



Pseudo-rupture of Extensor Pollicis Longus following Kirschner wire fixation of distal radius fractures

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We report two cases of extensor pollicis longus tendon tethering following K-wire insertion to treat unstable distal radius fractures, an unusual complication. In both cases, extensor pollicis longus function returned with conservative management. The structures considered “at risk” during K-wire insertion are described, and the common complications are discussed. Operative approaches to minimise soft tissue damage during K-wire insertion are reviewed. This case report is the first to demonstrate the potential for ultrasound scanning to aid in the diagnosis of extensor pollicis longus tethering.

INTRODUCTION

Percutaneous Kirschner wire (K-wire) fixation is a common treatment used to supplement cast immobilisation of unstable distal radial fractures. It is generally considered to be effective, simple and safe. However, it is associated with a number of complications, including extensor pollicis longus (EPL) rupture. The cases presented describe EPL tethering following the insertion of a K-wire, an unusual complication that may be mistaken clinically for EPL rupture.

CASE REPORTS

Case One

A 31-year-old lady fell onto her dominant right hand whilst on holiday, sustaining a distal radial

fracture. It was treated by closed manipulation under anaesthetic and percutaneous K-wire fixation. On her return to the United Kingdom, she presented to her local hospital for review. Radiographs demonstrated that one of the K-wires had been incorrectly placed through the lunate and into the radius and the K-wire fixation was revised. Three weeks later, she presented to the fracture clinic complaining of loss of extension of the inter-phalangeal and metacarpo-phalangeal joints of the thumb, which dated from the time of the second procedure. A rupture of the EPL tendon was diagnosed clinically and arrangements were made to perform an extensor indicis tendon transfer electively. The K-wires were removed six weeks after the fracture had been sustained and routine physiotherapy commenced to reduce wrist stiffness. However, after seven weeks of routine physiotherapy, EPL function returned, indicating that the tendon had always been intact.

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Case Two

A 56-year-old lady fell onto her dominant right hand, sustaining a distal radial fracture. It was treated by closed manipulation under anaesthetic and percutaneous K-wire fixation. Image intensification demonstrated that the K-wires were in an acceptable position, and a lightweight resin cast was applied. Five weeks after the fracture, the cast and K-wires were removed, at which time the loss of EPL function was apparent. In light of previous experience of EPL tethering, an ultrasound scan was undertaken, which demonstrated that EPL was intact, but tethered. There was no evidence of rupture or partial rupture. She was advised to commence deep friction massage soft tissues over the dorso-radial aspect of the wrist, which was successful in returning EPL function.

DISCUSSION

Extensor Pollicis Longus is the most frequently ruptured tendon following a distal radial fracture (5). EPL rupture can occur at any age, although it is more common after the age of thirty (6). EPL rupture is most common four to eight weeks after the fracture, and usually occurs at the level of Lister's tubercle (7). The causes of EPL rupture include circulatory disturbances within the tendon and attritional rupture over a prominent fracture edge or metalwork (1). Clinically significant EPL ruptures are commonly treated by extensor indicis proprius tendon transfer.

Distal radial fractures are frequently treated with K-wires, which are used to maintain fracture position in a cast. In most cases, this is a straightforward and effective procedure. However, significant complications have been described in up to 16% of fractures treated in this manner. When placing the K-wires, important soft tissue structures including the superficial radial nerve, the cephalic vein, the brachioradialis tendons and the extensor tendons of the wrist, thumb and fingers may be damaged. Damage to these structures leads to tendon ruptures and neurovascular lesions (3, 4). Other recognised complications associated with K-wires include pin track infection, and K-wire migration (2, 7).

In an attempt to minimise tendon and nerve damage, a modified percutaneous approach for the placement of K-wires in distal radial fractures has been described (3). However, this approach still demonstrated the potential for damage to a number of soft tissue structures and 12 of the 88 patients studied demonstrated paraesthesia in the distribution of the radial sensory nerve. However, this neurological deficit subsided within six weeks of pin removal, and after one year, no tendinous lesions or other serious complications were reported.

The procedure for K-wire insertion has been further refined in order to minimise damage to surrounding structures. A comparison of the relative risk of iatrogenic injury between percutaneous and limited open insertion of two K-wires in the distal radius demonstrated that a percutaneous approach carries a higher probability of piercing or displacing nerves and tendons. Therefore, a limited open approach with blunt dissection down to bone to displace the surrounding soft tissues and the subsequent use of a soft tissue protector is recommended to minimise soft tissue damage when inserting K-wires (4).

Tethering of the EPL tendon may occur despite evidence of satisfactory K-wire position. These cases demonstrate an unusual complication of K-wires inserted to stabilise distal radial fractures, which may be preventable by using a limited open approach. It may be prudent to exclude tethering of the EPL tendon in all patients presenting with the clinical signs of an EPL rupture by performing a readily available investigation such as an ultrasound scan.

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