CASE REPORT

Unusual complication of a tattoo in an immunosuppressed patient

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SUMMARY

Tattooing for decorative body art is becoming more popular and, as a result, so are tattoo-related complications. Patients are unlikely to discuss tattoos with medical professionals, even though these might be relevant. Long-term immunosuppressed patients are often young adults who may wish to consider tattooing. It is well recognised that immunosuppressed patients are at increased risk of infection including cutaneous mycobacterial infections. They therefore represent a group that is at a potentially higher risk of tattoo-related complications and warrant special consideration. We present the first documented case of inflammatory myopathy as a complication following tattooing in an immunosuppressed individual. This unusual case presented as distal thigh and medial knee pain and it was only after some time that a link to the tattoo was made. This serves as a reminder to consider tattoo-related complications in the differential diagnosis of unusual atraumatic musculoskeletal pain, especially in immunosuppressed individuals.

BACKGROUND

In recent years, there has been an increase in the popularity of tattooing as decorative body art, particularly in young adults. Tattooing is the process of implanting permanent pigment granules into the skin and is widely available. It is performed by many different individuals of varying training and in a wide range of environments. As there is no legislation to promote safe tattooing, complications are quite common. Acute inflammation of the skin, superficial and deep local infections, systemic infections, allergic reactions, photodermatitis, granulomatous reactions and lichenoid reactions are some of the more common complications.¹ Skin diseases localised on the tattooed area, such as eczema, psoriasis, lichen planus and morphea have also been described.²⁻⁶

It is well recognised that immunosuppressed patients are at increased risk of infection including cutaneous mycobacterial infections. It therefore stands to reason that these patients would have higher risk of complications as a result of tattooing.

We present a report of a unique case of a complication relating to tattooing in an immunosuppressed patient.

CASE PRESENTATION

This 31-year-old woman has a history of cystic fibrosis with bilateral lung transplants performed

in 2009. As a result, she is on long-term immunosuppressive therapy in the form of mycophenolate 1 g bd, tacrolimus 3 mg bd and prednisolone 10 mg daily.

In January 2015, she had a large (25×20 cm) coloured ink tattoo applied to the anterior aspect of her left thigh by a professional tattoo artist (figure 1). She described the practice as hygienic and she had no problems from a tattoo performed several years previously on her right leg.

Immediately after the tattoo, she had no unusual symptoms other than the mild skin irritation that is common. Nine days following this, she began to develop pain in her left distal thigh and medial aspect of her knee. There was no trauma and she had not been involved in any unusual physical activity. The pain was severe enough that she required tramadol, paracetamol and nefopam analgesia. Over the ensuing months, she had some settling of the pain but was still aware of a fullness and discomfort along the length of the medial side of her thigh from hip to knee. She is otherwise in good general health and did not experience any systemic features such as night sweats, weight loss, nausea or vomiting. In terms of travel history, she had been to Australia, Dubai and USA but has been to cities rather than to rural areas.

Additionally, she has cystic fibrosis-related diabetes mellitus for which she is on Levemir and Novomix insulin preparations.

She first presented to a rheumatology clinic 10 months later. Her pain was still troublesome, constant in nature and causing regular sleep disturbance. Light exercise would provide some relief of pain rather than aggravate it. In fact, there were no specific aggravating features.

On examination, she was very tender over the medial thigh from about 10 cm above the knee down to the knee joint itself. There was a palpable fullness and firmness over the course of the vastus medialis muscle. The knee was swollen with a mild effusion and had a full pain-free range of movement and tests of ligament stability and menisci were unremarkable. The hip moves freely and painlessly.

INVESTIGATIONS

Full blood count was normal with no eosinophilia and her erythrocyte sedimentation rate was 12 mm/hour and C reactive protein 2 mg/L. Her creatine kinase was normal. Glycated haemoglobin (HbA1C) was 9%. Rheumatological tests (Anti-Nuclear Antibody/Extractable Nuclear Antigen/rheumatoid factor) were all negative.

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Figure 1 Photograph of patient's left anterior thigh showing large decorative multicoloured tattoo.

Ten millilitres of straw-coloured fluid was aspirated from her knee and there was no bacterial or fungal growth after extended culture. Direct tuberculosis microscopy was negative as was culture for mycobacteria after 42 days incubation.

Plain radiographs of the knee, femur and pelvis demonstrated no abnormality. An MRI scan of her lumbar spine, pelvis, thigh and knee was then performed. This demonstrated focal inflammation of vastus medialis muscle throughout its length but most severe in the distal third (figures 2–4).

At this point, the patient was referred to orthopaedics and based on her MRI results and otherwise negative investigations, a biopsy of her vastus medialis muscle was arranged under general anaesthetic. This sample was sent for microbiology culture and to pathology for analysis. There was no bacterial growth obtained from extended culture.

The histopathology sample showed scattered internal nuclei, atrophic fibres, a mild perivascular inflammatory infiltrate focally and upregulation of Human Leukocyte Antigen. The impression was of an inflammatory myopathy and the pathological response may have been modified by the ongoing immunosuppression.

DIFFERENTIAL DIAGNOSIS

- ▶ Infection (including atypical organisms), abscess
- ▶ Referred hip/spinal pathology
- ▶ Connective tissue disease
- ▶ Inflammatory arthritis

Figure 2 T2-weighted MRI coronal section of left distal thigh/knee showing extensive oedema within vastus medialis.

- ▶ Intra-articular pathology (meniscal/osteoarthritis)
- ▶ Malignancy
- ▶ Myositis/myopathy
- ▶ Compartment Syndrome

TREATMENT

Following the muscle biopsy, the patient had a period of physiotherapy for basic quadriceps strengthening exercises.

Figure 3 T2-weighted MRI sagittal section of left distal thigh/knee showing extensive oedema within vastus medialis and effusion within the knee joint.

Figure 4 T2-weighted MRI axial section of left distal thigh/knee showing extensive oedema within vastus medialis.

OUTCOME AND FOLLOW-UP

Around 1 year after the onset of her symptoms, her condition started to improve. Now 3 years since, she is pain free and back to her normal activities.

DISCUSSION

The prevalence of tattoos has been increasing, as has the incidence of associated complications.^{1 2 7} These have been well documented and can be local or systemic infections as well as variety of skin reactions.^{2-6 8-10} A review of the literature revealed a long list of common complications following tattooing, ranging from minor skin irritation to severe infection causing death.¹¹⁻¹³ Rarer, mycobacterium infection^{7 14} and reports of tattoo ink-induced hypersensitivity vasculitis¹⁵ have been reported. To our knowledge, there have been no previously reported cases of tattoo-associated reactions causing an inflammatory myopathy. This could be a rare occurrence or represent an underdiagnosis for patients presenting with similar symptoms having had tattoos.

Inflammatory myopathies are a group of diseases that involve chronic muscle inflammation, which can lead to pain and muscle weakness. The four main types of chronic myopathy are polymyositis, dermatomyositis, inclusion body myositis and necrotising autoimmune myopathy. In many cases, the cause is unknown or the condition is idiopathic in nature. Autoimmune conditions have been implicated as well as reactions to toxins or infectious organism such as bacteria, viruses or fungi. Although in this case no causative pathogen was identified, the implication is that the myopathy may have been stimulated by either a toxin or pathogen introduced as part of the tattooing process. While we acknowledge that there is no evidence to definitely prove the causative effect, the timing of onset and the location of the symptoms correlated well with the tattoo application and there were no other identifiable factors to cause the pathology.

It is well recognised that adverse tattoo reactions can arise from the type of ink or colouring agent used. This is most commonly seen with red ink and the use of heavy metals in the agents.^{10 16}

There was a variety of coloured ink used in this tattoo and this could be another factor in the reaction.

The tattoo industry has no regulated or professional body to enhance standards across the UK and there have been cases of black ink being diluted to grey ink with non-sterile tap water, causing infection.⁷ In this case, the tattoo application by an unregulated parlour, combined with the patient's immune suppression could have resulted in the adverse reaction.

This is a unique adverse reaction following a tattoo, and given the increasing popularity of inking, it should remain an important point for medical professionals to consider during a consultation. Doctors should counsel immunosuppressed patients appropriately at an early stage of the dangers relating to tattoos. Patients have a responsibility to consider carefully the decision whether to undergo the tattoo, and if so, to time this appropriately such as a time when on minimal immunosuppression. Despite a perceived increased risk by medical professionals, there is limited evidence in the literature to support this, and therefore advising against could be counterproductive.¹⁷ If agreement is reached regarding tattooing, this should be after an open discussion and at a time when the medical condition is most stable. A professional artist who prioritises aseptic technique should be chosen and should be informed of the patient's condition so that all necessary preventative steps can be taken with care.

However, patients will not always perceive the possible risks related to their condition and it is our job to inform these patients properly. These younger organ transplant patients may be reluctant to discuss their desire to get a tattoo openly because of the fear of a judgmental approach, or that the specialist is not knowledgeable about tattooing.¹⁸ The same could be true of a patient presenting with this type of complication, where it is possible that the relevance of the tattoo may not cross the mind of either the patient or physician. As such, this case serves as a reminder to consider tattoo-related complications as part of the differential diagnosis when patients, especially the immune-suppressed, present with unusual atraumatic musculoskeletal symptoms.

Learning points

- ▶ Immunosuppressed patients are at elevated risk of complications from tattoos.
- ▶ Counsel immunosuppressed patients regarding the risks of tattoos.
- ▶ Ask about recent tattoos during history taking.
- ▶ Consider tattoo-induced myositis as a differential diagnosis.

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