

Collar button abscess of the foot: a case report

Key words:

- Collar button abscess
- Drainage
- Immunocompromised
- Infection

Abstract: The upper and lower limbs are the most exposed parts of the body, predisposing these areas for minor or major trauma, which can result in loss of skin integrity and bacterial inoculation. Seemingly minor injury, when not given early attention, may result in bacterial overgrowth and lead to deep space infections, especially in immunocompromised individuals. Collar button abscess, commonly associated with the hand, are a type of webspace infection that involves the plantar and dorsum aspect of the hand. A review of the literature has shown that discussion on collar button abscess of the foot is limited. Here we report a case of collar button abscess of the foot in an 11-year-old boy that progressed to healing following longitudinal incision and application of povidone dressings.

Limb infections are commonly seen in the community at large. The upper and lower limbs are the most exposed parts of the body, which predisposes them to trivial or major trauma, resulting in loss of skin integrity and bacterial inoculation. Seemingly trivial injury, when not given early attention, may result in bacterial overgrowth and lead to deep space infections, especially in immunocompromised individuals. These can contribute to grave morbidity and mortality, with potential limb loss.

Collar button abscess is an abscess involving the webspace, a term associated with the hands, and was first described after some similarities in its morphology to the collar buttons made famous from the 20th century. We would like to report a case mimicking a collar button abscess of the hand; however, for this patient, the collar button abscess involves the foot.

Case report

An 11-year-old boy with no medical illness presented with pain and swelling of his right foot. Caused by a cat scratch, this progressively worsened over the course of five days. He did not complain of fever and oral tolerance remained good. He was able to weight bear, despite experiencing pain in his right foot. Fluctuant swelling was visible at the plantar aspect of the foot and extended to the dorsum aspect of the right foot at the second toe

webspace (*Figure 1*). Systemic examination was unremarkable. Total white blood cell count was $11.44 \times 10^3/\mu\text{l}$ and radiological investigation was unremarkable. A longitudinal incision was done at the plantar and dorsum aspect of the second webspace (*Figure 2*), and pus was drained. Culture identified as *Staphylococcus aureus* was sensitive for oxacillin. On admission the child was started on a course of Intravenous amoxicillin/clavulanic acid for two days and subsequently discharged with oral amoxicillin/clavulanic acid to complete a one week course of antibiotics. The dressing of choice was povidone, which was changed once a day until the wound was healed. The patient was reviewed on day 14 postoperation and the wound had healed completely (*Figure 3*).

Discussion

Collar button abscesses are commonly associated with the hand and is a type of webspace infection that involves the plantar and dorsum aspect. A review of the literature has shown that information on collar button abscess of the foot is limited, as the term is commonly associated with the hand. Information on foot collar button abscess was detailed in relation to arterial end insufficiencies in the 1950's (Breidenbach and Lord, 1950). Anatomy of the foot has been extensively studied over many

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Figure 1. Right foot dorsum and plantar



Figure 2. Incision over the dorsum of right foot immediately after operation



Figure 3. Incision over the dorsum of right foot immediately after operation

decades (Loeffler and Ballard, 1980) and collar button abscess of the foot further shows that anatomy of the plantar aspect of the foot, both the layers, as well as the plantar fascial planes, is imperative to ensure proper surgical incisions are carried out.

The subcutaneous tissue of the sole is fibrous in nature. The fibrous septa may divide the tissue into many locules. The plantar aponeurosis is

composed of dense collagen fibres arranged longitudinally, originating from the medial aspect of the calcaneum. At the level distal to the metatarsal head, the longitudinal fibres are attached together by superficial transverse metatarsal ligament. The plantar aponeurosis then travels distally, inserting around the edge of fibrous flexor sheaths and into the deep transverse metatarsal ligament. The sole of the

foot is covered by thick skin with innervation from medial and lateral plantar nerves with medial three and a half toes innervated by the medial plantar nerve, which is similar to the ulna and median nerve distribution of the hand.

With such intricate anatomical considerations, exploration during debridement should be done on a systematic layer, so as to ensure every space is relieved of microbial load (Loeffler and Ballard, 1980; Kalbfell et al, 2016). Incisions should be made at both the plantar and dorsal aspect of the foot, due to the communicating nature of collar button abscess drawing parallels to the incision and drainage of hand collar button abscess (McDonald et al, 2011; Kalbfell et al, 2016; Malizos et al, 2020). Regardless of incision types, blunt dissection needs to be carried out to ensure the neurovascular bundles are preserved (Anakwenze et al, 2012). The blunt dissection will be able to form communication between the plantar and dorsum aspect of the abscess, allowing better drainage.

Nevertheless, damage to neurovascular bundle of the digits is always a risk. Traversing the webspace should be avoided when doing the incision to prevent neurovascular damage and postoperative contractures. After the incision and generous irrigation, the wound can be left open, and a moist antimicrobial dressing applied. In our case, a povidone dressing was selected for use. With tissue healing in the paediatric population significantly superior when compared with the adult population, prognosis will be good.

The most commonly affected immunocompromised individuals are patients with uncontrolled diabetes. Small abscesses can easily spread in these individuals causing sepsis thus increasing mortality and morbidity. These individuals also have an increased risk of developing necrotising fasciitis or gas gangrene (Jain and Viswanath, 2017). Collar button abscess is a deep space infection that should not be missed as delay in treatment may lead to devastating consequences, secondary to a spread in infection.

This abscess is the result of either a superimposed infection or a direct inoculation of bacteria. Research has shown that *Staphylococcus aureus* is the most common infectious organism, followed by Group A beta-haemolytic Streptococcus (Frank et al, 2005). *Staphylococcus* spp. is the most common commensal bacteria with up to 60% of individuals being permanently or intermittently colonised. This clearly shows the relatively high possibility of being infected by *Staphylococcus*

at any point. The challenge with *Staphylococcus aureus* is the high rate of resistance that occurs, along with it resulting in outbreak of methicillin-resistant *Staphylococcus aureus* (MRSA) infections at community level and/or healthcare level.

The spectrum of infection caused by *Staphylococcus aureus* is broad, ranging from superficial soft tissue infection such as cellulitis and erysipelas to deep-seated abscess. The pathogenicity of *Staphylococcus aureus* is known to cause fulminant multiorgan failure (Kobayashi et al, 2015). Therefore, it is imperative for treatment to include empiric antibiotics, which are then tailored according to the culture and sensitivity test.

As is the case in hand infections, management of foot infection needs to draw parallels from studies relating to the hand (Rigopoulos et al, 2012). As is for the hand, the anatomic pathway facilitates the spread of infection in the direction of least resistance. If disregarded with much less urgency than infection of the hand, infection may progress rapidly and potentially cause life- and/or limb-threatening emergencies (Gibbons, 1987; Frank et al, 2005; Anakwenze et al, 2012).

Since Kanavel studied the fascial planes of the hand (Kanavel, 1934; 1939) knowledge on hand incisions has grown, more so compared with the foot (Loeffler and Ballard, 1980). Collar button abscess of the foot is seemingly coined under the same umbrella of foot abscess. It is seen in the likes of immunocompromised individuals with a deeply infected DFU; this is an immediate cause for amputation in up to 50% of patients (Ricco et al, 2013).

In patients with diabetes and uncontrolled abscess, extensive involvement of the bone and joint predisposes them to being categorised as 'foot at risk', requiring prompt surgical debridement. It has been shown that patients with diabetes are 8 to 24 times more likely to undergo limb amputation than non-diabetics. This is important to note as this shows that the mortality and morbidity involving foot infections is high.

Death due to septic shock remains a grave concern (Jain and Viswanath, 2017). This review signifies the importance of taking foot infections seriously.

Conclusion

Collar button abscess can happen in the foot, although much less frequently when compared with the hand. Collar button abscess of the foot demonstrates the importance of understanding the foot anatomy in terms of the layers, as well as the fascial planes. A layer-by-layer

approach guided by knowledge of the above allows proper drainage of the abscess, thereby improving outcomes for the patient. **WAS**

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