma during dressing removal, controlling exudate, and providing ease of application.

During dressing removal, the mean VAS pain scores decreased by 41% (from 8.85 to 5.25) in the Foam dressing with silver group, whereas a 24% reduction (from 8.25 to 6.35) was observed in the Povidone iodine group compared

Table 5: Evaluation of Wound Surface Area

Wound surface area(cm ²)	Group	Mean	Sd	p-value
Initially	Foam dressing with silver	174.71	±200.01	p-value = 0.42
	Povidone iodine soaked gauze dressing	222.75	± 177	
First dressing	Foam dressing with silver	164.45	±197.79	p-value = 0.55
	Povidone iodine soaked gauze dressing	197.25	±146.11	
Second dressing	Foam dressing with silver	154.09	±195.3	p-value = 0.87
	Povidone iodine soaked gauze dressing	162.13	±124.6	
Week 2	Foam dressing with silver	133.03	±181	p-value = 0.97
	Povidone iodine soaked gauze dressing	134.25	±105.96	
Week 4	Foam dressing with silver	100.58	±155	p-value = 0.95
	Povidone iodine soaked gauze dressing	98.43	±79.9	

with the prestudy dressings. Likewise, after two weeks, pain scores in the Foam dressing with silver group showed a substantial 88% reduction (from 5.25 to 0.6), while the povidone–iodine gauze group demonstrated a 29% decrease (from 6.35 to 4.55).

In a prospective study, Senet et al. (2007)[14] evaluated the use of Foam dressing with silver in patients with chronic leg ulcers and reported positive outcomes, including reduced pain, decreased wound size and slough, and improved wound healing. Baseline wound evaluation scores were similar between the groups; however, the Foam dressing with silver group showed significantly greater improvement over time. By the fourth week, wounds treated with Foam dressing with silver showed near-complete healing, with an average score of 1.00 ± 0.00, which was significantly lower than the 1.40 ± 0.81 score observed in the povidone–iodine group (P < 0.05). These findings are supported by clinical evidence demonstrating the effectiveness and safety of silver-containing foam dressings in promoting healing of chronic wounds.[15]

The mean wound surface area was 174.71 cm² in the Foam dressing with silver group and 222.75cm² in the Povidone-Iodine group, statistically insignificant (P > 0.05). However, over the 4-week period, progressive reductions in surface area were observed in both groups. By week 4, the mean surface area was reduced to 100.58cm² in the Foam dressing with silver and 98.43cm² in the Povidone-Iodine group, statistically non significant (P > 0.05). This shows almost similar wound contraction and epithelial coverage in both groups.

In a prospective non-comparative study, McCarty et al. (2013).[16] evaluated Mepilex Border Ag in 299 wounds (215 chronic and 84 acute) with a median treatment

duration of 22 days. The study assessed signs of localized infection, periwound skin condition, pain severity using the VAS scale, wound size, and overall dressing performance. Results showed a progressive reduction in infection signs, improvement in periwound skin condition, and significant reduction in pain during and after dressing removal as well as during wear (p < 0.0001). Wound surface area and depth also decreased significantly by 28.5% and 35% respectively (p < 0.05). Overall, 55.8% of investigators rated the performance of Mepilex Border Ag as “very good” and 34.4% as “good.”

This study ensured demographic parity in age and gender, eliminating potential confounding factors. The mean age and gender distribution between groups were statistically insignificant (P > 0.05), supporting the reliability of the comparative outcomes. Randomized group assignment via lottery method also strengthened internal validity.

CONCLUSION

This study demonstrates that Foam dressing with silver is notably more effective than Povidone-Iodine for managing acute and chronic wounds. It provides better pain management, greater wound surface area reduction, and improved healing scores within four weeks, attributed to its sustained ionic silver release and superior exudate absorption. Conversely, Povidone-Iodine, while useful as a short-term antiseptic, lacks prolonged antimicrobial and wound-modulating effects, increasing cytotoxicity risk and necessitating frequent dressing changes.

Clinically, Foam dressing with silver accelerates healing, reduces complications, and lessens healthcare burdens by minimizing dressing frequency. It integrates antimicrobial action, moisture regulation, debridement, and

granulation support into one dressing, addressing multiple wound-healing factors.

Consequently, it should be prioritized as a first-line treatment for chronic wounds. Its use aligns with evidence-based, patient-centered wound care practices.

Future research should confirm these findings through long-term, multicenter studies and evaluate cost-effectiveness and patient satisfaction

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