The application of modern dressings to Buruli ulcers – Results from a pilot implementation project in Ghana

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Abstract

Buruli ulcer (BU) is a tropical, infectious skin disease. The resulting ulcer can take a long time to heal, and a high standard of wound care is essential. Currently, the only dressing used for BU wound care is gauze, and its removal causes pain and bleeding. We performed a pilot implementation project using HydroTac®, a modern dressing combining foam with a hydrogel component. For future BU treatment, we recommend to use a more absorbent dressing than the HydroTac dressing used in the current project. However, we show that modern dressings can be applied to Buruli ulcers, and that HydroTac® dressings yield clean, healing wounds, and prevent the pain and bleeding associated with gauze dressings. Wound care is a vital, but to date neglected aspect of BU management.
Buruli ulcer (BU) is a neglected tropical disease, caused by *Mycobacterium ulcerans*. It is currently most prevalent in West and Central Africa. Typically, BU starts with a small nodule that progresses into a discharging ulcer with necrotic slough and undermined edges over the course of several weeks. BU is most endemic in remote rural areas in West Africa, where healthcare services are limited, and there is often a delay in seeking treatment.

Although an effective treatment with antimicrobials has been introduced more than a decade ago, the healing process is slow, with a median time to healing of 18–30 weeks in small lesions. Large scars and contractures may result in functional limitations.

A high standard of wound care reduces the burden both on the patient and the health care system, as it shortens the time it takes for a wound to heal and it prevents secondary infections of the wound.

A recent survey of BU wound care practices in Ghana and Benin found that gauze was the only dressing type that was used. Though substantially cheaper, gauze has several disadvantages over more modern dressings, as it adheres to the wound bed and it disturbs dermal regeneration upon removal, causing pain during wound dressing. In addition, it does not create a moist environment, and cannot remain on the wound for more than one day, which for many BU patients means a daily loss of productivity of several hours (including walking to the health care center, waiting) that can be devastating to the household economy. Conceptually, modern dressing materials such as a foam dressing would be better suited to maintain a moist environment, can stay on the wound longer, and reduce pain and bleeding. In the current pilot, we evaluated the use of a hydrofoam dressing for BU wounds in a rural health care center in an endemic location.

All BU patients visiting the Ananekrom Health Care Center for wound dressing were included. During the project period (March – April 2012), their wounds were dressed with a hydrofoam dressing. The Ananekrom Health Care Center was chosen as it was the principal center for providing outpatient care for BU in an endemic, rural community (Asante-Akim North District, Ashanti region, Ghana).

After discussions with wound care specialists at our institution, we chose to use HydroTac® dressings (Hartmann, Heidenheim, Germany), which are absorbent foam dressings with an additional hydrogel layer, making it suitable for both moderately discharging and dry wounds, and hence for the various stages of a Buruli ulcer. After removal of the previous dressing, the wound was cleaned with moderate pressure irrigation by normal saline. No other topical solutions were used. Dressings were removed only if strike through of the dressing with exsudate was visible.
All wounds were photographed after removal of the dressing and cleaning. Once a week, the circumference of the wound was traced on an acetate sheet. At the end of the project, patients were asked what they liked and disliked about the foam and gauze dressings, and encouraged to grade both the foam and gauze dressings on a scale of 1 to 10.

This pilot project took place as part of capacity strengthening efforts for BU management in the framework of a randomized controlled trial. It was carried out to explore options for improved standards of wound management and assessment. The protocol was approved by the Ghana Health Service Ethical Review Committee (Reference 01/03/11). All participants provided verbal and written informed consent, and for children under the age of 18, informed consent was also obtained from one of the parents.

A total of 13 patients were included in this pilot. The mean age was 15 years. Eleven ulcers were located on one of the extremities, 1 on the chest and 1 on the abdomen. All patients had either begun or completed antimicrobial therapy for BU, and all patients had been using gauze dressings before the start of the pilot project. Patients were dressed with the HydroTac® dressings for an average period of four weeks.
Over the project period, there was a mean (SD) weekly decrease in ulcer surface of 9.3% (14.7). Two ulcers consistently increased in size over 4 weeks with 3.6% and 10.0% respectively (i.e. at a weekly average of 1% and 2.5%). On average the dressings had to be changed every two days. Wound observation generally showed clean wounds with reddish granulating tissue (Figure 1). No signs of secondary wound infection were observed in any of the ulcers. Buruli ulcers tend to produce a non-smelling exudative fluid or pus. We observed that the number of days a HydroTac dressing could remain on the wound was limited by the absorbent capacity of the dressings. In addition, as the absorbent capacity was not optimal, the wound environment would tend to be ‘wet’ rather than ‘moist’, and as a result, in some ulcers a slight amount of maceration could be seen on the edges (Figure 2).

Four patients that were 9 years or younger did not fully understand the questions and were excluded from the analysis. The remaining 9 patients gave a mean score of 8.5 to the hydrotac, and 4 to the gauze dressings. The comments most often heard were that ‘it is less painful when removing’, ‘it is comfortable’, ‘it drains the pus’, ‘I only have to remove it once every three days now’.

Most participants were children who work and play in muddy or dusty environments. The original plan was to attach the dressings using Hydrofilm (Hartmann), but this had to be replaced by locally bought plaster and bandages, as it was not adhesive enough (Figure 3).
The hydrotac dressings could be easily cut into the desired size, allowing the team to economize the volume of dressings used.

We describe a pilot project of using modern dressings in the care for Buruli ulcer. As the average time to healing is long, we did not expect to see any wounds heal during the project period. However, we did measure a steady decrease of wound surface, and observed clean, granulating wounds.

Modern dressings prevent the pain and bleeding associated with the removal of dried-out gauze, which is the current most frequently used method of dressing for Buruli ulcers. As a consequence, patients highly preferred these dressings to the gauze. In addition to increased comfort, it is likely that the lack of frequent disturbance of the wound bed contributes to an increased rate of healing.

We opted for the HydroTac dressing, as we believed it would be suitable for both the purulent, discharging phase and the red and dry phase of Buruli ulcers. However, its absorbent capacity appeared to be largely insufficient for discharging Buruli ulcers. We recommend that when choosing a dressing for BU, there should be a focus on absorbent capacity like a regular foam dressing without a hydrogel component. Waterproof films, such as the HydroFilm®, do not appear to be adhesive enough in the rural, muddy environment our patients typically reside, and clearly bandages and plaster should support the dressing.

Figure 3. Failed adhesion of the Hydrofilm® after one day on a Buruli Ulcer on the abdomen.
Modern dressings are inevitably more expensive than gauze dressings. However these costs could be offset by a reduction in the frequency of dressing changes, hence reducing the amount of staff time and disposables used. In addition, they might result in a shorter time to healing. Less frequent dressing changes also result in less time-consuming visits to the health care facility and hence less disruption of daily activities.

In a currently ongoing clinical trial in Ghana and Benin, the highly absorbent, fibre based Drawtex® (Beier Drawtex Healthcare, Centurion, South-Africa) was selected as dressing material. Data on the time to healing using this modern dressing are eagerly awaited. Research on the treatment of BU has traditionally focused on antimicrobial therapy. In this light it is encouraging that the University of Yaoundé in Cameroon has recently launched a diploma course on advanced wound care, largely based on experiences gained in the treatment of BU. We believe that wound care is a vital but to date neglected aspect of BU management, and that much can be gained, both in terms of patient comfort and time to healing, with studies that aim to optimize wound care.

In this pilot implementation of modern dressings for Buruli ulcer, we observed that they are easily applicable, result in clean, healing wounds, and prevent the bleeding and pain associated with gauze dressings.

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References