

Wound detectives: Can you solve the case?

Welcome to the next installment of 'Wound detectives'. Joy Tickle shares a real-world case presentation and asks whether you can solve the case. 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 referral was made to the tissue viability service from a practice nurse with regards to a young 25-year-old lady with a non-healing wound to her finger. She is married with two children and works as a school secretary.

The wound had presented suddenly and, despite various evidence-based wound treatments for over 4 months, it had failed to improve. The patient has no known underlying comorbidities and she had recently completed a course of medication for her skin acne. Upon discussion with the practice nurse she was quite vague in how the wound had developed; she was unsure if she had injured her finger while she was on holiday in France.

Over the past 4 months, the wound had been increasing in size and making everyday living activities difficult. Simple everyday tasks were now difficult to undertake due to the location of the wound; the wound was not painful but as she described was a 'nuisance'. This was causing her a great deal of distress and anxiety. It also made her job as a school secretary difficult. Following an holistic patient assessment, a quality of life assessment identified the negative impact the wound was having upon her life.

The tissue viability nurse specialist



Figure 1. The wound on presentation

Question 1

From the initial patient and wound assessment, what may be the possible cause of the wound? Name FIVE

Question 2

What signs and symptoms from the patient's history/wound description and image makes you find the wound unusual?

Question 3

What investigations/tests could be undertaken to assist in ascertaining the wound aetiology?

Question 4

For the patient in the case study, what do you think may have been the cause/triggers that may have led to the formation of the granuloma?

Question 5

From the information in the case study and the description of the different types of pyogenic granuloma, what type of granuloma do you think this patient developed?

Question 6

While awaiting treatment by the dermatologist, how best may you manage the wound signs and symptoms?

Question 7

Under the care of a specialist, name four other possible treatment options (apart from surgery) for this type of granuloma.

Question 8

What are the three main types of pyogenic granulomas?

examined the wound, which was present on her finger below her nail bed and measured 1.2 x 1 cm. The tissue to the wound was bright red and granular in appearance, friable

and bled easily upon examination. The tissue was extremely prominent from the skin surface and was 100% overgranulation tissue (Figure 1).

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Question 1. From the initial patient and wound assessment, what may be the possible cause of the wound? Name FIVE.

Answer: The possible causes may be :

- » Trauma
- » Insect bite
- » Malignancy/skin cancer
- » Granuloma
- » Soft tissue skin/wound infection (bacterial/fungal)
- » Sun damage
- » Viral infection (wart/herpes)
- » Autoimmune condition (inflammatory bowel disorders)
- » Medication reaction (reaction to, protease inhibitors, immunosuppressant agents, cancer therapies)
- » Foreign object (debris/suture)
- » Skin irritant (tattoo inks/silica)
- » Vascular malformation (Brennan, 2021; Simmons, 2016; Mitchell, 2021).

Question 2. What signs and symptoms from the patient's history/wound description and image makes you find the wound unusual?

Answer:

- » Rapid onset and growth
- » Non-healing despite various evidence-based treatments
- » Extremely prominent overgranulation tissue
- » Friable bleeding tissue
- » Unusual location with no history of trauma
- » Unknown cause
- » Not painful.

From her initial assessment, the practice nurse did wonder if the wound had been caused by sun damage while the patient was on holiday in France, or whether it could be the result of an insect bite or trauma. The patient did confirm that she remembered no episode of trauma or sunburn. In view of the unknown cause, the rapid onset of

the wound, and its unusual appearance and lack of progression, a decision was made by the tissue viability specialist to undertake further investigations in order to ascertain its true aetiology and thus ensure the implementation of appropriate and effective treatment.

Question 3. What investigations/tests could be undertaken to assist in ascertaining the wound aetiology?

Answer:

- » Patient history/physical examination
- » Microbiology/culture and sensitivity, both bacterial and fungal/viral
- » Blood chemistry to eliminate any underlying conditions, such as infection or anaemia
- » Tissue biopsy and histology
- » Radiography to identify any foreign objects
- » Medication review to address any possible triggers from prescribed drugs
- » Screening of any possible underlying disorders that may have triggered the skin lesion (e.g. inflammatory bowel disease, diabetes, thyroid disease, cancers).

The patient underwent several investigations in order to ascertain the true aetiology of the wound. A wound swab and skin scrapings were taken for culture and sensitivity. This was to ascertain if the non-healing wound was a result of infection due to bacteria or a fungi or a virus such as herpes. The results of these tests did not indicate any significant infection or link to a fungal or viral infection.

Blood chemistry testing showed no anomalies or indicators of any underlying disorders that may have caused the wound to develop or delay the wound healing process, such as diabetes, inflammatory bowel disease or anaemia (Wollina et al, 2017).

A plain X-ray of the finger was also undertaken to identify if there were any foreign objects within the wound. There was no indicator of any foreign body.

From initial screening questions, there were no indicators of possible autoimmune

disorders such as diabetes or thyroid disease.

What could not be eliminated was whether the wound developed as a result of a reaction to the retinoid drug prescribed to treat her recent episode of skin acne.

From the tissue viability nurse specialist's experience, the unusual clinical appearance of the wound, and its non-healing status, it was agreed that the patient should be referred to a dermatologist, who could assist in identifying the wound aetiology and starting successful management.

Following a clinical assessment by the dermatologist, a tissue biopsy was taken from the wound. The histology results showed a prominent lobular capillary arrangement in the dermis, and that the overlying epidermis was thinned and ulcerated. Within the tissue, there were also inflammatory changes and signs of haemorrhage and excessive granulation tissue formation. Reassuringly there was no evidence of malignancy. These results were consistent with a condition known as pyogenic granuloma. (Sarwal et al, 2020; Zaboallos et al, 2010).

Pyogenic granuloma is more accurately called a lobular capillary haemangioma (Patterson, 2020). It is a benign vascular tumour that occurs on the skin and mucous membranes (Wollina et al, 2017). The lesion is made up of mixed inflammatory granulation tissue immune cells and white blood cells (macrophages; Sarwal et al, 2020; Calonje et al, 2016).

This condition can affect people of all ages but is most common in children from 6 years upward, teenagers and young adults. Women are twice as likely to be affected and it can also occur as a result of pregnancy (Brennan, 2021).

The clinical feature of a pyogenic granuloma of the skin is that it presents as a solitary painless red fleshy nodule, typically 5–10mm in diameter that grows rapidly over a few weeks. The surface is initially smooth but can ulcerate, become crusty, or verrucous in appearance. Pyogenic granuloma is usually solitary, but multiple nodules and satellite lesions can erupt.

The most common sites involved are the fingers and face. Pyogenic granuloma easily bleeds with minor trauma (Sarwal, 2020; James, 2000). These were all clinical features presented by the patient in this case study.

The true cause of granuloma is unknown but is most likely linked to a reaction to a different triggering event.

There have been a number of reported factors and triggering events implicated in the pathogenesis of this condition. These are due to the body's immune response to:

- » Trauma/skin injury
- » Infection
- » Inflammation
- » Irritants
- » Foreign objects
- » Sun exposure (Minocha and Kurien, 2020; Neil, 2020).

During these events, the tissue cells clump together in order to protect the body from potential threats. The first is keeping an infection from spreading by localising it. The second is isolating an irritant or foreign body so it cannot cause further damage. This can occur on the skin or inside the body.

Other associated causal factors associated with pyogenic granuloma are:

- » Pregnancy
- » Medication reaction/sensitivity
- » Oral contraceptive
- » Vaccinations
- » Long-term conditions, such as autoimmune disorders, Crohn's disease, sarcoidosis, diabetes, thyroid disease and cancers (Calonje, 2016; Brennan, 2021; BAD, 2018).

As discussed previously, the clinical diagnosis of pyogenic granuloma needs to be made based on the patient's history, the clinical presentation of the wound, and additional tests and investigations to exclude or confirm differential diagnosis.

Question 4. For the patient in the case study, what do you think may have been the cause/triggers that may have led to the formation of the granuloma?

Answer: The trigger(s) may have been:

- » Reaction to retinoid drug for treatment of acne
- » Oral contraception
- » Female higher incidence
- » Unrecognised trauma/injury
- » Sun damage.

From the literature, there are different types of granulomas. They include:

1. Foreign body granulomas

Penetration of the skin, eye, or other parts of the body can lead to a foreign body granuloma. This appears as a small lump at the site of the damage (Wollina et al, 2017; Mitchell, 2021; Sarwal et al, 2020; Neil, 2020).

Things that can lead to foreign body granulomas include:

- » Splinters
- » Bee stings
- » Spider bites
- » Irritating substances, such as silica or some tattoo inks
- » Injections, such as steroids, collagen or vaccines
- » Stitches.

2. Skin granulomas

There are different types of skin granulomas. These are:

Localised and generalised granuloma annulare

Granuloma annulare is a skin condition that causes bumps underneath the skin. The bumps are usually pink, yellow, or flesh-coloured and usually appear in the shape of a ring (Neil, 2020).

Granuloma annulare can affect any part of the body. They commonly appear on the:

- » Fingers
- » Hands
- » Feet
- » Elbows
- » Legs.

The forehead, abdomen, and neck are among the second-most commonly affected areas (Neil, 2020).

However, the lumps may appear on only one part of the body, known as localised granuloma annulare, or multiple lumps on more than one part of the body, known as generalised granuloma annulare.

Subcutaneous granuloma annulare

Subcutaneous granuloma annulare is often just one lump underneath the skin. It tends to affect children more than adults, and normally is not painful (Neil, 2020).

Subcutaneous granuloma annulare commonly appear on the:

- » Scalp
- » Arms
- » Legs.

Perforating granuloma annulare

Perforating granuloma annulare causes lumps that develop a yellow sloughy centre. They discharge and often the smaller lumps may join together to create a larger lesion. The lesions are often over granulating tissue and protrude from the skin surface (Neil, 2020).

Linear granuloma

Linear granuloma is extremely rare. The lumps tend to develop in a line on the fingers.

3. Internal granulomas

Autoimmune diseases, or health conditions linked to the immune system, are the most common cause of internal granulomas. Granulomas can develop inside the body and can affect the lungs, gut, or blood vessels (Neil, 2020; Jafarzadeh, 2006).

Patients with **tuberculosis** may develop granulomas inside their lungs. This is the immune system's way of stopping the *Mycobacterium tuberculosis* bacteria from spreading to other parts of the body (Jafarzadeh, 2006).

Patients with **sarcoidosis**, another autoimmune condition, may develop granulomas to form inside the lungs and can lead to permanent scarring of the lung (Jafarzadeh, 2006).

Patients with **Crohn's disease** may develop granulomas in their gut.

Patients with **polyangiitis** may develop

granulomas in the blood vessels, making it difficult for blood to reach vital organs. This is a rare disease and is a type of vasculitis or inflammation of the blood vessels (Jafarzadeh, 2006).

Diagnosis of pyogenic granuloma will depend upon where the granulomas are located. A holistic patient history and physical examination can assist in identifying and diagnosing skin granulomas. To diagnose internal granulomas, the clinician will need to understand the underlying cause of the problem. This may require a full patient history and screening tests in order to identify the underlying cause.

Question 5. From the information in the case study and the description of the different types of pyogenic granuloma, what type of granuloma do you think this patient developed?

Answer: The patient had a lesion that had perforated the skin surface. It was prominent from the skin surface, and was exuding serous fluid and blood. This is a perforating granuloma annulare.

Question 6. While awaiting treatment by the dermatologist, how best may you manage the wound signs and symptoms?

Answer: The granuloma will not heal by conventional wound management treatments. However, it is important to promote patient comfort and reduce the risk of infection.

- ▶ Atraumatic primary dressings and dressing procedures to reduce discomfort and minimise bleeding
- ▶ Effective wound cleansing and debridement to reduce bioburden and biofilm formation
- ▶ Haemostatic dressing choice to assist in the reduction of blood loss
- ▶ Protective and padded secondary dressing to absorb exudate and reduce trauma to the wound

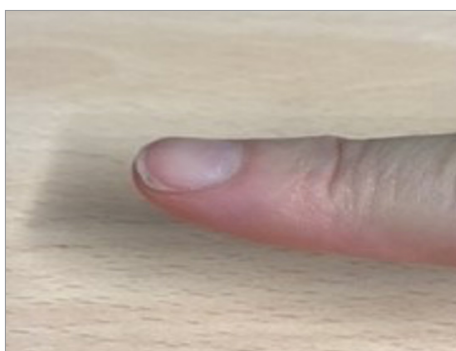


Figure 2. The healed wound following treatment

- ▶ Non-bulky secondary dressing to ensure the function and movement of the patient's finger is not restricted.
- ▶ Analgesia for pain relief
- ▶ A dressing regimen that can facilitate supported self-care to enable the patient to be involved with her treatment

Treatment plan

- Cleansing and debridement of the wound with normal saline and monofilament lolly to reduce bioburden and biofilm formation
- Alginate primary dressing to wound bed in order to assist with haemostasis
- Soft gauze and tubular finger bandage dressing to ensure absorbent of exudate and allow full movement of the digit
- A waterproof finger protector to allow the patient to carry out everyday activities of living.

(releasing time when not having to attend the practice for dressing change).

Taking into account the important wound management considerations, the following treatment plan was implemented for the patient in the case study.

Following the diagnosis of the granuloma, the dermatologist could now implement appropriate treatment. Clinical trials in the treatment of granulomas are limited, hence there is no accepted standard of care for treatment (Sarwal and Lapumnuaypol, 2020).

However, recommended specialist treatment options are:

- ▶ Cryotherapy (when extreme cold is used to freeze abnormal tissue)
- ▶ Curettage and cautery (removal of the lesion with a curette instrument and then cauterisation to stem the bleeding and also to lower the chance of re-growth)
- ▶ Application of a gel containing timolol or topical steroids. This maybe especially useful in children as it avoids more invasive procedures
- ▶ Intralesional steroid injection
- ▶ Topical or oral medical therapy (Beta adrenergic receptor antagonists) Timolol (TIMOPTIC-XE) gel 0.5%
- ▶ Imiquimod cream 5% cream used to treat warts and sun damage (works by stimulating the immune system)
- ▶ Laser surgery
- ▶ Surgical excision
- ▶ Phototherapy (ultra-violet light; Plachouri et al, 2019; Brennan, 2021; Wollina et al, 2017).

To ensure the granuloma is successfully resolved, the patient may require more than one episode of the specialist treatments.

Following an appointment with the dermatologist, it was agreed due to the size of the granuloma that it would be surgically removed. This was successful and the wound closed with minimal scarring (Figure 2).

Question 7. Under the care of a specialist, name four other possible treatment options (apart from surgery) for this type of granuloma.

Answer:

- ▶ Cryotherapy
- ▶ Curettage and cautery
- ▶ Application of a gel containing timolol or topical steroids
- ▶ Intralesional steroid injection
- ▶ Topical or oral medical therapy (Beta adrenergic receptor antagonists) Timolol (TIMOPTIC-XE) gel 0.5%
- ▶ Laser surgery.

Patients with this condition will need support and reassurance due to the fact

