Wound detectives: Can you solve the case?

Welcome to 'Wound detectives', where Joy Tickle shares a real-world case presentation and asks whether you can diagnose and treat the patient. What do you think is the cause of the wound, what tests would you order to confirm your diagnosis and what treatment would you provide?

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A 54-year-old lady named Elaine presented to the practice nurse at her local surgery with an extensive wound to her lower limb (*Figure 1*). The wound was extremely painful and distressing to her. Upon clinical examination the wound bed showed 100% devitalised tissue. The wound measured 15cm x 7cm, with the depth being difficult to determine due to the wound bed tissue and the periwound edge was raised. She had attended her local Accident and Emergency department for advice and treatment, two days before.

Elaine works in a food distribution warehouse as a packer she has a medical history of atrial fibrillation and osteoarthritis. Her medication was non-steroidal inflammatory tablets and Warfarin. She smoked twenty cigarettes per day.

At the appointment with her practice nurse the tissue viability nurse (TVN) consultant was undertaking a clinic in the same building and due to the extent of the tissue damage and the size of the wound the practice nurse asked her for specialist advice.

Elaine's wound was very painful and tender to touch and there was extensive periwound and lower limb oedema. There was also a high volume of thick viscous haemopurulent tissue that bled easily on dressing change, all

Figure 1. Haematoma to lower limb

characteristics of a haematoma determined the TVN consultant (*Figure 1*).

A haematoma can be described as a swelling caused by bleeding into the tissues usually as the result of injury (Smith and Williams, 2004). Lower-leg haematomas are caused by trauma and can develop spontaneously and can also be classed as closed or open (Pagan and Hunter, 2011). In the development of a closed lower-leg haematoma, large collections of blood accumulate, the pressure within the haematoma can exceed the blood pressure in the dermal and subdermal capillaries, and this, in turn, can result in large areas of necrosis (Chami et al, 2005). In these instances, prompt surgical action is needed to evacuate the haematoma and release the tension created.

Financially a haematoma requiring a hospital admission of 11 days and skin grafting costs the NHS £3500 per admission. (Thompson et al, 2012). Rees in 2007 found that a quarter of all patients who develop a lower leg haematoma required a period of rehabilitation after discharge from hospital, while 17% underwent a permanent change in their social circumstances by six months, post-discharge (Rees et al, 2007).

Question 1

What may lead to the development of a haematoma?

Question 2

What drugs/medication may increase the risk of bruising or haematoma formation?

Question 3

What contributing factors may have led to the development of Elaine's haematoma?

Question 4

Who may be involved in the assessment and management of the haematoma?

Question 5

What may the clinical staff advise/ implement to meet Elaine's main objectives?

Question 6

What methods of wound debridement may assist in the removal of the devitalised tissue to the wound bed?

Question 7

What are the ideal wound dressing properties for the treatment of the patient's haematoma?

Question 8

What advice could you offer Elaine with regards to her lifestyle and environment that may assist the wound healing process and prevent the risk of further haematoma formation?

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Question 1. What may lead to the development of a haematoma?

Answer:

Common causes, Barhum (2022):

- Trauma injury
- Bleeding disorders, which cause blood clotting problems, for example haemophilia
- Thrombocytopenia
- Alcohol dependency, which can lead to liver damage
- Liver disease
- Deficiency of vitamin C or K reducing blood clotting efficiency
- Severe viral infection
- Blood cancer
- Myxofibrosarcoma a subtype of soft tissue sarcoma, a tumour of the connective tissue
- Purpura simplex
- Actinic purpura, also known as senile purpura
- Dermatoporosis, a condition characterised by atrophy of the epidermis and dermal collagen. The subcutaneous vessels are also closer to the surface, making them more prone to injury that results in bleeding.

Uncommon causes, Barhum (2022):

- Hereditary haemorrhagic telangiectasia (HHT)
- Cushing syndrome.

Question 2. What drugs/medication may increase the risk of bruising or haematoma formation.

Answer (Barhum, 2022):

- Nonsteroidal anti-inflammatory drugs (NSAIDs) for example aspirin
- Blood thinners, for example heparin and Coumadin (warfarin), which may be used to treat blood clots
- Corticosteroids for example prednisone, which may be used to treat inflammatory conditions
- Certain types of antibiotics that may be prescribed for bacterial infections
- Herbal supplements for example Ginkgo biloba, omega-3 fatty acids, and garlic8.

The highest incidence of haematomas (90%) is among women, and it is thought that most of the injuries occur in the home and garden (Laing and Tan, 2009). Women are also at risk due to skin changes that occur due to decreasing hormone levels (Laing et al, 2002; Sussman and Golding, 2011). The effects of skin ageing are also a major risk factor in the development of lower-limb haematomas. Epidermal thinning and diminished cohesion of the skin layers. (Nazarko, 2007).

As already mentioned certain medications can increase the risk of lower-leg haematomas. People prescribed anticoagulants such as warfarin are at an increased risk of development of a lower-leg haematoma, especially those who have an uncontrolled, high international normalised ratio leading to slow blood clotting (Thompson et al, 2012). Corticosteroids have multiple side effects that not only make the skin vulnerable to trauma, but also delay healing and increase susceptibility to infection (Thompson 2012).

Question 3. What contributing factors may have led to the development of Elaine's haematoma.

Answer:

- Considerable risk of trauma injury due to her work environment
- Anti-coagulant medication
- NSAIDs medication
- Gender: female hormonal changes
- Comorbidities
- Age.

The assessment and treatment of Elaine's large and extensive haematoma needs to be timely effective and involve other members of the multidisciplinary team.

Question 4. Who may be involved in the assessment and management of the haematoma

Answer:

- Accident and emergency department
- Surgical consultant
- Vascular consultant
- Plastic surgeon
- GP regarding medication etc
- Tissue viability team.

As previously mentioned, Elaine had been assessed in the local A/E department two days before. Here under the care of the surgical team X-rays were undertaken to ascertain any potential damage to the bone or any presence of a foreign body from the trauma injury. Venous blood tests were taken to ensure safe clotting times/factors and full blood count and U/E to rule out any other potential disorder that may have caused the haematoma to develop. The results were favourable, and no other cause of concern identified through her blood screening. A vascular assessment also concluded that her arterial and venous blood flow were satisfactory.

The surgical team under local aesthetic undertook conservative sharp debridement to evacuate the haematoma and remove some of the devitalised tissue. This procedure was carried out only once it been determined that Elaine was no longer at risk of further bleeding. It is essential that regular analgesia is administered once the procedure has been carried out to control any pain the patient is experiencing from the injury. The benefit of carrying out debridement of the devitalised tissue in a timely manner is that it minimised the onset of complete skin loss, necrosis, infection, and the need for possible skin grafting (Karthikeyan et al, 2004). Therefore, it was decided that the haematoma would be managed conservatively.

The practice nurse, tissue viability specialist and Elaine discussed her treatment options. Elaine's personal objectives were to reduce her pain and to prevent the wound from "leaking", both of which were impacting her quality of life and causing her significant anxiety and stress.

Question 5. What may the clinical staff advise/implement to meet Elaine's main objectives?

Answer:

- Regular pain assessment and review of her pain management strategies/analgesia
- Effective wound cleansing/debridement to remove devitalised tissue/slough and prevent infection
- Implementation of absorbent dressings to absorb and retain the high volume of exudate and prevent leakage
- Timely and evidence-based primary wound dressing treatments to promote healing/ wound closure
- Advice and support regarding her lifestyle to assist wound healing such as: nutritional advice, cessation of smoking. elevation of her limb when resting, light mobilisation to assist with arterial flow and venous return to the limb, as well as protection of the limb to avoid further trauma.

When a lower leg haematoma is managed conservatively, the aim is to debride the haematoma as atraumatically as possible and to ensure the wound bed is prepared to facilitate the formation of granulation tissue, followed by epithelial tissue and ultimately wound closure. Wound debridement is defined as the scientific removal of the damaged, infected or dead tissues from the site of injury in order to facilitate speedy recovery and healing of the remaining healthy tissues as well as the affected tissues (Thompson-McHale, 2015). Removal of the devitalised tissue will also assist in reducing the risk of infection. (Beldon, 2011).

Before undertaking any method of debridement, it is imperative that clinicians revisit their skill set to ensure they are equipped to offer patients the appropriate debridement method for their needs. (Young 2012). In addition a holistic patient assessment considering any associated comorbidities and whether there is still a potential that debridement could cause further bleeding and damage. If there is no risk of further bleeding from the haematoma, debridement can take place. (Thompson-mchale, 2015).

Question 6. What methods of wound debridement may assist in the removal of the devitalised tissue to the wound bed?

Answer:

- Autolytic
- Mechanical debridement pads
- Chemo mechanical
- Larvae therapy
- Sharp debridement.

Wound debridement via autolysis is commonly used in wound treatments. Autolytic debridement will occur naturally as the individual's immune system will "breakdown" the non-viable tissue (Ayello et al, 2004). Phagocytic cells, such as macrophages and the destructive (proteolytic) enzymes in the wound bed, liquefy and separate necrotic tissue from the wound bed (Young, 2011). This debris is then cleared either by the dressing or by macrophages and neutrophils (Hampton, 2011). Wound dressings that provide a moist wound environment will act by softening the devitalised tissue examples of such dressing types may be hydrogels, hydrofibres, alginates and hydrocolloids.

Mechanical methods of wound debridement may involve the use of debridement pads, cloths and gloves that act by gently disrupting the devitalised tissue and slough then removing it on to the pad. (Stephen-Haynes and Callaghan, 2012; NICE, 2014).

Chemo mechanical methods can also assist with wound debridement Chemicals that debride devitalised tissue include topical antimicrobials and honey, which can also be used for this purpose (Thomas, 2010). Also, the use of surfactant solution and chemicals are extremely effective.

Larval therapy delivers rapid and non-invasive debridement of a haematoma (Rafter, 2012), where the Maggot larvae feed on dead and decayed tissues.

Finally sharp debridement is a rapid method of removing devitalised tissue. Often referred to as conservative sharp debridement (CSD) this is the removal of non-viable tissue using a scalpel or scissors, the clinician only removes nonviable material (Young, 2012). It is imperative that clinicians who perform CSD have the knowledge and skills to do so safely and effectively (Haycocks and Chadwick, 2012).

It is important that patients are involved in any decision regarding debridement of his or her wound. The discussion should include a discussion of various debridement options and potential outcomes for debridement techniques, e.g., reduction in risk of wound infection and the possibility of the wound becoming larger in size (Haycocks and Chadwick, 2012).

Following wound debridement and cleansing it is important to ensure that the dressing choice is tailored to the requirements of the patient, the wound, and the surrounding skin.

Question 7. What are the ideal wound dressing properties for the treatment of the patient's haematoma.

Answer:

- Prompts moist wound environment and facilitates autolysis to remove devitalised tissue and slough
- Dressing is comfortable with effective wear time to avoid unnecessary dressing changes, which may cause additional pain and distress
- Atraumatic on dressing application and removal
- Absorbent and locks away the high volume of exudate preventing dressing leakage
- Have haemostatic properties to assist with the bleeding haematoma
- Gentle to the periwound and surrounding skin to avoid further skin damage
- Compression therapy if appropriate to reduce oedema and encourage venous return
- Has antimicrobial properties, only if local/ systemic infection is identified.

The patient's haematoma was debrided using a chemo mechanical agent and dressed with a primary chitosan dressing, a secondary

Figure 2. After four weeks

superabsorbent dressing and compression therapy bandaging. After four weeks the devitalised tissue was completely removed and as a result a clean granulated wound bed was observed (*Figure 2*). The patients pain discomfort and anxiety were also resolving.

By week 16 the wound had completely healed but it was important to discuss with the patient how she could prevent further haematoma development.

Question 8. What advice could you offer Elaine with regards to her lifestyle and environment that may assist the wound healing process and prevent the risk of further haematoma formation.

Answer:

- To be vigilant regarding safety at work and home to avoid trauma injury, for example wearing appropriate footwear to prevent falls and the possibility of traumatic injuries to her legs
- Avoid alternative medicines that may act as an anticoagulant
- Seek medical advice immediately if there are any noticeable skin changes/colour changes to her limbs
- Ensure a good skin care regimen by keeping the skin clean and hydrated. Washing the skin with an emollient to prevent the skin becoming dry and the application of emollients can reduce the incidence of skin tears by 50% (Carville et al, 2014).

CONCLUSION

Haematoma formation is a debilitating condition that can be avoided. The incidence of lower limb haematomas is increasing (Laing et al, 2002). Emphasis on developing prevention strategies nationally and locally in both primary and secondary care is crucial.

It is hoped that this episode of the wound detective has supported you in recognising the clinical signs of a haematoma, understand ing the causes and risk factors associated with them and informed you about the effective treatment and prevention of haematomas so as to provide the best evidence-based care for your patients. WUK

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