

Use of a silicone contact layer and non adhesive foam dressing

ABSTRACT

Haematomas of the lower limb are traumatic wounds that can have serious and often debilitating consequences; especially in the aged. Wound healing may be protracted due to multiple factors including disruptive consumer behaviours from poor cognition from dementia.

This case study describes the management of an elderly consumer with dementia in a nursing home who sustained an extensive haematoma that resulted in a complex wound. Wound management was provided under local restrictions imposed by COVID-19.

The importance of using holistic wound assessment frameworks and evidence-based approaches to wound management to achieve positive wound healing outcomes are emphasised.

Keywords Haematoma, product choices, aged care, dementia, wound assessment

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INTRODUCTION

Subcutaneous haematomas secondary to trauma are common within the elderly¹ and are defined by Megson (2011)² as, “..an extravasation of blood outside the blood vessels”. Blood pools in the subcutaneous tissues or intramuscular spaces and presents as a raised dark red/black collection of blood that bulges above the surface of the skin.^{3,4} Large haematomas can exert significant pressure that exceeds that within the dermal and subdermal capillaries, which can precipitate necrosis of the overlying skin.³ Management of haematomas depends on the size of the haematoma and the health of the individual. Smaller haematomas may be readily reabsorbed. With larger or very large haematomas assessment of the haematoma needs to determine whether the haematoma can be managed conservatively with dressings and heal by secondary intention if local evacuation occurs or whether immediate surgical evacuation may be required.⁴ Medications such as

anticoagulant and steroid therapy place a person at higher risk of developing concomitant haematoma where a blunt force trauma injury has occurred.^{1,4,5}

There is a direct relationship between advanced age, dementia and falls that increases the elderly person’s risk of sustaining a lower extremity wound(s). Further, those with dementia, memory loss and cognitive decline may not comprehend instructions for wound management or become agitated with wound dressing processes and decline care offered.^{6,7}

Wound assessment is pivotal to initial and ongoing wound management strategies and evaluation of wound healing. Two commonly used wound assessment frameworks are the Triangle of Wound Assessment⁸ and Wound Bed Preparation.⁹ Collectively elements of these paradigms describe how to assess a person and their wound, ascertain characteristics of the wound and peri-wound skin, understand factors that may impair or advance wound healing and discuss relevant wound management strategies using an interprofessional approach.

This case study discusses the management of an elderly female consumer in an Australian nursing home who sustained a lower extremity haematoma that led to a chronic complex wound.

BACKGROUND

A 95-year-old female and permanent nursing home resident (the consumer) sustained a traumatic haematoma to her left

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lower limb during assistance with mobility and the use of a standing hoist. The injury was sustained on New Year's Day 2022, however, the injury was not identified until the following morning when staff removed her limb protectors to attend to personal hygiene and skin care for pressure injury prevention.

The consumer's past medical history includes advanced dementia, global amnesia, aphasia, dysphagia, incontinence of urine and faeces, cerebral vascular accident) intracranial haemorrhage (2014), psoriasis, impaired vision due to age-related macular degeneration and glaucoma, poor hearing, hypertension, varicose veins, senile purpura, recurrent falls with fractures- # R) neck of femur with gamma nail insertion (2021) and # R) Humerus (2022), chronic pain, osteoarthritis, vertebral spondylosis, metastatic bone disease - L) Humerus.

In addition to these co-morbid conditions she had a recent reduction in mobility status from her baseline due to a fall, requiring surgical management with Open Reduction and Internal Fixation (ORIF) for fractured Right neck of femur approximately 4 weeks prior to sustaining the haematoma. At the time of injury the consumer was chair bound.

Recent medication changes included the addition of opioid analgesia (post operative) and recent completion of post operative anticoagulation therapy. Her usual medications included: Macuvision, Calcium and vitamin D, Paracetamol, Latanoprost, Mometasone furoate, Calcipotriol; Bethamethasone dipropionate. Allergies were recorded as Co-trimoxazole, Sulphur and Penicillin.

Overall, the consumer's general health status was generally considered to be poor. A referral to the Clinical Nurse Specialist Skin Integrity (CNSSI) to review the consumer and her haematoma was received on 2nd January 2022. Simultaneously, a referral was sent to the consumer's General Practitioner (GP). Further it should be noted that this incident occurred when the nursing home was in isolation and lockdown due to COVID 19.

CASE PRESENTATION

Initial wound assessment and wound management strategies

On 2nd January 2022, registered nursing staff in the nursing home classified the injury to be "a bruise", however, they did refer the consumer for review on the internal electronic referral portal to the CNSSI and GP in line with facility policy for the injury. A photo accompanied the referral (Figure1). Interim advice to maintain integrity of the haematoma was provided via the internal electronic referral portal on 3rd January 2022 until the injury could be reviewed clinically the next day.

On clinical assessment by the CNSSI on the 4th January 2022 and using parameters of the Triangle of Wound Assessment as a guiding framework the following was noted:

- Wound bed assessment:
 - Tissue type: Haematoma with non-viable flap
 - Exudate: Low sanguineous exudate but not actively bleeding

- Infection: Inflammation resolving with no clinical signs of infection but remains at risk of infection
- Wound edge assessment: Well defined and dehydrated wound edges
- Peri-wound skin assessment: Dry skin.

In addition, to the above parameters the haematoma measured 180mm L X 65mm W and depth unknown. No other abnormalities were detected in the lower limb.

CLINICAL MANAGEMENT

Short term goals of care and initial wound management strategies

On initial clinical review of the haematoma, it was identified that close monitoring was essential and that limb perfusion, exudate levels and potential for further bleeding and swelling should be monitored closely throughout the day. Therefore, the initial goals of care and management of the haematoma was conservative and adopted the principles of R.I.C.E.; Rest, Ice, Compression and Elevation.¹⁰ In addition to this the GP prescribed a daily application of Hirudoid cream to assist with alleviation of localised pain, inflammation and bruising.

In terms of R.I.C.E. the following occurred:

- R: Bed rest was imposed for a week with the CNSSI recommending on the 10/1/22 that the consumer "may sit out for meal times only for the next week"
- I: Ice was applied in accordance with general principles R.I.C.E. for approximately 20 minutes every four hours as tolerated by the consumer
- C: Compression was applied using one layer of Tubigrip size E
- E: Elevation occurred with bed rest and further elevation on a soft pillow placed longitudinally to ensure the heel was offloaded of any pressure.

Initial wound management strategies

Initial wound management strategies included wound bed preparation using an aseptic technique, lower limb hygiene and skin care and dressing choices to protect and preserve the integrity of the haematoma. The regimen included:

- Wound cleansing agent: N/Saline
- Lower limb hygiene: Skin inspection and washing limb with warm water at time of dressing change and moisturise
- Peri-wound skin care: Barrier film to wound edges/peri-wound skin and emollient to surrounding skin to improve skin condition, reduce dryness and reduce risk of future damage
- Primary dressing: Silicone contact layer; Adaptic Touch™ (3M)
- Secondary dressing: Sterile highly absorbent pad; Impervia Neosorb
- Fixation: Velban, Crepe bandage and one layer of Tubigrip size E toe to knee

- Dressing frequency or change: 3rd daily or as required if dressing disturbed.

The haematoma was monitored closely for morphological changes that may occur as haematomas resolve or deteriorate and ensuing complications that may arise such as infection. Additional considerations at this point were:

- Bleeding: increased risk for bleeding due to recent use of post operative Enoxaparin and being mindful that wound debridement may be required
- Pain: differentiation of acute on chronic pain because of the haematoma
- Pre-existing lower limb oedema: potential to exacerbate complications
- Consumer behaviour: the consumer's behaviour was monitored to ensure past behaviors of removing dressings was minimised. In this instance, noncompliance with leg elevation and aggressive behaviors' at time of dressing change, such as kicking out, were challenging to manage due to increased risk of damage to wound bed and disruption of asepsis during the dressing procedure.

The haematoma remained relatively stable for a short period of time (Figure 2) Day 6 but at Day 9 it was noted there was some loss of the epidermis. The dressing regime was continued as per the initial plan of silicone contact layer, sterile highly absorbent pad and Tubigrip. By Day 12 (13/01/2022) the haematoma had dried, and the flap is noted to be non-viable (Figure 3).

By Day 16 (17/01/2022) the inflammation has settled further, and the flap was lifting and ready for debridement; there was no active bleeding, wound edges remained clearly defined, there were low exudate levels and no signs of infection. Using the principles of conservative sharp debridement the CNSSI debrided the non-viable flap from the wound bed in conjunction with thorough irrigation of the wound bed to remove residual clot. Following wound debridement, the wound now presented similar to that of a category 3 skin tear with full flap loss (Figure 4).

Long term goals of care and secondary wound management strategies

Following wound debridement and the resultant large surface area of the wound, the goals of wound healing were changed to reflect this. The focus was to promote granulation tissue, avoid or suppress hypergranulation tissue, reduce the potential for wound bacterial bioburden and manage wound exudate as this was expected to increase post debridement.

With these factors in mind the dressing regimen was changed to:

- Primary dressing: Silicone contact layer to cover a wide peri wound margin Adaptic Touch™ (3M)
- Secondary dressing: A non-adhesive foam to remove the

'dead space' between the wound and the dressing Biatain® Non Adhesive Foam

- Fixation: Dressings were secured with Velband, crepe bandages and Tubigrip toe to knee
- Dressing observation and frequency of dressing change: Daily dressing check and aim for weekly dressing change. By Day 24 a marked improvement in wound healing could be seen with a healthy evenly granulating wound bed (Figure 5).

Between six to eight weeks post debridement the CNSSI reviews noted the wound was healing well resulting in a significant decrease in overall wound size and change in shape. There was noticeable advancement of the wound edges, further development of epithelial tissue beginning to cover the wound bed that resulted in the wound bed being separated by an epithelial island resulting in two areas measuring L 28mm x W 24mm (Proximal) and L 86mm x W 48mm (Distal). Exudate levels remained low and well managed with no signs of peri wound skin maceration. In addition, the surrounding skin condition also improved but remained slightly dry. There was no lower limb oedema (Figures 6 and 7).

Subsequently, the dressing selection was changed to a larger sized Biatain® Silicone Foam border 15x15cm to provide wider peri wound margins, ensuring reduced risk of damage to fragile peri wound skin. There was ongoing use of a barrier film to wound edges/peri-wound skin and moisturiser to surrounding skin.

Ongoing monitoring and evaluation

Unfortunately, eleven days later (11 March 2022) fresh bleeding was noted, which nursing staff stated was trauma related due to consumer agitation and sitting position (Figure 8). However, on chart review it was also noted an alternative silicone foam border product was applied a few days prior due to an issue with stock availability. Further, minor wound deterioration occurred in terms of increased exudate, slight odour and change in exudate type were noted but not reported to the CNSSI until 25th March 2022 whereby the wound management plan was updated to include Inadine® to the distal wound edge for seven days after which the silicone foam border dressing was reapplied (Figure 9).

The wound then progressed well throughout April / May 2022. At the end of May, Nursing staff requested the wound chart be closed as the wound was noted to be 'healed'. Further review by the CNSSI identified persistent gravitational lower limb oedema remained and was challenging to manage, posing a risk of wound deterioration. The wound chart was kept open with weekly ongoing monitoring and application of the silicone foam border dressing for protection. The wound healed and the wound chart was eventually closed in August 2022, 7 months (215 days) after the injury occurred (Figure 10).

During the treatment period a multi-disciplinary team approach to holistic care was initiated.



Figure 1. Day 1- 3rd January 2022



Figure 2. Day 6 - 7th January

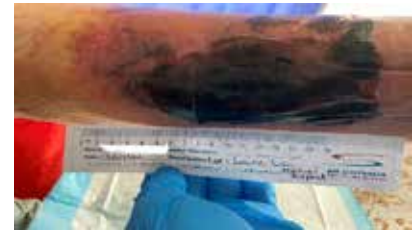


Figure 3. Day 12 - 13th January



Figure 4. Day 16 - 17th January 2022



Figure 5. Day 24 - 25th January 2022



Figure 6. Day 54 - 24th February 2022



Figure 7. Day 58 - 28th February 2022



Figure 8. Day 69 - 11 March 2022



Figure 9. Day 89 - 31 March post application Iodine to distal edges of wound margins



Figure 10. Day 215 - 4th August 2022

This commenced with open disclosure to family at the time of the injury, with updates provided by the home management team throughout the treatment period.

At time of injury initial referrals were made to the GP who initiated first aid (R.I.C.E. and Hirudoid cream), then to the CNSI for commencement of a wound management plan and oversight of healing process.

An onward referral to the Physiotherapist was recommended due to the recent falls and change in baseline mobility post hospitalisation. Involvement of the Physiotherapist helped to ensure current transfer and mobility assessments remained applicable and that the environment was safe and conducive to increased care needs and equipment. Additionally, there was a need to ensure that staff were aware of the importance of following the correct manual handling procedures and were aware of how to use the equipment in the home.

In the later stages of healing, when gravitational lower leg oedema became a concern, due to return to baseline mobility and spending increased time out of bed, the involvement of the Dietitian helped to ensure that nutritional needs were met through nutritional strategies, including protein supplementation with compact protein BD.

There was no need for any wound swab, or for any antibiotic therapy during the healing process as deterioration in the wound, when noted, was treated locally and monitored closely.

CHALLENGES IN CARE DELIVERY

The injury occurred during COVID-19 where in Australia nursing homes were subject to strict regulations and lockdown periods that governed criteria for entry to the nursing home, which created additional challenges in care delivery. These related primarily to organisational, staffing and product supply.

At an organisational level while the facility normally had registered nurse coverage 24hours a day but because of COVID 19 and subsequent staffing constraints assistants in nursing and care staff were, on occasion, required to attend to dressings. Further, there was higher use of agency staff due to Christmas/New Year and January summer holiday periods. This lack of continuity of care and differences in knowledge raised concerns that all staff may not be able to accurately assess, identify and respond appropriately to potential or actual signs and symptoms of complications and to effectively communicate and document these accordingly.

The supply of wound management products was a real challenge with interruptions to supply chains from the global effect of COVID-19. The CNSSI and facility management were acutely cognizant that any management plan put in place needed to be mindful of this. Further, staff training in appropriate use of recommended dressing products and cost-effective choices in dressing products were additional considerations and challenges to overcome.

DISCUSSION

Post injury and discovery of the development of the haematoma R.I.C.E. treatment protocols were initiated. While there is some discussion about the ongoing value of R.I.C.E. it is still a commonly used technique to reduce secondary tissue damage and soft tissue swelling within the skin and tissue of acute musculoskeletal injuries¹⁰.

Frameworks to guide wound management are useful tools to achieve common understanding of the assessment, management and ongoing evaluation of healing wounds and to facilitate communication of these factors in clinically appropriate language between nursing home staff and the broader multidisciplinary team. In this case the CNSSI used the guiding principles defined with the Triangle of Wound Assessment⁸ and Wound Bed Preparation paradigms⁹ to assess and evaluate wound healing, guide clinical nursing interventions and dressing choices as well as facilitate communication with staff and the multidisciplinary team. For example, wound debridement of the non-viable flap of the haematoma on the basis there was sufficient perfusion to support wound healing.

Similarly, product selection was made based on the short and long terms goals of care throughout the different phases of wound healing. In this case, and following debridement of the haematoma that created a wound with similar features to that of a category 3 skin tear with no flap, it was important to choose a primary dressing which would enable wound healing. And, in addition, control for local wound factors such as management of moisture, exudate, potential for infection, protection of peri-wound skin, ability to contour to the wound bed, be easy to apply and remove reducing the risk of medical adhesive related skin injury and decreased pain for the consumer as well as minimising frequency of dressing changes.^{11,12,13,14,15} Therefore, a silicone contact layer Adaptic Touch™ (3M) was initially chosen as the primary dressing to cover the wound bed and at times a wider area of peri-wound skin for additional skin protection. A non-adhesive foam, Biatain® Non Adhesive Foam, to remove the 'dead space' between the wound and the dressing thereby reducing risks of infection and hypergranulation was applied. Silicone contact layers, which have a coating of soft silicone on one or both sides of the dressing are advocated for their ability to support healing of granulation tissue, observation of the wound bed without having to remove the contact layer, protection of peri-wound skin and are atraumatic on removal.^{11,12} Further, they are useful in maintaining dry or necrotic wounds where moisture retention or re-hydration is not a primary goal of care.^{16,17}

When re-referral to the wound specialist did occur late on 25/03/2022, the wound management plan was updated to include Inadine® to distal edge only. Although Inadine® is not usually recommended for skin tears due to drying effect¹⁸ Inadine® was chosen to manage peri-wound skin maceration on the distal edge. Further, Inadine® is non-adherent, has antimicrobial action, is cost effective¹⁹ and was readily available given challenges experienced with product supply at the time. As staff were familiar with its use it was a safe and appropriate choice to use for over the weekend and for a further five days until the wound could be reviewed by the CNSSI after which use of the silicone foam border dressing resumed.

These choices also allowed for less frequent dressing changes by aiming for weekly dressing changes in conjunction with daily dressing checks to assess for exudate strikethrough and that the dressings remained in place. If staff assessed the dressing as requiring more frequent changes, then the CNSSI requested a wound image prior to changing the dressing frequency to ensure this was appropriate and that there were no additional underlying concerns or issues.

Lower limb oedema was challenging to manage in the later stages of healing as this was impacted by a return to improved mobility, spending longer time out of bed, involvement in lifestyle activities and reduced pain all of which were positive steps forward but increased the level of gravitational oedema and contributed heavily to the chronicity of the wound and delays in wound healing.

Overall, in terms of wound healing the consumer's multiple singular and co-related co-morbid conditions, some of which were not modifiable factors, likely contributed to the protracted period of wound healing.⁹

Wound management in persons with dementia can be problematic whereby due to cognitive decline and decreased ability to follow care directives consumers behaviours or actions can be or are detrimental to wound healing.^{20,21} In this case, the consumer required close supervision to ensure her behaviors of pushing dressings down, non-compliance with lower limb elevation and impulsive movements did not impact compliance with the R.I.C.E., wound management strategies and repositioning regimens, which if this occurred with regularity had the potential to increase the risk of further tissue damage, infection or pressure injury. If the consumer declined dressing changes the consumer was re-approached at different times by different people to see if the consumer could be persuaded to allow dressing changes before a formal decline was documented.

A multidisciplinary approach to care was adopted as much as possible under the restraints of COVID-19 conditions that included communication with the GP, dietician and physiotherapist in respect to the consumers food and nutritional intake and level of mobility; and, the consumers family regarding wound healing progression. Staff education was provided on mobility, falls and the environment, manual handling, and correct use of equipment ensuring safe transfers,

and positioning and the importance of risk assessments, care evaluation and the impacts of lifestyle and nutrition on wound healing. The CNSSI further highlighted the role that the GP and family continued to play in the consumers care at this stage.

COVID-19, as it did around the world,^{22,23} at times affected supply of wound management products and service delivery, which were overcome with product substitution, electronic chart reviews and telehealth.

CONCLUSIONS AND LESSONS LEARNT

Lower extremity haematomas are traumatic wounds that can have severe long-term consequences in terms of wound healing; particularly in the aged. Holistic assessment and continuous evaluation of wound healing using recognized wound related frameworks in conjunction with a multi-disciplinary team approach is imperative in achieving short and long-term goals of wound healing in complex cases such as this.

Deterioration in health should be recognized early so that risk assessments adequately reflect the consumer's current health condition as fluctuations in health can happen rapidly and significantly impact the level of care required. If clinical staff are aware of changes in a consumer's level of risk staff can aim to prevent potential complications, rather than a need to treat.

Here, increased awareness across the treating health disciplines was heightened to assist in early recognition and the management of any deterioration in the wound as well as providing supporting strategies to prevent recurrent lower extremity haematomas from traumatic injury.

Managing wounds in the aged, especially in the presence of dementia and within nursing home environments is multifactorial, complex and challenging. An individualized person-centered approach to their care is required that reflects the needs of a person with dementia and a wound.

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CONFLICT OF INTEREST

The authors declare there are no conflicts of interest.

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