Role of Four Layer Compression Dressings in Management of Chronic Venous Ulcers

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Introduction

Nonhealing venous ulcers are one of the most common forms of lower extremity ulcers in the present population. It is cumbersome to treat and is associated with high-morbidity and immense treatment expenses. The current treatments include compression therapy. Four-layer compression dressings have proven to be an effective treatment for venous ulcers.

Objective

This study aimed to evaluate the efficacy of four-layer compression dressings and to study the rate of healing and duration of treatment with four-layer compression dressings.

Materials and Methods

A prospective randomized study conducted at MS Ramaiah Medical college which included 70 patients who completed the course of weekly dressings depending on the size of ulcer. The regular four-layer dressings were done by a trained podiatrist in vascular outpatient department (OPD) once a week. The area of the ulcer was calculated using the modified Gilmen formula.

Results

A total of 70 patients who were compliant with the treatment were included in the study. A considerable percentage (74%) of patients were male and all the ulcers were located at the gaiter area. Most belonged to the age group between 41 to 50 years (25%). The healing rate of ulcers at the end of 4, 8, and 12 weeks were 46.87, 28.12, and 25%, respectively. At the end of 12 weeks, all the ulcers healed.

Abstract

Keywords

► compression dressings
► four-layer dressing
► venous ulcer

This is one of the most common causes of leg ulcers (60–80%). The venous ulcers are characterized by a cyclical pattern of healing and recurrence. Recurrence rates of 45 to 70% have been reported.1

Nonhealing, long-standing venous ulcers were traditionally treated with limb elevation, daily dressings, mechanical compression therapy, and ankle physiotherapy.2,3 The four-layer bandage dressing that provides a subankle pressure of 40 mm Hg has revolutionized the treatment of nonhealing venous ulcers.5

We present our experience with 4-layer compression dressing as an outpatient treatment for chronic venous ulcers.

DOI https://doi.org/10.1055/s-0040-1708222
ISSN 2455-7420.
Materials and Methods

It is a prospective, observational study conducted at the MS Ramaiah Medical College, Bengaluru, from July 2018 to July 2019. A total of 70 patients with nonhealing chronic venous ulcer who underwent 4-layer compression dressings were included after proper written and informed consents. Patients with arterial insufficiency (ankle brachial pressure index [ABPI] < 0.9), diabetic, and arterial ulcers were excluded from the study. The 4-layer dressings were done by a trained podiatrist in all the patients on weekly basis. In patients with exudative wounds, silver-impregnated foam dressing was applied after cleaning of wounds and prior to 4-layer dressing. All patients received antibiotics as per the culture sensitivity reports. The patients who were not compliant with the treatment were excluded.

Modified Gilman formula was used to calculate the area of ulcer in the follow therapy:

Modified Gilman Index (cm) \( D = \frac{\Delta S}{p} = \frac{SI - SF}{(CF + CI) / 2} \)

\( SI: \) Initial total area (\( cm^2 \))

\( SF: \) final wound total area after two months (\( cm^2 \))

\( CI: \) initial circumference (cm)

\( CF: \) final wound circumference after two months (cm)

\( \Delta S\%: \) percentage change of the total surface area (%)

\( \Delta S\% = \frac{(SI - SF) \times 100\%}{SI} \)

Patients were followed up every 4, 8, and 12 weeks for partial or complete healing of ulcer.

Statistical Analysis

Continuous variables were presented as mean for parametric data and median if the data are nonparametric or skewed. Student \( t \)-test was applied for calculation of statistical significance whenever the data followed normative distribution. The Mann–Whitney test was applied whenever data followed non-normative distribution. Categorical variables were expressed as frequencies and percentages. Nominal categorical data between the groups was compared using Chi-square test or Fisher’s exact test as appropriate. \( p < 0.05 \) was taken to calculate statistical significance.

Results

The majority of the patients were between 41 to 50 years of age. A significant percentage (74%) of patients in our study were males (►Fig. 1) and pain was the most common symptom in 68.5% patients followed by edema in 51.4% patients.

Maximum number of ulcers (28.57%) ranged between 11 to 20 \( cm^2 \) and 21.14% patients had ulcers of 21 to 30 \( cm^2 \) (►Table 1).

Discussion

Chronic venous insufficiency is the most common cause of venous ulcer. The cornerstone of treatment of this condition involves reducing the ambulatory limb venous pressures, and four-layered dressings have been shown to bring down the ambulatory venous pressures. These four-layer dressings have a proven role in wound healing.

The purpose of this study was to assess the efficacy of four-layered dressing in the outpatient setting, as venous
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Chronic venous ulcers as described have a debilitating effect on the patients’ quality of life. Four-layer compression dressing has been proven to be a simple, cost effective out-patient treatment for these patients. As majority of the patients are young males, the lone bread earners of the family a weekly four layer dressing treatment has good compliance rates in these patients. The limitation of our study was a small sample size, but the effectiveness of the four layer dressings in healing of chronic venous ulcers cannot be denied.

Table 2 Time of healing

<table>
<thead>
<tr>
<th>No. of weeks</th>
<th>Partially healed (%)</th>
<th>Completely healed (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 4 wk</td>
<td>28.12</td>
<td>18.75</td>
<td>46.87</td>
</tr>
<tr>
<td>At 8 wk</td>
<td>15.62</td>
<td>12.50</td>
<td>28.12</td>
</tr>
<tr>
<td>At 12 wk</td>
<td>9.3</td>
<td>15.62</td>
<td>25</td>
</tr>
</tbody>
</table>

Fig. 2 Status of wounds at different time periods of observation.
Conflict of Interest
None declared.

References