

## Original article

# Efficacy of superoxidised solution versus povidone iodine in the management of lower limb ulcers

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### Abstract:

**Background :** Wounds and their management are fundamental in the practice of surgery. Super oxidised solution is new concept in wound management, it is an electrochemically processed aqueous solution with neutral pH. Very few studies conducted to compare the efficacy of superoxidised solution and povidone iodine. Hence, this study is conducted as wounds are a great burden on the Healthcare system.

**Objectives:** To Compare the Efficacy of Superoxidised solution versus Povidone Iodine in the Management of Lower Limb Ulcers and to observe Wound disinfection, Decrease in wound size, Appearance of Granulation tissue and duration of Hospital stay in both groups.

**Material and methods:** Prospective study of patients with lower limb ulcers admitted at our hospital, satisfying the inclusion criteria, randomized into 2 groups for SOS and PI with 100 patients in each group. Wound assessments done at regular intervals and various wound outcome variables compared. Statistical analysis of data done using chi square test, independent t test, 1-way Anova, post hoc bonferroni correction and Pearsons correlation.

**Results:** In a study of 200 patients, most patients were in the age group of 51- 60years, 61.5% were diabetics and 75.5% were males. Superoxidised solution, has faster response in wound healing and gives better efficacy as compared to the traditional Povidone Iodine solution for use in wound care in management of lower limb ulcers.

### Introduction:

Povidone iodine is the most commonly used topical wound care product in practice and has been efficiently used over the years in the treatment of lower limb ulcers and other wounds.

Lower limb ulcers are a very common sight in any surgical ward and the scarcity of epidemiological studies on the incidence of leg ulceration probably reflects a general lack of interest in a chronic, nonfatal condition which mainly affects the elderly.<sup>1</sup> Their origin is multifactorial and hence proper diagnosis of arterial, venous and neuropathic ulcers is essential if further compromise of the lower limb is to be avoided. Ulcers may appear similar, but upon closer inspection it becomes apparent that they are completely different entities. Not only are lower limb ulcers of different etiologies but also ulcers have specific anatomic locations which by itself gives rise to special problems in their management. During the past 3 decades, considerable knowledge has been gained regarding physiology, anatomy, pathology and management of lower limb ulcers. Also, with the advent of new and precise diagnostic techniques like duplex scanning, angiographic and venographic studies and modern surgical techniques, there is a resurgence of interest in lower limb ulcer management. Various treatment modalities have been discovered over the years in forms of different types of wound dressings - creams, ointments, solutions. Other classes of wound dressings are occlusive dressing, nonocclusive dressing, absorptive dressing, skin substitutes, and negative suction vacuum dressing.<sup>2</sup>

**Material and methods:**

Patients with Lower Limb Ulcers admitted at KIMSH&RC General Surgery Dept. were screened and selected for this study. 200 patients were randomised into 2 groups with 100 patients in each group, Group A being Superoxidised Solution (SOS) and Group B being Povidone Iodine (PI).

Inclusion Criteria: 1. Age: >18 years 2. Traumatic Ulcers 3. Diabetic Ulcers 4. Acute Ulcers .

The cases were taken up for study on admission and after obtaining written consent.

Randomization was done using minimization procedure. This was done using a software program called minim developed by Stephan Evans. Age in years with two categories (50 years), Diabetes Mellitus (DM) with categories (present/ absent), sex with two categories (male/female) and wound size with two categories (15cms), and Grading of Ulcer (Grade 1 to 4) was factored and weighed into the minimization program.

Method of Data Collection:

The included patients were subjected to: 1. Detailed clinical history 2. General Physical examination and local ulcer examination. 3. Investigations .

Various Assessment Tools were used to compare wound healing between SOS and PI groups based.

**Results:**

There was no significant change in wound size between Group A (SOS) and Group B (PI) groups at day 1-9 ( $t=0.96$ ,  $p=0.35$ ) and day 1-12 ( $t=1.85$ ,  $p=0.09$ ) but significance was seen with greater decrease in wound size at day 21 in Group A (SOS) compared to Group B (PI) ( $t=10.87$ ,  $p<0.001$ ). (Table 6)

Table 1: Appearance of Granulation Tissue

Group		Appearance of Granulation tissue (days)
Group A (SOS)	Mean $\pm$ SD	4.78*** $\pm$ 1.60
	N	100
Group B (PI)	Mean $\pm$ SD	6.79 $\pm$ 2.06
	N	100

\*\*\* $P<0.001$  between groups using independent samples t test

Table 2: Appearance of Epithelialization

Group		Appearance of Epithelialization (days)
Group A (SOS)	Mean $\pm$ SD	8.04*** $\pm$ 2.03
	N	100
Group B (PI)	Mean $\pm$ SD	11.87 $\pm$ 2.48
	N	100

\*\*\* $P<0.001$  between groups using independent samples t test

Table 3: Wound Disinfection

Group		Day of Wound Disinfection (days)
Group A (SOS)	Mean ± SD	8.52*** ± 2.57
	N	100
Group B (PI)	Mean ± SD	12.33± 3.12
	N	100

\*\*\*P<0.001 between groups using independent samples t test

**Discussion:**

In the present study, the effect of superoxidised solution versus povidone iodine in the management of lower limb ulcers in a group of 100 patients each was studied. The mean age of patients in the study was 56.52±13.6 years, 75% of patients were male. 61.5% of patients were diabetic and 11% of patients had traumatic etiology. Various wound outcome variables were compared between both groups. The average reduction in wound size from day 1 to day 21 was statistically significant, with the Superoxidised solution group showing more rapid reduction in wound size compared to Povidone Iodine group. There was a 35% average reduction in wound size in GroupA (SOS) as compared to 20% in Group B (PI) at Day 21.<sup>3,4</sup>

In the Group A(SOS),there was earlier appearance of granulation tissue (4.78 ± 1.6 days) as compared to Group B (PI) (6.79±2.06days).

In the present study, the effect of superoxidised solution versus povidone iodine in the management of lower limb ulcers in a group of 100 patients each was studied. The mean age of patients in the study was 56.52±13.6 years, 75% of patients were male. 61.5% of patients were diabetic and 11% of patients had traumatic etiology. Various wound outcome variables were compared between both groups. The average reduction in wound size from day 1 to day 21 was statistically significant, with the Superoxidised solution group showing more rapid reduction in wound size compared to Povidone Iodine group. There was a 35% average reduction in wound size in GroupA (SOS) as compared to 20% in Group B (PI) at Day 21.

Ashok Anand<sup>5</sup>, compared efficacy of SOS versus PI in post Csection wounds, showed that 88% had granulation by day 5 in SOS group compared to 80% in PI group and by day 10 there was granulation in all patients. By day 5, 4% in SOS group had erythema at surgical wound compared to 12% in PI group. The results are similar in our study although done on lower limb ulcers. In Group A (SOS) the average duration for wound disinfection was  $8.52 \pm 2.5$  days compared to  $12.3 \pm 3.1$  days. In a study conducted by Chittoria RK et al for role of SOS in the management of diabetic foot ulcers in Andhra Pradesh on 20 patients, 19 out of 20 cases were negative for infection after 5 days.<sup>6,7</sup>

#### **Conclusion:**

This study confirms that Superoxidised solution with its moistening effects and cost effectiveness is safe, has faster response in wound healing and gives better efficacy as compared to the traditional Povidone Iodine solution for use as a topical/irrigant solution in wound care in management of lower limb ulcers. Hence it is a good choice for management of lower limb ulcers.

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