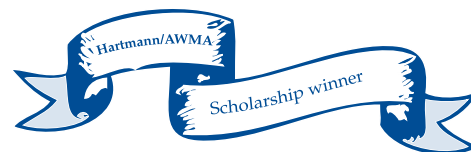


# Management of a pressure ulcer in the presence of arterial disease and MRSA infection

Higgins N



## Abstract

This is a case study of an elderly lady with a Stage IV heel pressure ulcer. The ulcer was complicated by underlying arterial disease and wound swabs revealed the presence of methicillin-resistant *Staphylococcus aureus* (MRSA).

## Introduction

Ms P was an 82 year old woman who had been residing in a local nursing home for the previous 5 years. She had had a diving accident when she was 16, leaving her with two broken cervical vertebrae and partial paraplegia. In 2002, Ms P fractured her right tibia and fibula, leaving her unable to weight-bear. Her main social support came from a lifelong friend and carer who lived in the local area.

## Case study

On presentation to the local general practice, Ms P had ulcers on her right calf, right heel, and the dorsum of her right foot and her left heel, all of which were covered with eschar. These ulcers had been present for 4-6 weeks. For the purpose of this case study, the focus will be on the right heel ulcer (Figure 1). Ms P presented Goolwa Medical Centre at the request of her GP as her ulcers were not responding to the treatment being applied at the nursing home and there was cellulitis present. Ms P was in 9/10 pain (on a scale from 1-10 where 10 is the worst pain experienced), her appetite had become very poor, and she believed that there was no hope of her ulcers healing.

Ms P's medical history included being a partial paraplegic, fractures to her fibula and tibia (2003) which were unable to be repaired due to low bone density, peripheral vascular disease, and hyperparathyroidism. Ms P had previously developed a pressure ulcer to her sacrum during the 5 years that she had been a resident in the nursing home but this was reported to have healed in a timely manner. Ms P had a suprapubic

catheter and was receiving long-term trimethoprim therapy due to recurrent urinary tract infections.

As a result of her current wound infections, Ms P was taking a course of cephalexin. On referral, it was noted that treatment for her right heel ulcer included cleaning the wound with saline for irrigation; any edges that appeared sloughy were washed with a weak (pale pink) solution of Condys crystals. The wound was then dressed with a wet hydrofibre dressing (Aquacel™), a wet non-adherent dry dressing (Melolin™), and tulle gras (Jelonet™). A combine and crepe bandage were used to retain the dressing. The explanation offered as to why the hydrofibre and non-adherent dry dressings had been used wet was that it had been recommended by clinician from a metropolitan hospital. As a result of these dressing choices, the skin surrounding the eschar had become macerated while the eschar had repelled the water and was still very hard. An amorphous hydrogel (SoluSite™) had also been tried as a dressing option.

On presentation, Ms P was taking the following medications – diazepam, metoclopramide, mobic, paracetamol, tramadol, trimethoprim, lactulose syrup and cephalexin. Ms P was allergic to sulfonamides.

## Wound assessment

The wound was determined to be a pressure ulcer, complicated by underlying arterial disease. The wound had started as a blister and Ms P's Braden score of 12 put her in the high risk category for developing a pressure ulcer. Signs of arterial disease were evident as pulses were not palpable, Ms P's legs were shiny and hairless, the ABPI (ankle brachial pressure index) was 0.5, and her pain was initially 9/10.

Ms P's ulcer was located on her right heel. It is noted that 19-36% of pressure ulcers occur in the heels of the person who is in the supine position<sup>1</sup>. The wound measured 8.8cm

Naomi Higgins RN, B Nursing,  
Professional Certificate in Wound Management  
Email naomi.michelle@hotmail.com

long and 5.7cm wide with a surface area of 34.3cm<sup>2</sup>. There was erythema around the wound and the surrounding skin was macerated. Further, the wound was covered with dry, hard, necrotic tissue. The minimal amount of exudate was a result of autolysis of the edges of the wound which had also resulted in a degree of malodour. There was exposed tendon visible in the base of the wound after the necrotic tissue was debrided, classifying the wound as a Stage IV pressure ulcer.

Wound swabs revealed the presence of methicillin-resistant *Staphylococcus aureus* (MRSA), sensitive to Vancomycin and Clindamycin. A complete blood exam showed an elevated white cell count of 12.28x10<sup>9</sup>/L, and haemoglobin of 108g/L. Albumin and protein levels were 28g/L and 64g/L respectively.

The aim of treatment was therefore to heal the ulcer, reduce Ms P's pain, treat the infection, improve Ms P's nutritional state, address Ms P's psychosocial needs, and implement long-term pressure relieving measures.

### Wound management

Initial assessment of the wound was done by the author at a rural general practice in South Australia at the request of Ms P's general practitioner approximately 1 month after the wound first developed. This assessment involved a verbal history from the client and her GP as well as written and verbal communications from nursing staff at the nursing home. Further assessment data were obtained from Ms P's medical records. The wound profile was also assessed as outlined above.

From the assessment it was decided that the necrotic devitalised tissue covering the whole wound needed to be debrided using conservative sharp debridement. This decision was based on best practice guidelines as identified by the TIME acronym of wound bed preparation<sup>2</sup>. Due to the presence of signs of infection, namely erythema, pain and warmth, a wound swab was taken from the tissue exposed after the wound had been debrided. This later revealed the presence of MRSA sensitive to Clindamycin, so Ms P was commenced on oral Clindamycin 300mg QID.



Figure 1. Right heel ulcer on presentation at Goolwa Medical Centre.

Cadexomer iodine (Iodosorb<sup>TM</sup>) was chosen as the primary dressing due to its antimicrobial properties and its ability to promote moist wound healing and facilitate debridement<sup>2-4</sup>. A foam (Allevyn<sup>TM</sup>) was chosen as a secondary dressing as it provided some cushioning and would be able to manage the exudate between dressing changes (planned to be twice a week). Sorbolene cream was applied to Ms P's skin to promote skin integrity. Natural fibre padding (Soffban<sup>TM</sup>) was applied with a loose crepe bandage to retain the dressing.

Prior to debridement, Ms P's pain was 9/10 but after the wound was dressed as above she stated that it was 6/10. After reviewing her medication chart, it was also noticed that she was not receiving regular analgesia so she was encouraged to ask for it whenever she experienced any pain. The nursing staff at the residential aged care facility were asked to administer analgesia regularly. Ms P was commenced on a nutritional supplement in the form of Arginaid Extra<sup>TM</sup> drinks twice daily as it is well recognised that good nutrition is necessary for optimal wound healing<sup>1,5-8</sup>.

The assessment also revealed that Ms P had a pressure relieving mattress in situ on her bed but that during the day she was reclining in a bed chair which had a synthetic overlay on it. Ms P also had a Zimmer splint in situ on her right leg due to the old fractures. Relief of pressure and friction were identified as very important to promoting healing. Consequently the Zimmer splint was removed, Ms P's legs were left resting on a pillow so that there was no pressure on her heels, and later a medical grade sheepskin was obtained to put under her heels and calves as this has been documented to assist in the maintenance of pressure minimisation<sup>9</sup>.

The presence of multiple pressure ulcers had had detrimental effects on Ms P's psychological status, a phenomenon that has been well identified<sup>7</sup>. It was evident that Ms P was experiencing feelings of hopelessness and powerlessness. This was addressed by encouraging her to adopt a positive attitude towards the healing of her ulcers and by being an advocate for her needs. Involving her lifelong friend and former carer in her direct care at dressing changes also helped to develop therapeutic relationships and engender trust.

### Progress / follow-up

During the first 3 months of treatment, it was necessary to continue to debride slough and necrotic tissue from the surface of the wound at each dressing change. Over this time, the redness around the wound disappeared, the wound edges were no longer macerated, granulation tissue became evident and Ms P's pain levels had reduced. A large area of tendon was visible in the distal part of the wound and a smaller amount was visible in the proximal area of the wound.

The dressing regimen stated above was continued during this time as was the oral clindamycin. However, during this time the clindamycin was not given for a week; this was immediately obvious as the wound failed to progress, the odour increased and Ms P reported an increase in her pain. At the end of 3 months it was decided to change the primary dressing to nanocrystalline silver (Acticoat 3 day™). There was no longer the large amount of adherent slough present as the wound was almost entirely covered in granulation tissue; however, an antimicrobial dressing was important due to the presence of both MRSA and *Pseudomonas* (species not identified). This *Pseudomonas*, which was confirmed by a wound swab, was not initially present but became evident by the presence of green tinged exudate and purulent odour. Acticoat 3 day™ contains nanocrystalline silver which has documented antimicrobial properties and is effective against both MRSA and *Pseudomonas*<sup>2, 10, 11</sup>.

Two weeks after commencing the nanocrystalline silver, the wound had started to epithelialise around the edges and there was less tendon visible. Eighteen weeks after starting treatment, there was a 40.3% reduction in wound surface area which indicated that there was a good response to the treatment being implemented<sup>12</sup>. After 4 months routine blood



Figure 2. Wound – Six months after treatment commenced.

tests were done which revealed that there was no change in Ms P's haemoglobin and a slight decrease in white cell count ( $12.28 \times 10^9/L$ ); her albumin was 29g/L and protein had dropped slightly to 61g/L.

Six months after initially seeing Ms P, the area of tendon at the distal end of the wound had granulation tissue covering it almost entirely, the area of exposed tendon at the proximal area of the wound had become slightly larger than what it was at the 3 month stage but the wound edges had advanced significantly and there was healthy granulation tissue covering the rest of the wound (Figure 2). At this

## RELIANCE MEDICAL

“PEOPLE AND SOLUTIONS YOU CAN RELY ON”

**Reliance Medical** is a specialist wound care company. It is Australian owned and caters specifically for growing clinical and economical health needs in a broad range of disciplines across the health care sectors. All the Reliance Medical wound dressings are fully TGA approved, they are all CE marked, Latex free and supported by new clinical papers.

PASSION

DEDICATION

COMPETENCE

COMPLETE  
WOUND CARE  
SOLUTIONS

UNIQUE

EXCEPTIONAL  
CLIENT  
OUTCOMES

QUALIFIED  
EXPERIENCED  
SPECIALISTS

**PolyMem**  
is a QuadraFoam™...

**DryMax**  
DRESSING

**YU-KI BAN™**  
Surgical Tapes

**XTRATA™**  
Transparent Film Dressings

PO Box 2350 Chermside Centre QLD 4032

**Free Call: 1800 280 133** Fax: 07 3261 6021

[www.reliancemedical.com.au](http://www.reliancemedical.com.au)

Reliance Medical Pty Limited ABN 37 126 909 117

stage Ms P stated that her pain was well controlled with the tramadol, she was taking an interest in the progress of her wounds, and appeared much brighter.

On 28 December, Ms P's wound had healed with complete epithelialisation (Figure 3). By this stage, Ms was not suffering any pain. Her albumin was 33g/L, protein 64g/L, haemoglobin 111g/L and her white cell count was  $10.66 \times 10^9/L$ , all of which had improved. Ms P was very happy that her dream for the complete healing of her wounds had come true.



Figure 3. Heel wound showing complete re-epithelialisation.

## Discussion

Best practice guidelines for the prevention and management of pressure ulcers state pressure reduction to be the cornerstone of treatment<sup>5,7</sup>. This best practice approach of treating the underlying aetiology was complicated in this case by the presence of arterial disease and it would have been ideal to have had a vascular review. However, Ms P elected not to travel to the city for a vascular review but decided to attend the general practice clinic for regular wound management. As evidenced by the satisfactory rate of reduction in surface area of the wound, it appeared that there was sufficient arterial supply for healing. The presence of MRSA and later *Pseudomonas* was another complicating factor and the need for long-term antibiotics in this case was illustrated by the fact that the wound failed to progress when Ms P was not taking the clindamycin but immediately responded again when it was restarted.

The principles of wound bed preparation proved vital and formed the basis for clinical decision making, including the decision to use antimicrobial dressings. A holistic assessment and approach to the treatment of this wound proved important in being able to recognise the aetiologies present and, as far as possible, address the factors that were inhibiting healing. Overall, considering Ms P's co-morbidities, the aims of the treatment were met in a timely manner, and Ms P stated that she was very happy with the outcomes.

## Summary

This case study illustrates the complex nature of wounds in the client with multiple co-morbidities and the need to determine the aetiology of the wound so that underlying factors can be considered and addressed. Pressure reduction and conservative sharp debridement, combined with the use of topical antimicrobials, oral antibiotic therapy, nutritional supplementation, and the recognition of the client's psychosocial needs, formed the basis of treatment. The client's pain was managed through the use of analgesia, addressing the infection and promoting moist wound healing.

## Recommendations

Clinicians need to be vigilant in addressing underlying factors associated with the development of wounds and utilising the principles of wound bed preparation so that optimal treatment can be commenced at the first sign of ulceration. Residents in nursing homes at risk of developing pressure ulcers need to be identified and pressure relieving measures implemented so that cases of severe ulceration such as Ms P are minimised. In order to guide practice, research into the efficacy of nutritional supplementation, its use in wound management, and the best type of supplementation to use would be useful. More research into the place and use of prolonged courses of antibiotics is required to develop standards for the use of antibiotic therapies, the best route of administration, and indicators for cessation of treatment in this client group.

## References

1. Pieper B. Mechanical forces: pressure shear, and friction. In: Bryant RA (Ed). *Acute and Chronic Wounds: Nursing Management* (2nd ed). Mosby Inc, 2000:225-236.
2. Carville K. *Wound Care Manual* (5th ed). Silver Chain Foundation, 2005.
3. Smith & Nephew. *The science made simple: Iosorb*. Smith & Nephew, 2005.
4. Falanga V. Iodine-containing pharmaceuticals: a reappraisal. In: Macmillan Magazines Ltd. *Proceedings of the 6th European Conference on Advances in Wound Management*, London, 1997.
5. Dealey C. The management of patients with chronic wounds. In: *The Care of Wounds: A Guide for Nurses* (2nd ed). Oxford: Blackwell Science, 1999:96-100.
6. Murray LD, Magazinic N & Stacey MC. Clinical practice guidelines for the prediction and prevention of pressure ulcers. *Primary Intention* 2001; **9**(3):88-92, 94-97.
7. Dolynchuk K, Keast D, Campbell K, Houghton P, Orsted H, Sibbald G & Atkinson A. Best practices for the prevention and treatment of pressure ulcers. *Ostomy Wound Manage* 2000; **46**(11):38, 40-52.
8. Desneves KJ, Todorovic BE, Cassar A & Crowe TC. Treatment with supplementary arginine, vitamin C and Zinc in patients with pressure ulcers: a randomised controlled trial. *Clin Nutr* 2005; **24**:979-987.
9. McGowan S, Montgomery K, Jolley D & Wright R. The role of sheepskins in preventing pressure ulcers in elderly orthopaedic patients. *Primary Intention* 2000; **8**(4):127-134.
10. Smith & Nephew. *Dynamic silver release, rapid bacterial destruction, sustained protection: Acticoat*. Smith & Nephew.
11. Woodward M. Silver dressings in wound healing: what is the evidence? *Primary Intention* 2005; **13**(4):153-160.
12. Flanagan M. Wound measurement: can it help us to monitor progression to healing? *J Wound Care* 2003; **12**(5).