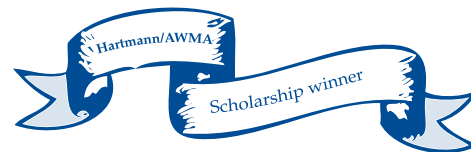


Collaboration the key to successful wound healing

Geard D



Abstract

The focus of this case study was to demonstrate the importance of collaboration between all care providers to achieve optimum outcomes for all clients, despite being constrained by the system of waiting lists for specialist intervention.

Introduction

Mrs Cook [pseudonym] was a 72 year old lady with a previous history of leg ulcers; her general health status was good and she led an active social life. She was referred to a community nursing clinic by a specialist wound clinic for ongoing wound management for an ulcer on her left medial malleolus as delayed healing and deterioration had been seen in recent weeks. Mrs Cook had been attending her general practitioner's surgery three times weekly for dressing changes; she had been reinforcing those dressings herself most days between those visits.

Medical history

Her current medical history included hypertension and osteoarthritis; she had a prior history of a quadruple heart bypass 5 years previously, and ligation and stripping of the varicose veins in her left leg over 20 years ago. Other previous surgery included a hysterectomy and a bladder repair 8 years previously and a cholecystectomy. Allergy testing revealed multiple sensitivities, particularly with cream bases used on her skin. Mrs Cook had a comprehensive list of her allergies to which she regularly referred when making choices for her ongoing lifestyle and care needs. Medications included Moduretic, Minax, Cartia, Lipitor, Serepax, Panamax, Fosamax and a multi-vitamin supplement.

Wound profile

Her wound was a chronic ulcer on her left medial malleolus of over 12 months' duration and of mixed venous/arterial

origin (Figure 1). Ankle brachial pressure indices (ABPI) were L=0.79 and R=0.76. Her original wound occurred as a result of an eczematous skin irritation. The wound bed was agranular and covered with an adherent slough film. The wound measured 6.5cm in length by 4.5cm wide and was 4mm deep and a large volume of non-malodorous haemoserous exudate was present. The peri-wound area was excoriated, oedematous and inflamed; this extended approx 5cms out into the surrounding skin, with tenderness and dry flaking skin over this whole area. The peri-wound was also hot to touch in comparison to the rest of the lower leg. Also noted were multiple varicosities of the left lower leg, with one area of engorged prominent varicose veins on the left calf.

Pain at the time of assessment was 5-7 out of 10 (Mankoski pain scale). During dressing changes she was experiencing a high degree of discomfort despite taking eight or more Panamax regularly throughout the day. She did experience some relief but was never pain free. Mrs Cook was wearing supermarket-purchased support hosiery.

Wound management

The goals of care were to contain the exudate, reduce the pain and oedema, reduce the pain and trauma at dressing changes (while selecting a dressing which she would tolerate without exacerbating the peri-wound irritation) and minimise the risk of further skin breakdown. Referral arrangements to a plastic surgeon had already been made for Mrs Cook, with a view to skin grafting for wound closure.

Wound assessment involved consultation with a wound care consultant, a physiotherapist, a dermatologist and her GP. Mrs Cook was involved in all the decisions made, with specific requests for ongoing management. All products selected for the management of her wound were based on previous experience and patch testing due to previous sensitivity history.

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Twice-weekly dressing changes were initiated, giving consideration to the wound condition. Consideration was also given to the availability of the physiotherapist, as adjunctive ultrasound therapy was being considered to promote healing in the wound.

Ultrasound therapy

Ultrasound is a mechanical vibration delivered at a frequency above the human hearing range. It is typically delivered at a range of 1-3MHz in cycles ranging from 20-100% of total time and is usually termed 'pulsed' ultrasound when delivered at less than 100% of total time. When delivered at 100% of total time it is usually referred to as 'continuous' ¹⁻³. Ultrasound is often recommended in the treatment of clients with partial or full thickness wounds and is usually delivered over a hydrogel sheet or a semi-permeable film dressing as direct contact with the wound bed is usually too painful and increases the risk of cross infection. Using a sachet or appropriately sized bag of intravenous (IV) normal saline over the wound, depending on its size and depth, provides an equally satisfactory effect on the wound bed and minimises the risk of infection.

During the inflammatory phase of wound healing, ultrasound causes a degranulation of the mast cells which results in the



Figure 1. Wound on presentation.

release of histamine. This, and other chemical mediators that are released from the mast cells, are thought to attract neutrophils and monocytes to the injury, and thus promote healing. Ultrasound has also been noted to have some effect on the fibroblasts and stimulates them to secrete collagen ¹. This can enhance the process of wound contraction and

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increase the strength of the newly healed tissue. Further, it has been observed that connective tissue will elongate better when both heat and stretch are combined – continuous ultrasound at higher therapeutic intensity can be an effective means of heating the deeper tissues prior to stretch³. It has also been noted anecdotally in clinical practice that the use of ultrasound during wound healing has appeared to increase the local wound bed response and also reduces the rigidity and increases the flexibility of the scarring.

Consideration must be given to the inappropriate use of such a device and the fact that serious complications could result. Some basic precautions should therefore be taken¹. For example, the technique should only be used by an appropriately trained clinician² and treatment should be delivered at the lowest intensity to gain the desired result³. Further, the applicator head needs to be kept in constant motion during the treatment, and an appropriate water-based coupling medium should be used (e.g. a saline bag)². Finally, the intensity should be reduced or terminated if the patient complains of any substantial increase in pain¹⁻³.

Treatment regime

Firstly the ulcer and surrounding skin were cleaned with soap free wash and warm water. Ultrasound therapy was then applied to the wound by the physiotherapist through a 500ml bag of sterile IV normal saline for a period of 6 minutes at 1.8 watts/cm². This had the immediate effect of reducing the peri-wound oedema and pain at the site. The wound bed also had the appearance of an increase in perfusion by becoming more 'flushed' than prior to treatment.

The primary dressing used was a hydrofibre, for three main reasons. First was its ability to maintain a moist wound environment. Second, was its ability to wick vertically into the secondary dressing, and thus reduce the risk of maceration. Third, was its ability to reduce pain at each dressing change, as it does not adhere to the wound bed while conforming to the wound base⁴.

With regards to her skin care regime, a zinc-based barrier cream was applied to the immediate peri-wound to protect the intact skin and hopefully reduce the peri-wound irritation. The remainder of Mrs Cook's lower leg was moisturised with an emulsifying ointment (this was for short-term use only)⁵.

The secondary dressing was an absorbent pad measuring 10x15cm and secured over the wound with adhesive gauze bandage. A cotton liner was then applied toe to knee, followed by the application of appropriately-sized shaped tubular graduated compression garment to assist in the reduction in the level of oedema and improve exchange of oxygen and nutrients to the wound and its immediate area⁶. Mrs Cook

found the dressing to be comfortable at the time and reported a reduction in pain over the next few days; reinforcement was required once only between the subsequent dressing change.

At the end of Week 1, the exudate had decreased and was well contained within the dressings. However, the wound bed remained slough-filled and tender, and the peri-wound remained inflamed and excoriated. A wound swab was taken for microscopy, culture and sensitivity; culture showed a heavy growth of *Streptococcus agalactiae* (Group B) and *Pseudomonas aeruginosa*. Given these results, the primary dressing was changed to a topical dressing containing silver due to its antimicrobial properties and because Mrs Cook had reported no sensitivity to the initial dressing^{4,7}. Zinc barrier cream was ceased as it appeared to be increasing the peri-wound irritation and, in consultation with the dermatologist, a decision was made to use emulsifying ointment up to the wound edges.

There was an approximate 50% reduction in the slough in the wound bed and a slight reduction in the peri-wound erythema. Mrs Cook's GP was consulted about the swab and antibiotics were withheld, given the improved wound condition and response to the antimicrobial dressing.

On further review, the wound bed remained slough-free but agranular; the peri-wound inflammation persisted and Mrs Cook reported a reduced but significant degree of pain. Further wound swabs showed the same organisms, but only a moderate growth this time. The GP was contacted in order to report the current wound status and to discuss concerns regarding the lack of progress; Mrs Cook was reviewed by the GP who prescribed oral antibiotic therapy (Ciproxin 500mg BD with a repeat).



Figure 2. Wound 12 months after initial visit.

Ongoing care and investigations

Review at the specialist wound clinic and referral to a vascular specialist was arranged, given the ABPI results and pending arterial duplex scans. Topical cortisone ointment was prescribed for application to the peri-wound skin irritation by the dermatologist. Dressings and ultrasound therapy were continued twice weekly with an antimicrobial as the primary dressing; cortisone ointment was applied to the peri-wound irritated skin and emulsifying ointment was applied to the remainder of the lower leg. Secondary dressings were regularly reviewed and changed according to her skin condition. This led to changing from absorbent pad to cotton padding. Mrs Cook's pain was significantly reduced during this time and she was only experiencing minor intermittent discomfort (2-3 out of 10). Skin grafting was offered as an option by her GP but she declined as she didn't want another wound and was comfortable with her level of progress.

Investigations and outcomes

Arterial duplex scan results showed 75% stenosis of the mid femoral artery 170mm below the groin, and two areas of complete occlusion 200mm below the groin. An additional occlusion of the posterior tibial artery was detected with reduced flow to the anterior tibial and peroneal vessels. Subsequent review by a vascular specialist resulted in Mrs Cook being scheduled for an angioplasty. Balloon angioplasty and insertion of a stent was performed 4 months after referral as a result of several delays.

Throughout this time, regular graphing and photography was carried out as part of the management plan. Steady progress towards healing was indicated by the reduction in size and exudate and the level of pain. Once granulation tissue was level with the surrounding skin, primary dressings were changed to Atrauman [Hartmann]⁸ which was continued until the wound healed. This approach led to minimal scarring as can be seen 12 months after her initial visit to the clinic (Figure 2).

To date, the area remains healed and is causing no ongoing problems. Mrs Cook continues to moisturise both her lower legs daily to maintain good skin integrity and reduce the likelihood of recurrence⁵.

Discussion

All chronic wounds are influenced by multiple factors, intrinsic and extrinsic, that can delay the healing process. With respect to this case, it was noted that the ongoing, regular

reassessment throughout the healing process (by graphing and photographing, in addition to observations and accurate documentation) aided in clinical decision making and use of best practice evidence. Further, the use of ultrasound therapy throughout the healing process resulted in a reduction in pain and oedema during the acute phase and a well healed wound with minimal scarring.

This case also shows that further research into the benefits and effects of ultrasound therapy as part of wound management may be beneficial in supporting current information available to clinicians. However, the availability of this therapy is limited by the availability of clinicians appropriately trained in the operation of the device.

Reducing pain at dressing changes and between dressings should always be considered when choosing dressing materials in order to reduce the impact of wounds on the client's lifestyle and sense of wellbeing. It should also be noted that earlier intervention and reduction in delays of appropriately indicated treatment would probably have reduced the healing time for Mrs Cook's wound by some months. However, the antimicrobial dressings used in this case proved effective in reducing the wound bacterial load, aiding in the reduction of pain and enhancing the wound healing activity.

Conclusion

Primary carers in wound management need to remember they are not working alone. Collaboration and coordination of care in wound management involves the knowledge, skills and resources of many, including the client, to achieve the ultimate goal of healing.

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