

Simple wound care facilitates full healing in post-earthquake Haiti

The author provides an insight into the basic health care needs of two spinal cord injury patients who were cared for in a specially set up 25-bedded spinal cord injury unit in Haiti. While focusing on their extreme wound care requirements, the author highlights the need for adequate fluid, nutrition, hygiene and aseptic technique. Both patients were victims of the January 2010 earthquake in Port au Prince, Haiti. The author describes the basic wound care strategy for a patient with a category IV sacral pressure ulcer and another with a broken down thoracic spine surgical wound with visible metal work. This article describes how simple wound care effected the complete healing of large sacral pressure ulcers and broken down spinal surgical wounds without the need for further surgical intervention.

nutrition; hygiene; povidine-iodine; saline-soaked gauze packing; hydrogel

I have worked in Haiti since the 12 January 2010 earthquake, and in collaboration with the small UK charity, Haiti Hospital Appeal, I established the country's first dedicated spinal cord injury (SCI) unit and implemented a successful wound care programme there.

In most cases, health care in Haiti is not free and in many hospitals patients must pay for their wound dressings in advance. Sadly, in other hospitals I have witnessed wounds covered in paper towels because the patient and their family could not afford dressings. Thanks to the generosity of companies and individuals who have donated their time, money and medical supplies, the Haiti Hospital Appeal SCI unit is able to provide free health care.

The massive earthquake that struck Haiti affected everyone in Port-au-Prince and its surrounding areas.¹ On arrival at the SCI unit, most patients not only had unstable spines but also large, deep, category 4 sacral pressure ulcers (PUs). The patients sustained these ulcers in other hospitals after the earthquake due to the war-like conditions there, although ignorance of the need for regular repositioning also played a part. Most of the patients were women in their twenties and thirties who had been inside buildings when the earthquake struck. All were chronically malnourished and dehydrated on admission. This had enormous implications for healing.²

This article describes how simple wound care effected the complete healing of large sacral PUs and broken down spinal surgical wounds without the need for further surgical intervention.

Improving nutritional intake

The World Health Organization (WHO) has stated that malnutrition is a problem in all provinces in Haiti, but that populations affected by earthquakes, especially vulnerable groups, are at increased risk of moderate and severe acute malnutrition. Additional problems are lack of access to appropriate and adequate food, increased cases of diarrhoeal diseases and reduced access to health and nutrition services.³

Malnutrition is a major risk factor for pressure ulceration, particularly in patients with spinal cord injuries,⁴⁻⁶ and it prolongs healing. Patients with SCIs who have PUs have higher energy needs than those without PUs.^{7,8} Pressure ulcer surface area has also been found to be significantly related to the percentage of predicted energy expenditure.⁸ One possible explanation is the underlying chronic inflammatory processes induced by cytokines and cortisol:^{9,10} protein is essential for tissue growth, maintenance and repair, and a high protein intake is needed for optimal healing of PUs.¹¹ In the SCI unit, high protein drinks (when available) and

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Multivitamins were therefore administered daily as part of the patient's prescribed medication.

With these nutritional requirements in mind, well-balanced meals were provided free to patients and their families three times a day, comprising freshly cooked meat, vegetables, rice, salad and soup, as well as fresh fruit juice. Families also had access to safe water, in order to reduce their chronic dehydration — inadequate fluid intake is a risk factor for pressure ulceration.^{12,13}

Good hygiene

Due to the large number of casualties requiring hospital treatment prior to their referral to the SCI unit, patients were treated in hot and cramped field tents and/or hospitals with minimum staff and medical supplies. This, of course, complicated their chances of survival.¹⁴

Open injuries have the potential to develop serious bacterial infections, including gas gangrene and tetanus, which can result in long-term disability, chronic wound and/or bone infection, and even death. The risk and severity of infection is particularly high when injured patients present late or in large numbers.¹⁵ In a hot, humid, insect-prevalent, tropical climate, with minimal or no fans or air conditioning, infection control is a high priority.

We achieved this in the unit by adhering to a few important rules, including:

- Regular hand washing, with access to running water and/or hand gel
- Use of disposable gloves
- Positioning beds at least 1.5m apart
- Safe disposal of food 30 minutes after meals
- Waste collection
- Laundry collection
- Regular cleaning of the floors and bathrooms.

While these may seem like basic standards, they are often not adhered to in hospitals there. Unfortunately, there is no standardised nurse training in Haiti, which can have a bearing on wound management and infection control. Furthermore, although nursing care is directed by nurses, relatives are often the main carers. It is common practice, for example, for relatives to dispose of dirty dressings: throwing them out of the window into the hospital grounds was known to occur.

Hence there was a clear need to provide the nurses in the SCI unit with education on basic infection control and sound aseptic techniques, which they could then pass on to relatives.

Effective wound management

The scarce medical supplies and need to make do with whatever arrived in an emergency relief container made it difficult to adopt a westernised approach to wound care. The only readily available dressings were 4 x 4cm gauze squares and paraffin-

impregnated gauze (Jelonet, Smith & Nephew and Xeroform, Covidien) and abdominal dressings. In addition, 0.9% saline was available as a sterile irrigation solution or an intravenous preparation in various sized aliquots. However, I did manage to obtain donations of hydrogel dressings from the UK and USA for use in deep wounds.¹⁶

I taught the local nurses how to carry out wound care using these resources and applying a strict aseptic technique. Table 1 describes the care plan for a typical patient with a category IV PU. Wounds were individually assessed and, providing they were not heavily exuding or the saline-soaked gauze had not dried out, the dressings were changed daily. For patients with pressure ulcers, nurses were advised to:

- Assess the wounds using the Waterlow score¹⁷
- Reposition the patient every 2 hours
- Encourage food and fluid intake
- Encourage relatives to perform passive limb exercises for the patient.

The nurses were also taught that, even in chaotic post-earthquake Haiti, it was vital to regularly photograph and measure wounds in order to monitor and evaluate the progression towards healing. They were instructed to update the documentation each week, or more often depending on the patient's needs and wound status. However, such regular documentation became an effective education tool as it provided the nurses with tangible evidence of the effectiveness of the nursing process outlined above.

Finally, the nurses were encouraged to agree realistic outcomes of care with the patient as soon as possible after presentation at the unit. Steps were followed to ensure these outcomes were understood by both nurses and patients. Agreed outcomes can be used to guide decision-making throughout the continuum of care, and avoid unnecessary frustration with care.¹⁸ In short, nurses were encouraged to implement care using the APIE process, which was first described in 1967¹⁹ and appeared to be a new concept to the unit staff:

- Assess wound
- Plan care
- Implement a care plan
- Evaluate the care plan

Case studies

Of the 25 patients admitted to the SCI Unit, 23 arrived with pressure ulcers ranging from category II to IV. One of the patients, whose grade II PU took 120 days to heal, was also an unstable diabetic. None of the patients required antibiotics to aid their wound healing, although many received ciprofloxacin (which was hard to find at times) for urinary tract infections, due to indwelling catheters and other bladder problems associated with spinal cord injury.

Table 1. Haiti Hospital Appeal wound care and dressing guidelines

Gain patient consent
Ensure patient privacy
Position the patient for easy access to the wound and position the prepared dressing trolley by him/her
Wash your hands and apply gloves
Remove the old dressing and enclose it in your gloves when removing them from your hands. This will reduce the risk of contamination and cross infection
Dispose of old dressing and gloves safely
Apply new sterile gloves
Cleanse surrounding unbroken skin with povidine-iodine solution (betadine, Mölnlycke). Check the patient is not allergic to iodine before applying
Gently cleanse wound tissue with 0.9% saline. Irrigate and/or use gauze swabs
Cleanse from the inside of the wound to the outside, and then discard the gauze
Repeat until the wound is cleansed
Observe closely for signs of pain, swelling and infection, or any other change in the wound. Measure and photograph the wound weekly
Explore the wound for cavities and sinuses
If a patient has more than one wound, treat each one separately
For grossly infected wounds, a weak solution of 5–10% povidine-iodine in 0.9% saline may be used as an irrigation and/or flushed directly into cavities. Be aware that iodine may be irritant to the newly granulating tissue
Apply hydrogel to deep wounds, covering all granulating tissue to keep it moist and aid healing
Pack the wound with 0.9% saline-soaked gauze
Cover with abdominal padding
Secure with tape
Ensure the patient is repositioned comfortably and safely, keeping the spine straight
Ensure the patient is able to reach drinking water and other items
Update the wound care plan weekly or whenever there is a change in the wound and/or when the dressing has been changed. Document the wound measurements and photographs at each weekly assessment
Please discuss any concerns with the nurse manager and educator

As part of the wound care programme, povidone-iodine solution (Betadine, Purdue Pharma), applied to the intact skin around the wounds of all the patients, was used as a barrier between the anus and sacral wounds. In patients with heavy, offensive exudate, a diluted povidone-iodine solution was used to help overcome infection without the need for antibiotics.

Two patients had broken down surgical wounds on admission, and one of these wounds had visible metal work.

The two patients identified as case studies were chosen to illustrate the basic and effective wound care given on the SCI unit.

Patient with a category IV sacral PU

Delila was out walking when a building collapsed on her. Bystanders pulled her from the rubble and she was unconscious for some hours. She was first treated locally in Port au Prince (PaP), where it was revealed that she had sustained a T8 fracture, and she had early word-finding difficulties. She was then transferred to a hospital in The Dominican Republic and after 2 weeks was repatriated to Haiti. She spent a week at a different hospital before being transferred to the SCI unit.

Delila developed a category IV PU soon after the earthquake (the exact time frame is unknown due to the scarce, multiple language medical records). She was admitted to the spinal cord injury unit on 5 February and received the general wound care that the Haitian nurses were taught to follow (Table 1). Initially measuring 20 x 15cm, the sacral wound took 237 days (approximately 8 months) to heal following admission.

Simple healing of a broken down wound with exposed thoracic metal work

Tabatha was a 24 year old female from PaP who was injured when rubble fell on top of her and she sustained L1/L2 fractures. Having been evaluated in a field hospital in PaP she was transferred to another hospital tent in PaP, where she underwent a T10–L5 percutaneous fusion on February 12, 2010. She was later transferred by helicopter to another hospital before her transferral to the SCI unit on 6th March. She had multiple superficial scars from the rubble.

The basic principles of our wound management programme were strictly adhered to, along with daily vigilant flushing of the wound and metal work with a diluted solution of <10% povidone-iodine concentrate in 0.9% saline. The wound was then carefully packed with 0.9% saline-soaked gauze—the dressings were removed with ease, approximately 30–60 minutes post analgesia.

This patient did not require antibiotics as she had normal vital signs, which were monitored



Fig 1:A. Exposed metal work on admission. B. Healed wound

carefully every six hours. WHO states that: 'Antibiotics do not reach the source of the wound infection. Antibiotics only reach the area around the wound; they are necessary but not sufficient and need to be combined with appropriate debridement and wound toilet. Use of topical antibiotics and washing wounds with antibiotic solutions are not recommended'.¹⁵

Analgesia was given as required and prior to every wound care procedure. This wound took 40 days until the metal was not visible and 66 days to fully heal from admission to the SCI unit (Fig 1). Although a relatively long time, this did not prolong her SCI rehabilitation programme as the patient was able to start a rigorous mobility regime.

Conclusion

The importance of nutrition, along with a high standard of hygiene and strict aseptic technique, in the healing process cannot be over-emphasised.

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Surgical intervention may have reduced the hospital stay for both patients described here, but this option was not available at the time and has risks in its own right. Furthermore, advanced wound dressings were not available in Haiti, while an intermittent power supply precluded the use of electrically operated apparatus. Nevertheless, in my opinion, Haitian patients may have an advantage over western patients in not being exposed to many antibiotics or hospital-acquired antibiotic-resistant infections such as *Staphylococcus aureus* (MRSA).

Our experience clearly demonstrates that saline-soaked gauze dressings, along with the use of hydrogel, can be effective in healing large wounds in countries with minimal health-care options. Irrigation/flushing a broken down wound with exposed spinal fixation metal work²⁰ with diluted povidone-iodine²¹ also proved to be effective.

Potential issues, such as infection risk, prolonged hypothermia and increased costs causing increased hospitalisation remain.²² Our experience shows that, with good basic care, wounds can heal with time but at what expense?

It is frustrating to know that PUs are preventable, prolong hospitalisation and have added financial implications to a family's already impoverished life style. The Haitian Government, Medical and Nursing Profession need to address this fundamental problem by establishing sound nursing education and by providing advanced wound care products and surgical intervention if required.

Simple to use medical and nursing records must be used to document care. ■

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