The 'missing piece' sign: distant migration of a patellar tendon cerclage wire

Introduction

Migration of wires used in trauma surgery is well described, but the vast majority of cases pertain to sharp smooth wires or pins used around the shoulder (Lyons and Rockwood, 1990). Migration of broken cerclage wire to distant sites without venous translocation has not been described previously. This article reports a case of wire migration and demonstrates the radiographic 'missing piece' sign.

Discussion

Radiographs demonstrating a broken cerclage wire should be carefully inspected to ensure that all pieces of the wire are accounted for. The 'missing piece' sign requires thorough clinical and radiographic assessment in order to locate the missing piece.

There is potential for wire fragments to migrate to a variety of critical sites. Biddau et al (2006) described a case of a broken cerclage wire from the patella migrating to the right ventricle, necessitating a right atriotomy for removal. Similarly Haapaniemi and Hermansson (1997) described the migration of a Kirschner wire from the finger to the right ventricle leading to cardiac arrhythmia. Fransen et al (2007) described the migration of a Kirschner wire from the clavicle to the thoracic spine perforating the spinal cord, and Choi et al (2008) described the migration of Kirschner wires from the patella to the popliteal fossa in close proximity to the neurovascular bundle.

Figure 1. Anteroposterior radiograph on the left knee demonstrating three wire fragments around the patellar tendon with a 'missing piece' sign.

Figure 2. Anteroposterior radiograph of the ankle demonstrating a wire fragment lying just lateral to the midline of the ankle.

Figure 3. Lateral radiograph of the ankle showing the wire fragment anterior to the fibula.

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Case Report

A 37-year-old man presented with a tender palpable lump medial to his left patella. Two years previously he underwent surgical repair of a patellar tendon rupture including a protecting cerclage wire. He was informed that the wire did not require removal. There was no further history of trauma subsequent to the surgery. He had no other musculoskeletal problems and no past history of relevance.

Clinical examination revealed a midline scar over the left knee with a tender palpable wire on the medial side of the patella. There were no other significant clinical findings in the knee.

Plain radiographs revealed three wire fragments around the knee (*Figure 1*). These three fragments did not appear to account for the full circumference of the patellar tendon, raising the concern of a missing piece of wire. A further radiographic survey revealed that the missing wire fragment lay at the anterolateral aspect of the ankle joint (*Figures 2* and *3*).

On surgical exploration, the wire was located between the peroneus tertius and extensor digitorum longus tendons with the tip just proximal to the superior retinaculum. It was assumed to have found its way from the subcutaneous space anterior to the knee into the anterior compartment of the leg and migrated distally to abut the talus.

Conclusions

The true incidence of wire fracture and migration is unknown, but in an era of increasing magnetic resonance imaging utilization the presence of free ferrous fragments arising from orthopaedic wires is of concern. The authors would advocate radiographic monitoring of such wires. Patients should be followed up until wires have been removed and care must be taken when removing broken wires to ensure the entire length is accounted for. The 'missing piece' sign on X-ray should always prompt further investigation. **BJHM**

Biddau F, Fioriti M, Benelli G (2006) Migration of a broken cerclage wire from the patella into the heart. A case report. *J Bone Joint Surg Am* **88:** 2057–9

Choi HR, Min KD, Choi SW, Lee BI (2008) Migration to the popliteal fossa of broken wires from a fixed patellar fracture. *Knee* **15***:* 491–3

Fransen P, Bourgeois S, Rommens J (2007) Kirschner wire migration causing spinal cord injury one year after internal fixation of a clavicle fracture. *Acta Orthop Belg* **73:** 390–2

Haapaniemi TA, Hermansson US (1997) Cardiac arrhythmia caused by a Kirschner wire inside the heart. An unusual complication of finger osteosynthesis. *J Hand Surg Br* **22:** 402–4

Lyons FA, Rockwood CA JR (1990) Migration of pins used in operations on the shoulder. *J Bone Joint Surg Am* **72:** 1262–7