

# Lower leg haematomas: Potential for complications in older people

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## Abstract

Older people are a high-risk population for lower leg soft-tissue injuries with the potential of haematoma development that can then create complications of infection, skin loss leading to chronic wounds and can potentially develop into lipomas or other soft-tissue mass. Lower leg haematomas are seldom reported in the literature or may be included in pretibial injury definitions. The New Zealand Southern Wound Service has experienced spontaneous and injury-related haematoma presentations. This case report presents a literature review and discusses and illustrates early and late intervention and provides recommendations for practice.

## Introduction

The Southern District Health Board consists of two regions, of which Southland is New Zealand's most southern health service, serving a population of 107,000<sup>1</sup>. From 2005, the Wound Service has provided holistic patient/wound assessments and management plans, education and support to patients, their whanau/family, care providers and health professionals in primary and secondary health care settings. Wound care is predominately practised and managed in the primary care sector<sup>2</sup> and a vast proportion of the work involves older people in their homes, out-patient clinics and in aged residential care facilities.

The Wound Service has encountered closed and open haematomas in older people that have occurred spontaneously

or have been associated with minor lower leg injury. If not managed appropriately, these skin injuries have progressed to partial or full thickness skin loss wounds healing by secondary intention and/or subsequently require surgical grafting as illustrated in the following three case studies. Case study four illustrates haematoma development and management and will be presented in two parts. To maintain confidentiality, fictitious names have been used.

## Case study one

Annie, a 70-year-old, active lady, resides at an aged care facility. Annie has dementia and sustained a closed left lower leg pretibial injury after a patient's walking-frame fell onto her leg. Annie's medications include anticoagulant therapy (aspirin) and the injury which was managed conservatively

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Figure 1a. Post skin excision and haematoma evacuation.



Figure 1b. 5 weeks healing by secondary intention post skin excision.



Figure 1c. Wound grafted 7 weeks post injury.

subsequently deteriorated. Annie's general practitioner referred her to the hospital emergency department and the necrosed skin was excised down to muscle fascia and the haematoma was evacuated (Figure 1a). Annie was then referred to the Wound Service and the wound was managed with products providing a moist healing environment and toe to knee tubular compression (Figure 1b). At seven weeks, the wound bed was skin grafted (Figure 1c).

### Case study two

June is an articulate, 81-year-old lady who mobilises with a walking-frame and requires some assistance with her activities of daily living. June resides in an aged care facility and has a history of congestive heart failure, atrial fibrillation and a right total knee replacement. June's medications include anticoagulant therapy (warfarin and aspirin). June developed a spontaneous expanding right medial lower leg haematoma

and was referred on day four to the Wound Service by the facility's registered nurse (RN). After this initial assessment, the Wound Service, concerned about the growing size of the haematoma, devitalised underlying tissue and risk of infection, urgently referred June to the hospital surgical team (Figure 2a). June required surgical excision down to the muscle fascia with haematoma evacuation and was managed with topical negative pressure, which was discontinued due to uncontrolled wound bleeding. The RN and Wound Service subsequently managed June's wound with moist wound healing products and low compression therapy. Once a healthy granulating wound bed was achieved, June had an elective split skin graft one month post-skin excision (Figure 2b).



Figure 2a. Presenting expanding spontaneous haematoma.



Figure 2b. Graft site approximately one-month post surgical excision procedure.

### Case study three

Molly, an independent, 96-year-old lady, was admitted from her home to hospital with a history of ischaemic heart disease and chronic renal failure. Her medications included anticoagulants (aspirin and clopidogrel, an antiplatelet agent). During her hospitalisation, Molly knocked her left lateral lower leg on the frame of the weighing scales, causing loss of epidermal tissue and instant tissue swelling (Figure 3a). A small dermal tear sustained from the injury facilitated free draining of haemoserous fluid. Conservative management including limb elevation and use of low-adherent dressings and absorbent secondary dressings were used. At day seven, the dermal tissue presented necrosed and was surgically debrided (Figure 3b). Molly was placed into an aged care facility with support from the Wound Service. Molly declined skin grafting and her wound was left to heal by secondary intention, assisted by moist wound healing and low compression therapy (Figure 3c). Molly's wound re-epithelialised rapidly, but unfortunately she died from cardiac failure one month post-injury.



Figure 3a. Post trauma injury.

### Case study four

John, an independent, 78-year-old man, attended a routine 'well-leg check' post-venous ulcer healing at the Southland Wound Clinic. John had been moving furniture the previous

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Figure 3b. Wound presentation at day seven.



Figure 3c. Wound presentation 5-days post surgical debridement.

day and knocked his right lateral lower leg on a table and developed a closed haematoma (Figure 4a). John's management and treatment will be discussed later in part two.

## Literature review

A literature review was performed using Medical Subject Headings (MeSH®). Terms were included with the use of Boolean operators: aged, humans, haematoma (therapy), soft-tissue injuries (complications and therapy), pretibial, degloving (MeSH® term used leg injuries – complications and therapy). Ovid MEDLINE(R) 1996 to Present, Cinahl,

Cochrane Database, PubMed and American College of Physicians (ACP Journal Club).

No systemic reviews, randomised controlled trials or cohort studies were found specifically relating to lower leg haematomas, although a review and retrospective study on pretibial injuries was included. A retrospective review analysing lipomas after blunt soft-tissue trauma and a series of patient case studies concerning acute management and the development of chronic haematomas were also reviewed.

## Haematoma causation

Case reports have identified low and high velocity trauma, bleeding disorders, anticoagulant therapy and spontaneous development of lower leg soft-tissue haematomas<sup>3-7</sup>. It is proposed that haematomas develop from a shearing injury, causing separation of the skin and subcutaneous tissue from muscle fascia. This develops a space capable of filling with blood, causing high-pressure forces on the tissues potentially causing skin necrosis or the formation of a fibrous cavity<sup>4,7</sup>.

Pretibial injury refers to an injury affecting the medial, lateral and anterior areas of the tibial bone. Older people are overly represented in these injuries due to skin vulnerability as ageing reduces skin elasticity, dermal anchorage and subcutaneous tissue. Older people also have a higher risk of other factors predisposing to lower limb haematomas including falls, diabetes-related neuropathy, and lower leg vascular disease<sup>8-10</sup>. Pretibial injuries are often associated with haematoma development<sup>8</sup>, but this definition does not include non-injury, spontaneous haematomas. A New Zealand retrospective study utilising national health discharge information from 1986 to 1999 approximates pretibial injuries occur at 33 per 1000 population, with up to 90% affecting women and higher rates occurring at 70–90 years of age<sup>11</sup>.

## Haematoma management

Lower leg haematoma management in older people poses many challenges due to ageing skin changes, patient comorbidities, especially vascular disease, poly-pharmacy, including the use of anticoagulants and drugs that affect skin and wound healing<sup>9,12</sup>.

Higher mortality rates associated with delayed surgical intervention and social decline have been reported in older patients presenting with pretibial injuries<sup>13</sup>. To salvage tissue, early haematoma evacuation is recommended for larger volume haematomas, as these may result in skin necrosis and infection, requiring debridement and possibly skin grafting<sup>5,12</sup>.

A system of pretibial laceration classification proposed by Beldon<sup>14</sup> combines two approaches to classification and incorporates both classification and management for pretibial injuries. This system recommends surgical intervention for non-absorbable haematoma. If the injury is open and related to a potentially contaminated source, tetanus vaccination status should also be reviewed<sup>8</sup>. A case report utilised a liposuction cannula and syringe (post-local anaesthesia) to aspirate developing and coagulated closed haematomas situated over muscle fascia<sup>4</sup>. Post-procedure, an Unna boot (compression dressing) was applied to reduce haematoma reformation and allow degloved skin to re-adhere and heal<sup>4</sup>. Similarly, the use of Yankauer suction cannula attached to suction has been used to evacuate haematomas of the lower leg<sup>12</sup>. Post-procedure, the skin opening is left open or taped to allow drainage and lower-leg compression is applied<sup>12</sup>. An alternative or adjunct to compression bandaging is topical negative pressure. Although not specific to the lower leg, its use has been reported for an acute degloving injury of the buttock and lower back<sup>15</sup>.



Figure 4a. Presenting closed haematoma post trauma injury.

A review on the use of prophylactic antibiotics for pretibial haematomas was performed but no evidence currently exists to resolve this enquiry<sup>16</sup>.

### Case study four – part two

John's closed haematoma was managed at the clinic with local injected skin anaesthetic and a full-thickness incision

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Figure 4b. Skin locally anaesthetised, incised and clot expelled.



Figure 4c. Day seven post clot evacuation and compression therapy.

performed, the haematoma was then expelled using firm palpation (Figure 4b). John was then placed into compression bandaging for one week. The clinic arranged follow-up at seven days and the compression was removed, revealing no tissue loss or haematoma redevelopment (Figure 4c). As previously reported, compression therapy post-haematoma evacuation reduces the risk of haematoma reformation, re-adheres skin layers and manages lower leg oedema experienced after traumatic injuries<sup>17</sup>. Compression therapy also allows the patient to mobilise and remain independent, enabling them to be managed on an out-patient basis.

It is important to emphasise a thorough patient history and limb and arterial vascular assessment (ankle brachial pressure index) should be performed by a trained health care professional prior to applying high compression<sup>18</sup>. The limb should also be regularly assessed for vascular compromise if

using low compression such as the use of toe-to-knee, straight tubular bandages<sup>19</sup>. Therefore, patient assessment, education and ability to remove compression (or someone to provide this assistance) need to be assessed and plans regularly re-evaluated to ensure effective management strategies are maintained.

### Chronic haematoma complications

Haematomas that do not cause skin necrosis may result in a permanent raised skin defect that may be more prone to injury or may insidiously grow and are often mistaken for a neoplasm<sup>7</sup>. Though occurring rarely, haematomas can increase the risk of developing compartment syndrome affecting leg muscles, nerves and progressing to tissue hypoxia<sup>3,20</sup>. In one case report, bed rest was used to conservatively manage a spontaneous haematoma that reoccurred three times over prolonged time periods in a 52-year-old man<sup>3</sup>. The cause was attributed to repeated tissue trauma related to his occupation as a construction worker<sup>3</sup>.

Another case report describes a 78-year-old man who presented with a 12-month history of an enlarging lower leg mass over an old war injury site<sup>21</sup>. An incisional biopsy revealed it to be a calcifying haematoma, which is rarely reported in the literature<sup>21</sup>. A retrospective review analysing 170 patients (age range 18–74 years) used ultrasound to diagnose 31 patients with 34 lipomas found in the subcutaneous skin layer in varied body locations from lower and upper legs, chest, back, head and neck and hands and arms<sup>22</sup>. These lipomas were directly associated with a prior blunt soft-tissue injury<sup>22</sup>. The aetiology of lipomas post-injury is not clearly understood and the authors suggest it may be attributed to chronic inflammation and the release of cytokines and growth factors from the residual haematoma and necrosed tissue<sup>22</sup>. Lipomas can develop from five months to six years after injury, are slow forming and painless but can be aesthetically displeasing<sup>22</sup>. Surgical excision or liposuction with primary closure was used in all cases with no reported complications<sup>22</sup>.

### Practice recommendations

Injury prevention is paramount to reduce pain and suffering and the associated health care-related costs of lower leg injuries<sup>11</sup>. Ageing affects skin turgor and reduces resistance to injury; comorbidities and polypharmacy may also increase the risk of falls<sup>14</sup>. Haematoma development is further increased with the use of anticoagulant therapies<sup>14</sup>. It is important to investigate the cause of injury and the patient should be assessed to determine any underlying medical conditions

that may need to be better managed or rectified<sup>8</sup>. Skin care guidelines, such as the Wound Care Association of NSW Skin Care Guidelines<sup>23</sup>, should be incorporated into practice by health care professionals and care assistants in patient homes, hospitals and care facilities, since prevention is achievable in accidental trauma-related injury cases. These guidelines provide clear instruction on caring for aged skin; preventing injury; providing a safe environment; using limb protectors; and providing adequate nutrition and hydration, which are both essential to skin health and wound healing<sup>23</sup>.

In New Zealand, physical care of older people in aged residential care facilities is predominately provided by unregulated health care assistants who have no scope of practice or ongoing educational requirements<sup>24</sup>. Therefore, the provision of education is left to individual facilities to provide<sup>24</sup>. These indispensable front-line workers require the investment of ongoing education so they have the knowledge and confidence to help prevent injuries, assist with relevant skin care guidelines and provide early reporting of any anomalies<sup>24</sup>.

Early haematoma identification and patient referral to a relevant wound service or hospital for management is paramount alongside pain assessments and appropriate wound management for any skin injury and, if necessary, the consideration of topical analgesia to reduce the risk of side effects related to systemic analgesia<sup>14</sup>.

## Summary

This case report and accompanying literature review has discussed and illustrated the varied procedures used to manage lower leg haematomas in their acute and chronic phases, and highlighted the importance of early referral and haematoma evacuation. Older people are a group particularly susceptible for this type of injury and who would benefit from lower leg injury prevention plans. Health care professionals collectively can work together with their patients to develop and implement such plans and reduce these potential risks. Should such an injury occur, an evidence-based approach to management should ensure a successful outcome.

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