

# Effectiveness of silver dressings in treatment of diabetic ulcer

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## Abstract

**Background and objective:** With the increase in the life expectancy, the incidence of diabetic ulcers is inevitable. In this study we compare the efficacy of topical silver preparation with conventional wound dressing in healing of diabetic ulcers, in terms of days required for healing, rate of granulation tissue formation, quality of graft bed, graft uptake, effect on bacterial growth and side effects of silver preparations. **Method:** 58 patients with diabetic ulcers were selected by purposive sampling technique in Father Muller Medical College and Hospital between August 2012 to September 2014. Data related to the objectives of the study were collected. **Result:** this study has shown better granulation tissue formation, graft uptake, negative bacterial growth and decreased hospital stay in patients receiving silver dressings than patients receiving conventional dressings. **Conclusion:** The study concludes that silver preparations are better than conventional preparation. They are also cheap, readily available and easy to use alternative with no side effect.

**Keywords:** Diabetic ulcer, Silver dressing, Conventional dressings.

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## INTRODUCTION

Wound healing is a complex biological process influenced by several agents, which promote granulation tissue regeneration and contribute towards wound healing. Chronic skin wounds affect approximately 3% of persons elderly and are usually related to neuropathy (eg, diabetic foot or pressure ulcers), vasculopathy (venous stasis or arterial insufficiency ulcers), or trauma. Patients with diabetic ulcers are frequently treated with either systemic or topical antimicrobial therapy. Various studies done have shown that even if the infection remains confined to superficial tissues, not only does it delay wound healing, cause exudation and malodor but in due course of time progresses to involve deeper tissues and may be a potential for systemic infection. Topical therapy

affords many potential advantages like avoidance of systemic adverse effects of the drug. The most simple of all therapeutic procedures which uses the topical antimicrobials is the treatment of cutaneous infection with topical medication. Hence we have decided to study the role of topical silver dressing in healing of Diabetic ulcers.<sup>1</sup> The topical antimicrobial agent silver has been used for hundreds of years in wound care<sup>1</sup> but its use was cumbersome as the silver available for dressings was difficult to apply. Recently of a wide range of wound dressings that contain elemental silver or a silver-releasing compound have been developed which are easier to apply, provide sustained availability of silver, need less frequent dressing changes have overcome some of the problems associated with the first silver preparations<sup>2</sup>. Silver dressings maintain a moist wound environment and help in facilitation of autolytic debridement<sup>3</sup>.

### Diabetic foot ulcer<sup>7,8,9,10</sup>

It is estimated that in all diabetic 15% of them develop chronic ulcer, and about 25% of those progress to need an amputation. In diabetic ulcers although vascular and neurological impairment is the main reason for reduced healing, recent studies have shown wound healing is impaired in part due to deficiency of growth factors. The treatment of diabetic ulcers requires frequent

debridement, moist wound care, treatment of infection, and revascularization of ischemic limb if necessary. Silver ions are highly reactive and affect multiple sites within bacterial cells, ultimately causing bacterial cell death by binding to the bacterial cell membranes and causing disruption of the bacterial cell wall and cell leakage, they also interfere with energy production, enzyme function and cell replication and thus are active against a broad range of bacteria, fungi and viruses.<sup>4,5</sup>

**OBJECTIVES OF STUDY**

- To study the efficacy and advantages of topical application silver in diabetic ulcer.
- Comparison between topical silver preparations and conventional dressings in management of diabetic ulcer.

**MATERIALS AND METHODS**

**Source of Data**

Patients in Father Muller Medical College Hospital, Mangalore admitted with diabetic ulcers between august 2012 and September 2014.

**Method of Collection of Data**

**Study type:**

Prospective study The study was done on 58 patients who presented with diabetic ulcers at Father Muller hospital with purposive sampling technique. A complete detailed history and physical evaluation, relevant blood investigations, radiological investigations were done.

**Data Collection:**

Age of the patient, Symptoms and their duration, Past history, Complete physical examination, laboratory investigations (including specific investigations like Pus cultures was done at regular intervals), Radiological investigations wherever necessary was done and treatment also given.

**Inclusion Criteria:** All patients above 20 yrs who were diagnosed to have diabetic ulcers were included.

**Exclusion Criteria:** Malignant ulcers, X-rays showing features of osteomyelitis, Other clinically significant medical conditions that would impair wound healing including renal .hepatic, hematological, neurological and immunological diseases, Patients receiving corticosteroids, immunosuppressive agents, radiation, or chemotherapy within one month prior to entry into study were also excluded.

**Plan for Data - Analysis**

Collected data will be analyzed by ANOVA for repeated measures and Chi - Square test.

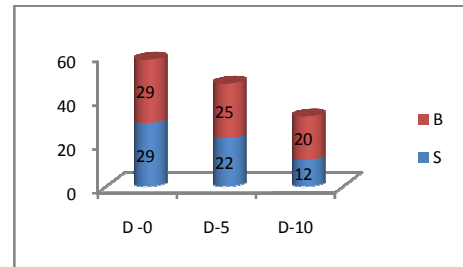
**RESULTS**

In our study 58 patients were chosen and further divided into a study group consisting of 29 patients who were designated to receive the silver dressings and a control

group consisting of 29 patients who were designated to receive the conventional dressings after elimination of all statistically significant bias.

**Table 1: Discharge (purulent)**

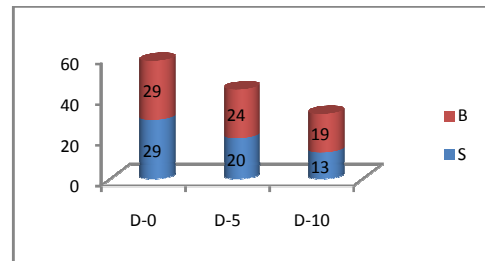
Discharge	Silver	Betadine
Day 0	29	29
Day 5	22	25
Day 10	12	20



As we can see in our study the amount of discharge is decreased more in case of silver dressings as compared to conventional dressings.

**Table 2: Slough**

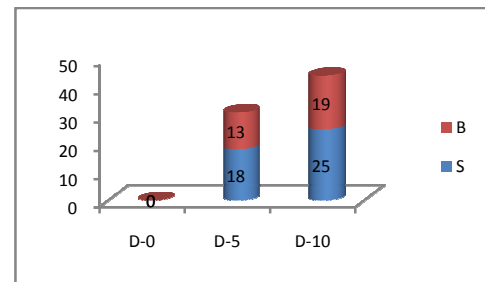
Slough	Silver	Betadine
Day 0	29	29
Day 5	20	24
Day 10	13	19



As we can see in our study the quantity of slough is decreased more in case of silver dressings as compared to conventional dressings.

**Table 3: Granulation tissue**

Granulation tissue	Silver	Betadine
Day 0	0	0
Day 5	18	13
Day 10	25	19



As we can see in our study that granulation tissue formation is more in case of silver dressings as compared to conventional dressings.

## DISCUSSION

This study has shown better granulation tissue formation, reduced slough formation, decreased purulent discharge, better graft uptake, and negative bacterial growth and decreased hospital stay in patients receiving silver dressings than patients receiving conventional dressings which is in comparison with Sergensen. B et al,<sup>6</sup> conducted an open label multicentre randomised controlled study in which they evaluated silver releasing alginates foam dressings with foam dressings in critically colonised chronic ulcers and found that silver releasing alginate foam dressings reduced ulcer area significantly, fewer leakages and lesser maceration was seen. In another study by Eun<sup>7</sup> and colleagues demonstrated that silver nanoparticles had a broad-spectrum antimicrobial activity and could also be used as a topical agent applied to cervical tissues or to mucous membrane.

## CONCLUSION

The study concludes that silver preparations are better than conventional preparation. They are also cheap, readily available and easy to use alternative with no side effect.

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