CASE REPORT

Plantar fascia calcification a sequelae of corticosteroid injection in the treatment of recalcitrant plantar fasciitis

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SUMMARY

We report the case of a 72-year-old woman suffering with severe plantar fasciitis who received a therapeutic corticosteroid injection. Two-and-a-half years after the injection she developed a small calcified lump under the skin which subsequently caused ulceration and infection. She went on to develop a diabetic foot infection requiring an extended course of intravenous antibiotics.

BACKGROUND

Plantar fasciitis is a common foot disorder responsible for approximately 1 million doctor consultations per year. The exact aetiology of this condition is not well understood, supporting the theory that the cause may be multifactorial.¹ High incidence is found among runners which could imply repetitive microtrauma as a causal factor. Other associations include obesity or occupations which involve prolonged standing. Owing to these associations, it is theorised that overloading the plantar foot muscles originating at the volar calcaneus (adductor hallucis, quadratus plantae, flexor digitorum brevis and abductor digiti minimi quinti) can lead to inflammation and hence pain in the plantar fascia.¹

Risk factors can also be divided into extrinsic and intrinsic. Extrinsic factors include footwear and training surfaces while intrinsic risk factors include pes planus, overpronation, pes cavus, leg-length discrepancy, excessive lateral tibial torsion and excessive femoral anteversion.²⁻⁴

There are very few documented cases that reported of plantar calcification following corticosteroid injection. It is thought that the accumulation of insoluble steroid acts as a foreign body and

induces a chronic granulomatous inflammatory process, with subsequent calcification.⁵

CASE PRESENTATION

A 72-year-old woman was treated for severe recalcitrant plantar fasciitis with a corticosteroid injection. Initially her symptoms improved; however, she re-presented two-and-a-half years later with a small area of ulceration on the medial aspect of her left foot (figure 1). A plain lateral X-ray of her foot showed a superficial area of calcification at the point of injection (figure 2). Following debridement, a 5 mm calcified object was removed (figure 3). *Pseudomonas* bacteria were grown on culture and so she was treated with an extended course of intravenous antibiotics.

DIFFERENTIAL DIAGNOSIS

Plantar fasciitis is a clinical diagnosis based on findings in the history and examination. The differential diagnosis includes Achilles tendon injuries and tendonitis, calcaneal bursitis, contusions, foot fractures, lumbosacral radiculopathy, osteomyelitis, reactive arthritis, retrocalcaneal bursitis and tarsal tunnel syndrome.

The differential diagnosis for foot ulceration includes arterial ulcers, vascular ulcers, neuropathy ulcers, diabetic ulcers and trauma.

TREATMENT

Conservative

Conservative management consists of appropriate fitting footwear, for example, runners who overpronate and who have pes planus should select motion-control shoes. Night splints have been

Figure 1 The area of ulceration on the medial aspect of the left foot.

Figure 2 Lateral foot X-ray showing a superficial area of calcification at the point of injection.

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Figure 3 After the first debridement a small calcified lump was removed.

shown to be effective in some cases. It is believed they work to aid the healing process by providing rest and constant stretching.⁶

Some studies including a meta-analysis have found significant benefit in the use of orthoses as a conservative measure for treatment of plantar fasciitis.^{7–9}

Stretching and strengthening techniques have been found to be beneficial in some cases.¹⁰

Medical

Medical management includes the use of non-steroidal anti-inflammatory drugs, a corticosteroid injection, a Botox injection and an autologous blood and plasma injection.

A recent meta-analysis also validated extracorporeal shock wave therapy as a treatment option for chronic plantar fasciitis.¹¹

Surgical

In 5–10% of cases of plantar fasciitis, surgery may be required. This option is reserved for those who have failed at least 1 year of conservative and medical therapy. The procedure performed is a plantar fascia release, sectioning part or all of the fascia via an open or endoscopic procedure. However, this may result in instability of the medial column of the foot, along with lateral column overload and pain.^{12–13}

OUTCOME AND FOLLOW-UP

Following removal of the offending object and an extended course of antibiotics, the patient made a full recovery.

DISCUSSION

Plantar fasciitis is typically a self-limited condition, and studies have reported a resolution incidence of up to 90% with non-surgical measures.^{14–18}

The evidence in support of corticosteroid injections is substantial with most reporting success rates of 70% or better.^{19–25}

The established risks involved with the injection of corticosteroids include skin atrophy, skin hypopigmentation, soft-tissue atrophy, infection and bleeding. Almost 10% of patients were found to have rupture of the plantar fascia according to one case series.²⁶ Fat pad atrophy has also been reported.²⁷ Patients should also be warned of the potential for a steroid flare-up, which consists of increased pain for up to several days, may occur in around 2% of individuals.²⁰

Incorrect injection of corticosteroids can result in necrosis and atrophy of the plantar fat pad. This complication may result in significant pain.

Infection at the injection site is possible but rare. Intravascular injection could potentially cause cardiac dysfunction as a consequence of the inherent toxicity of local anaesthetic agents.²⁵ Peripheral nerve dysfunction is possible if the local anaesthetic is

injected either close to or within the medial plantar nerve or the calcaneal branch of the tibial nerve.²⁴

In patients with diabetes, corticosteroid injection may result in a transient hyperglycaemia due to increased gluconeogenesis and glycogenolysis.

The above complications are well documented in the literature; however, there exist only a few cases of calcification following a corticosteroid injection. Raghavendran *et al*²⁸ reported such a case in 2008 involving subcutaneous calcium deposition and ulceration 15 years after injection of triamcinolone hexacetonide for plantar fasciitis. Giant calcification of the shoulder is reported by Troussierot *et al*²⁹ following corticosteroid injection.

A blinded retrospective study of 100 patients who had been treated with intrasynovial corticosteroids for juvenile rheumatoid arthritis found a causal effect of calcification.³⁰

There certainly exists a paucity of evidence for a causal association between corticosteroid injection and calcification. Most references in the literature arise from case reports and these are very few in number. It remains, however, an important yet extremely rare complication, which may involve significant morbidity if ulceration develops.

Learning points

- ▶ Calcification is an extremely rare complication of a corticosteroid injection.
- ▶ Ulceration and infection may develop secondary to calcification.
- ▶ Patients should be advised to seek medical attention if calcification develops post-steroid injection.
- ▶ Patients may present years later with subcutaneous calcification.

Competing interests None.

Patient consent Obtained.

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