A silver tale: pseudomonas vs Aquacel Ag

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Abstract

The treatment of infected wounds often requires a multi-faceted and multi-disciplinary approach. The use of intravenous antibiotics in combination with effective antimicrobial silver dressings will have positive outcomes for the patient, management team and organisation. However, wound management practitioners often work within finite budgets and the use of expensive silver dressings must be both evidence-based and outcome driven. The following case study shows intravenous antibiotics alone were unsuccessful in managing a severe pseudomonas infection; however, in collaboration with Aquacel Ag®, desired wound healing was achieved. This outcome, and countless similar cases managed at Redcliffe Hospital, validates the use of expensive silver dressings in improving patient outcomes and facilitating early discharge.

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Case report

Mrs R was a 65 year old female with a history of hypertension. She presented to the emergency department feeling generally unwell. She was febrile, flushed, and mildly hypertensive. Mrs R had fallen on a rock whilst at the beach the previous day and sustained a superficial 2x2cm abrasion to her left forearm; the wound appeared mildly cellulitic (Figures 1 & 2). Following close observation, it was decided to discharge Mrs R home with oral antibiotics and regular analgesia. She was advised to return if her condition deteriorated, e.g. increasing redness, heat, swelling, offensive odour and pain, or increased general unwellness. Otherwise, she was advised to follow-up with her GP in 2 days.

Mrs R re-presented to emergency the following day with swelling to her left forearm, nausea, vomiting and dizziness. Her condition deteriorated rapidly and she was diagnosed with septic shock secondary to cellulitis. On examination, the forearm was oedematous with superficial vesiculation. Only mild erythema was noted, with no apparent necrosis or crepitation. Full blood screen, cultures and wound swabs were taken. She was commenced on triple intravenous antibiotics via a PICC line and admitted to hospital for ongoing management.

Examination the following day by a medical officer noted blisters had formed down the length of the forearm; several were drained and the purulent fluid sent to pathology. Dry dressings were applied. *Pseudomonas aeruginosa* was cultured from the wound swab. Note that *P. aeruginosa* has the ability to grow and multiply easily in water and is mainly found in water and soil [1]. This strongly correlates with the origin of injury.

A referral was placed with the wound management practitioner to review the wound 5 days post-admission. On examination, there were extensive purulent blisters extending from the elbow to wrist anteriorly and radiating through to the inner forearm. Blisters extending down the anterior aspect were firm and purulent in appearance. A 5x7cm fluid-filled vesicle was noted on the inner aspect. The forearm and hand were significantly oedematous, with associated taut, shiny skin. Considerable bruising was present on the forearm, hand and adjacent to wound edges. Limb function was severely limited due to oedema and associated wound pain. Mrs R rated her pain at 8-9/10. She was uncomfortable

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Figure 1. Day 1.

Figure 2. Day 1.

and verbalised her concerns regarding the ongoing deterioration of her wounds.

Several wound challenges were identified:

- To halt the progressive tissue destruction.
- To effect positive bacterial load management at the wound bed, thereby facilitating effective wound healing, decreased pain, improved limb function and early discharge.
- To manage associated wound pain through correct dressing choice and frequency of change.
- To improve limb function by reducing oedema and associated wound pain.
- To facilitate discharge home with twice weekly community dressings.

It was evident that, despite 5 days of triple intravenous antibiotics, the wounds had deteriorated. The need for a good antimicrobial dressing was obvious. Blisters, where possible, were de-roofed and collections drained. A wound management plan of Aquacel Ag®, non-adherent dry dressing, combine and bandage twice weekly was initiated. The arm was elevated in a gallows sling initially to aid in oedema reduction. As the wounds healed, Bactigras was placed over the new epithelium and Aquacel Ag was continued on the remaining open areas.

Prior to discharge, 10 days after wound treatment was commenced, the oedema had resolved and almost all sloughy tissue was debrided. Dry, flaking skin and eschar were debrided carefully at each dressing change. Mild erythema persisted. Mrs R chose to return to the hospital twice weekly for Aquacel Ag dressings (Figures 3 & 4). Eleven days post discharge, the wounds were 90% epithelialised. The remaining areas were clean and granular. Nil erythema was noted and management was changed to weekly dressings. Mrs R returned 1 week later with her wound healed (Figures 5 & 6).

Discussion

Aquacel Ag was chosen as the primary dressing for several reasons:

- Silver has a known cytological effect against *P. aeruginosa.*
- *P. aeruginosa* is known to be a "water loving bug"[1]. Aquacel Ag promoted absorption of excess fluid, thereby reducing the free fluid the bacteria enjoys. Conversely, the use of other silver products, which can require regular irrigation with sterile water to facilitate silver release, could encourage the bacteria to proliferate if the dressing is kept too moist[2].

Figure 3. Day 17.

Figure 4. Day 17.

Figure 5. Day 28.

Figure 6. Day 28.

- Gel formation engendered soothing wound contact and atraumatic removal, reducing associated pain.
- It facilitated twice weekly dressing changes.

The use of Aquacel Ag had an almost immediate positive impact on wound healing and this, in turn, led to a significant improvement in Mrs R's mental wellbeing.

Conclusion

Aggressive bacterial wound infections, such as that described, require a combination of appropriate systemic antibiotic therapy and topical antimicrobial dressings to facilitate optimal wound healing in a timely manner. Use of expensive silver dressing was both valid and justifiable, given the positive outcomes associated with the facilitation of timely wound healing, pain reduction, increased mobility, improved patient physical and psychological wellbeing, and early discharge. Choosing the correct wound dressing promotes quality outcomes as well as engendering patient and collegial confidence in the wound practitioner.

Editor's note

References

1. Public Health Fact Sheets, July 2004. Pseudomonas Infections. Communicable Diseases Unit, Queensland Health, Brisbane.
2. Armstrong DG. The use of silver as an antimicrobial. LLC Somerset: Alpha & Omega Worldwide, 2002.