

**ORIGINAL RESEARCH**

# Efficacy of silver stream and povidine iodine in diabetic ulcer

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**ABSTRACT**

**Background:** Diabetic foot ulcers affect approximately 15% of diabetic people worldwide. The present study was conducted to compare the efficacy of silver stream vs povidine iodine in patients with diabetic ulcers. **Materials & Methods:** 60 diabetic patients with chronic ulcers of both genders were divided into 2 groups. Group I patient received dressing of silver stream. In group II, patients' received povidine-iodine. Decrease in ulcer size at end of 2 weeks, 4 weeks, 6 weeks, 8 weeks of treatment or till complete healing, number of ulcers showing complete or partial responsiveness, number of patients in both group in which ulcer persisted till 8 weeks.

**Results:** Group I had 17 males and 13 females and group II had 18 males and 12 females. The difference was non-significant ( $P > 0.05$ ). % reduction of size of diabetic ulcer was 87% in group I and 35% in group II. The difference was significant ( $P < 0.05$ ). Complete response was seen in 24 in group I and 15 in group II, partial in 6 in group I and 10 in group II and no response in 5 in group II. The difference was significant ( $P < 0.05$ ). **Conclusion:** Silver-based dressing had better results in comparison to povidine-iodine dressing in the management of diabetic foot ulcer.

**Key words:** diabetic foot, povidine-iodine, silver stream

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**INTRODUCTION**

Diabetic foot ulcers constitute a devastating part of course of illness and influence morbidity, mortality and quality of life.<sup>1</sup> Diabetic foot ulcers affect approximately 15% of diabetic people worldwide. Important factors contributing to causation of diabetic ulcers include loss of glycemic control, peripheral neuropathy, peripheral vascular disease and immunosuppression.<sup>2</sup>

Inflammation is body's natural response to any injury and plays crucial role in healing process. Bacterial infection leads to excessively prolonged inflammation, biofilm formation, abnormal remodelling, and delayed healing. So acute injuries become chronic wounds because of infection.<sup>3</sup>

Wound dressings are an important aspect of diabetic foot ulcer treatment. Dressings should, in principle, relieve symptoms, protect wounds, and promote healing. There is no single dressing that can meet all the needs of a diabetic patient with an infected foot ulcer. Germicides have been favored during the wound dressing in diabetic ulcers including povidine-iodine, silver stream, hydrogen peroxide, benzalkonium

chloride, pilohexanide and so forth.<sup>4</sup> Popularly, povidine-iodine is a widely used antiseptic in patients with foot ulcers, whereas silver stream dressing have also been utilized for the management of diabetic ulcers, but there is absence of controlled trails comparing their efficacy in healing of diabetic ulcers.<sup>5</sup> The present study was conducted to compare the efficacy of silver stream vs povidine iodine in patients with diabetic ulcers.

**MATERIALS & METHODS**

The present study comprised of 60 diabetic patients with chronic ulcers of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. A detailed history, clinical features were recorded. Surgical debridement of the wounds was done. After debridement, group I patient received dressing of silver stream. Dressing was changed every 48 hrs. At every 14 days ulcer was evaluated for signs of healing like decrease in size, decrease in inflammation, formation of granulation tissue and degree of epithelisation. In group II patients' ulcer

dressings was done at 48 hours interval with povidine-iodine and ulcers were evaluated. Decrease in ulcer size at end of 2 weeks, 4 weeks, 6 weeks, 8 weeks of treatment or till complete healing, number of ulcers showing complete or partial responsiveness,

number of patients in both groups which ulcer persisted till 8 weeks. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I: Distribution of patients**

Gender	Group I (30)	Group II (30)	P value
Males	17	18	0.91
Females	13	12	

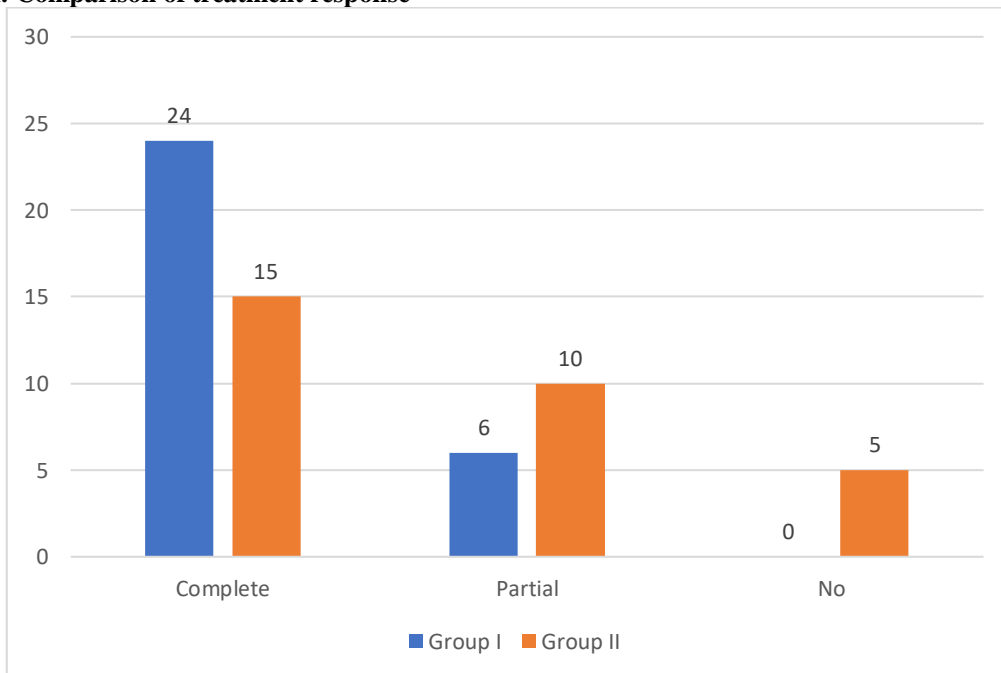
Table I shows that group I had 17 males and 13 females and group II had 18 males and 12 females. The difference was non-significant (P > 0.05).

**Table II: Percentage reduction in diabetic foot ulcer size**

Groups	Group I	Group II	P value
Pre-treatment	40.2	40.6	0.92
8 weeks	3.8	12.4	0.02
% reduction	87%	35%	0.01

Table II shows that % reduction of size of diabetic ulcer was 87% in group I and 35% in group II. The difference was significant (P < 0.05).

**Graph I: Comparison of treatment response**



Graph I shows that complete response was seen in 24 in group I and 15 in group II, partial in 6 in group I and 10 in group II and no response in 5 in group II. The difference was significant (P < 0.05).

**DISCUSSION**

Diabetic ulcers influence morbidity, mortality and quality of life in diabetic patients. Ulcers usually get colonized by microbes. Such microbial colonization may be non-consequential, or sometimes aids in healing.<sup>6</sup> However, contamination of ulcers with pathogenic organisms causes sepsis that in turn disturbs the healing process. The overall impact of bacterial colonization of ulcer is determined by

complex interaction of numerous microbial, host and environmental factors.<sup>7</sup>

Loss of glycemic control, peripheral neuropathy, peripheral vascular disease, and immunosuppression all contribute to diabetic foot ulcers, which are a devastating part of the course of illness.<sup>8</sup> Diabetic foot ulcers affect approximately 15% of diabetic people worldwide. Inflammation is body's natural response to any injury and plays crucial role in healing process.<sup>9</sup> Bacterial infection leads to excessively prolonged inflammation, biofilm formation, abnormal remodeling, and delayed healing. So acute injuries become chronic wounds because of infection. Presence of biofilm enables pathogens to survive attack of host defensive mechanism. Their

responsiveness to antimicrobials also decreases.<sup>10</sup>The present study was conducted to compare the efficacy of silver stream vs povidine iodine in patients with diabetic ulcers.

We found that group I had 17 males and 13 females and group II had 18 males and 12 females. Kumar et al<sup>11</sup> 100 diabetic ulcer patients randomly divided into 2 groups A and B of 50 each, received ulcer dressing with silver stream solution or povidone iodine respectively every 48 hourly. Ulcer size and healing was evaluated at 2 weeks intervals for 8 weeks or till ulcer healed. Patients of both groups were comparable in their age/sex distribution, duration, control of diabetes and pre-treatment mean ulcer size. At end of 8 weeks, percentage reduction in mean ulcer size was much more in group A (89.51%) than in group B (33%). All patients treated with silver stream responded, though response was partial in (10%). Patients having poor glycemic control. In contrast only 46% showed complete response to povidone iodine, 42% had partial response and 12% did not responded.

We found that % reduction of size of diabetic ulcer was 87% in group I and 35% in group II. Sharma et al<sup>12</sup> compared the outcome of silver colloidal based dressing in comparison to conventional dressing in management of diabetic foot ulcers. Out of 25 patients, 13 were randomized to silver colloid group and 12 in conventional dressing group. Age and sex distribution was comparable among two groups. Total 29 ulcers were present in silver colloidal and conventional dressing group. Mean wound area in silver colloidal dressing group and conventional dressing group on admission was 36.8 and 20.46 cm<sup>2</sup> respectively. After 12 weeks of dressing mean wound area in silver colloidal dressing group and conventional dressing group decreased by 31.52 (85.65%) and 14.04 (68.62%) and after 12-week complete healing was seen in 11 (84.62%) patients in silver colloidal dressing group and 5 (41.67) patients in conventional dressing group.

We found that complete response was seen in 24 in group I and 15 in group II, partial in 6 in group I and 10 in group II and no response in 5 in group II. Sibald et al<sup>13</sup> included nine patients with foot ulcers, six patients with venous stasis ulcers, two patients with pressure ulcers, and 12 patients with miscellaneous wounds. All wounds were assessed for the usual signs of clinical infection, with most of these parameters being measured and recorded. Microbiologically, bacterial load was determined via quantitative biopsies and semi-quantitative swabs. In general, the results showed a marked clinical improvement for the majority of wounds treated with the dressing. Among improved parameters included decreased exudate and decreased purulence. The quantitative bacterial biopsies did not show any decrease in organism numbers, although the semi-quantitative swabs indicated a decrease in the wound surface bacterial loading. This was indicative of the dressing's ability to

reduce surface bacteria and achieve an element of bacterial balance in the superficial dermal compartment. The proposed mechanism of action for this ionized nanocrystalline based dressing is through bacterial and moisture balance within the superficial wound space compartment.

## CONCLUSION

Author found that the silver-based dressing had better results in comparison to povidone- iodine dressing in the management of diabetic foot ulcer.

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