Comparison of Hydrocolloid Dressings (Duoderm) with Povidone -Iodine Dressings in Diabetic Foot Ulcer.

Gul-e-Lala*, Shaista Akhtar **, Faryal Azhar**, Tousief Fatima ***, Naheed Akhtar ****, Faisal Bhopal *****

*Department of Surgery, Lady Reading Hospital Peshawar, ** Department of Surgery District Headquarters Hospital and Rawalpindi Medical College, Rawalpindi, *** Department of Surgery, Pakistan Railway Hospital, Rawalpindi; **** Department of Surgery, Khyber Teaching Hospital Peshawar; *****Department of Surgery, Multan.

Abstract

Background: To compare effects of hydrocolloid dressings with povidone-iodine dressings in debrided diabetic foot regarding fast wound healing and reducing amputation.

Methods: In this descriptive study patients with diabetic foot were enrolled. In-group A dressings was done with hydrocolloid while in-group B dressing was done with povidone –iodine. Wounds were assessed for depth ischemia classification. Vasculopathy, neuropathy and osteomyelitis were assessed. Parenteral antibiotics based on culture sensitivity were given. Insulin was used according to sliding scale. Split Thickness skin grafting was performed for all wounds > 5 cm if the wounds were found to be clean. Wounds < 5 cm in diameter were allowed to epithelize and heal without Split thickness skin graft. The total healing period was measured by the number of days from the date of initial debridement to the date of the Split thickness skin grafting or complete epithelization.

Results: Mean number of days of healing by complete epithelization for group A (n= 70/140) were 40.87 ± 14. days and mean number of days of healing by complete epithelization for group B patients were 47.16 ± 17.52 days (p-value < 0.05; significant).

Conclusion: Hydrocolloid (duoderm) is a more effective and safe treatment in promoting wound healing in diabetic foot ulcers.

Key Words: Conventional dressings, Duoderm

Introduction

The diabetic foot syndrome encircles other pathologies like diabetic neuropathy, vasculopathy, Charcot's neuroarthropathy, foot ulceration, osteomyelitis and the potentially preventable end point amputation. A multidisciplinary approach is required to deal with diabetic foot complications. Amputation rates increase with increase in ulcer grade. The principle of dressings in diabetic foot ulcers is that it should absorb exudates produced in the wounds and it should be non-adherent. 1 Diabetic foot ulceration is a serious and financially expensive complication with a significant morbidity rate of 15% of diabetic patients during their lifetime. Majority (80%) of total amputations are secondary to diabetic foot ulcers. 2 Foot ulcers occur in 12 to 25 percent of persons with diabetes and precede 84 percent of all non-traumatic amputations. 3, 4 Wound care regimens have changed dramatically over the last 35 years as the physiology of wound healing has become better understood. 5

Such wounds need weeks or months of treatment and sometimes require major amputation. 6 The multidisciplinary team is necessary to treat diabetic ulcers. It will look at medical managements of ulcers including dressings, offloading and the treatment of infection, either cellulitis or osteomyelitis. There is role of surgery in offloading, and the treatment of osteomyelitis as well as the role of vascular surgery. The most important aspect of management choice is the need to focus on the needs of the person with a diabetic foot ulcer rather than simply on the treatment of the ulcer in isolation. 7 Neuropathy, foot deformity, high plantar pressures and a history of amputation are significantly associated with the presence of foot ulceration. 8

Diabetic foot ulcers, due to neuropathy can now be treated with new medical therapies. Even with these advances their care usually includes wound debridement, appropriate wound dressings, and "off-loading" the area of the foot that has ulcerated. Off-loading refers to methods that protect the ulcer from the repetitive trauma of activities of daily living. Off-loading methods include molded shoes, orthotics, crutches, wheelchairs, contact casts, and other devices. Off-loading helps protect the wound so that it can heal. 9

Patients and Methods

This descriptive study was carried out at Surgical unit of District Headquarters Teaching Hospital Rawalpindi, from February 2008 to August 2008. Keeping prevalence of diabetic foot at 10% 7 using
the formula and error at 5% sample size was calculated to be 140 patients. 70 patients in each group, were included.

Formula: \( n = \frac{Z^2 \cdot \text{PV}}{E^2} \)

Patients with type 1 and type 2 diabetes mellitus, repeated debridements (bed sided or under anesthesia) for diabetic foot wounds with reformation of slough in the immediate postoperative period (within 72 hours), depth of class 0,1,2,3 (Table 1) and ischemia of class A, were included. Patients with ischemia of class B, C and D, peripheral vascular disease other than diabetic vasculopathy, chronic smokers, clean wounds in the immediate postoperative period and diabetic osteomyelitis were excluded.

Table 1: Depth classification for diabetic foot

<table>
<thead>
<tr>
<th>Depth Classification</th>
<th>Definition</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>At-risk foot, no ulceration</td>
<td>Patient education, accommodative footwear, regular clinical examination</td>
</tr>
<tr>
<td>1</td>
<td>Superficial ulceration, not infected</td>
<td>Offloading with total contact cast (TCC), walking brace, or special footwear</td>
</tr>
<tr>
<td>2</td>
<td>Deep ulceration exposing tendons or joints</td>
<td>Surgical debridement, wound care, offloading, culture-specific antibiotics</td>
</tr>
<tr>
<td>3</td>
<td>Extensive ulceration or abscess</td>
<td>Debridement or partial amputation, offloading, culture-specific antibiotics</td>
</tr>
</tbody>
</table>

Ischemia Classification

<table>
<thead>
<tr>
<th>A</th>
<th>Not ischemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Ischemia without gangrene</td>
</tr>
<tr>
<td>C</td>
<td>Partial (forefoot) gangrene</td>
</tr>
<tr>
<td>D</td>
<td>Complete foot gangrene</td>
</tr>
</tbody>
</table>

Patients were assigned double blind, randomized control trials by lottery method. Patients were divided in two groups. At the initial visit a full medical history and assessment of the patient's present conditions on presentation was recorded. Local drainage lymph nodes were examined. Any discharge, slough or smell was noted. Concomitant medications and their indications for use were also recorded. Diabetic status of the patient including duration, type, and management was noted with current activity level, ambulatory status and history of ulceration or amputations. Vascular insufficiency was assessed by pulse oxymetre and Doppler ultrasound and ABPI. Plain X-rays was done to rule out osteomyelitis.

The target wound's greatest length, width, and depth were measured at initial visit. The wounds were assessed before and after cleansing or debridement for local infection and for wound condition (improving, stable, or deteriorating). Wound bed characteristics, the peri wound skin was also assessed. Eligible patients were treated with either type of dressing Duoderm or Povidone-iodine. In-group A dressings was done with Hydrocolloid (Duoderm) local application while in-group B dressing was done with povidone-iodine. The dressing of each patient was performed by the same dressing staff and measurement of wound size was done with measuring tape. The surrounding tissue was carefully dried to avoid tissue damage. Wounds were assessed for depth ischemia classification system. Parenteral antibiotics based on culture sensitivity were given. Insulin was used according to sliding scale.

In the group A Duoderm dressing was applied as the primary dressing. It was then covered with gauze and a bandage and tape as the secondary dressing. In group B, povidone-iodine was applied as the primary dressing over the wound and covered with gauze and a bandage and tape as the secondary dressing. Duoderm was applied for 5-7 days and changed early if wound had high exudates. Povidone-iodine was applied daily once a day or twice a day depending on wound condition.

The wounds in both groups were thoroughly cleaned with normal saline solution at the time of the dressing change. Split thickness skin grafting was performed for all wounds > 5 cm if the wounds were to be clean and culture of the surface swab were not showing any significant bacterial growth. Wounds < 5 cm in diameter were allowed to epithelize and heal without STSG. At each follow up visit, the investigator assessed the condition of the primary dressing and the study wound, compliance with dressing use and change, the use of foot off-loading, changes in medication, the presence or absence of any adverse events and the number of dressing changes. Ultimate evaluation of diabetic ulcers was made whether amputation was done or not. The total healing period was measured by the number of days from the date of initial debridement to the date of the skin grafting or complete epithelization.

Results

A total of 140 patients were enrolled in the study and randomized to two groups. In-group A (n=70/140) dressings was done with Hydrocolloid (Duoderm) dressing, while in-group B (n=70/140)
The principles of treatment, in diabetic foot, are generous incision, wound debridement and careful gentle excision of necrotic tissue along with appropriate antibiotics and proper dressings. Non-conventional dressings like Hypochlorite (Eusol), Tetrachlorodecaoxide (Oxferin), hydrocolloid (duoderm) and calcium alginate. Kaltostat can be used for diabetic ulcers. If possible, amputations should be avoided by good debridements but once the amputation is needed, it should be planned to be performed once and through the healthy tissue. 15-17

Majority of patients in present study, in both the groups, belonged to class 2 depth. Wagener’s classification Class 2 is usually the common presentation in most of patients. 18 All types of diabetic foot ulcers are associated with high morbidity and mortality. 19 Early diagnosis of osteomyelitis is critical, as prompt antibiotic treatment decreases the rate of amputation Plain film radiograph yields valuable anatomical information at a lower cost. It could be followed by a three-phase, bone scan and additional imaging as and when needed. 20,21 Consistent follow-up with prompt treatment of wounds and management of callous formation to prevent further injury can result in fewer lower extremity amputations in the diabetic population. 22 Different studies revealed better wound healing and less amputation in Hydrocolloid group. 23, 28

Split-skin grafting is an effective method of managing diabetic foot ulcers as, compared with the conservative dressings, it reduced healing time and the length of hospital stay, while donor-site morbidity is minimal. 29 Application of HSE (Human skin equivalent) with the surgical principles used in a traditional skin graft is successful in producing healing. HSE may function as a reservoir of growth factors that also stimulate wound contraction and epithelialisation. 30 In the treatment of split-thickness skin graft donor sites, honey-impregnated gauzes showed faster epithelization time and a low sense of
pain than paraffin gauzes and saline-soaked gauzes. Early operative treatments are to restore anatomical alignment and improve function of diabetic patients with stage-I Charcot arthropathy.

Wound measurement is an important component of successful wound management. Although more complex methods of wound measurement exist (planimetry, digitizing techniques, and stereophotogrammetry) current practice focuses on wound measurement using simple ruler-based methods or by wound tracing. Ruler-based schemes tended to be less reliable in wounds >5 cm².

The holistic care of diabetic foot ulcer patients requires a multidisciplinary team approach. Apart from blood sugar control, treatment of ulcer involves debridement; offloading, appropriate dressings like hydrogels, foams, calcium alginites, absorbent polymers, growth factors and skin replacements can be used. Use of adjunctive treatments like growth factors, skin replacement dressings and vacuum assisted closure will accelerate healing in selected cases.

Conclusion

1. Early detection of diabetic foot, control of infection, control of diabetes and wound care is important.
2. Hydrocolloid is a more effective and safe treatment in promoting wound healing in diabetic foot ulcers.

References