Case Report and Literature Review

Migration of a Kirschner wire from the wrist to the cubital fossa

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Abstract
A patient presented with a distal radius and ulna fracture which was treated with closed reduction and Kirschner wires. The patient presented after an extended time period with elbow pain and associated loss of function. Examination revealed that the Kirschner wires migrated to his cubital fossa. Removal of the Kirschner wire resulted in complete functional recovery.

Introduction
Migration of Kirschner wires is a relatively uncommon occurrence that can have serious consequences. We present a case of a Kirschner wire migrating from the distal ulna to the cubital fossa resulting in loss of function.

Case report
A 14-year-old boy presented at the casualty unit in July 2008 with the complaint of a painful, swollen right wrist after falling on an outstretched hand. X-rays confirmed a Colles-type fracture of the distal radius and ulna (*Figure 1*). The patient was admitted and received a closed reduction and fixation with Kirschner wires in the radius and ulna. The wires were positioned subcutaneously and bent adequately so as to prevent migration. Post-reduction X-rays (*Figure 2*) showed a good reduction. The patient was followed up regularly at the fracture clinic and had a good recovery without any complications.

Removal of the Kirschner wires was performed under local anaesthetic in the outpatient department after six weeks when adequate callus was observed on X-ray. Only the radial wire was removed due to difficulty in removing the ulnar wire. X-rays after the removal of the radial wire showed the ulnar wire to be flush with the bony surface (*Figure 3*).

A theatre appointment was made for formal exploration and removal of the Kirschner wire, but the patient absconded and was lost to follow-up.

In April 2009 the patient presented at the fracture clinic with complaints of right elbow pain and a decrease in range of motion at the elbow joint. There was no history of trauma. Examination showed decreased flexion to approximately 45° and decreased pronation limited to 30°. There was no obvious deformity of the elbow although a hard object could be felt medial to the biceps tendon and palpation of this mass resulted in pain. The patient had normal sensation and all pulses were palpable at the wrist.

Figure 1

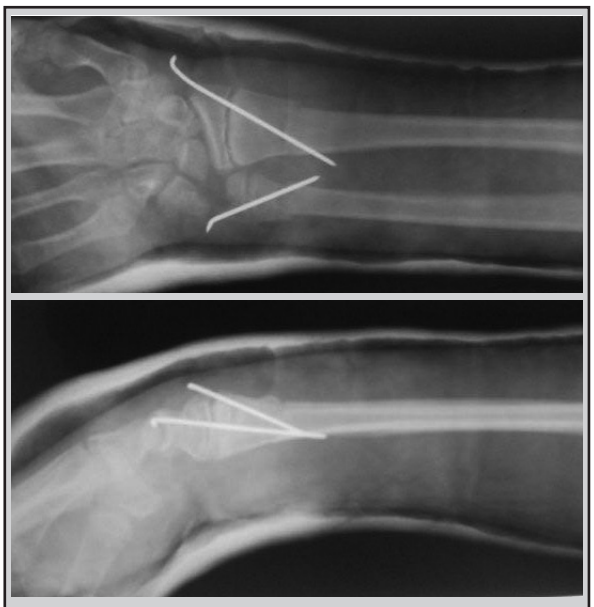

Figure 2

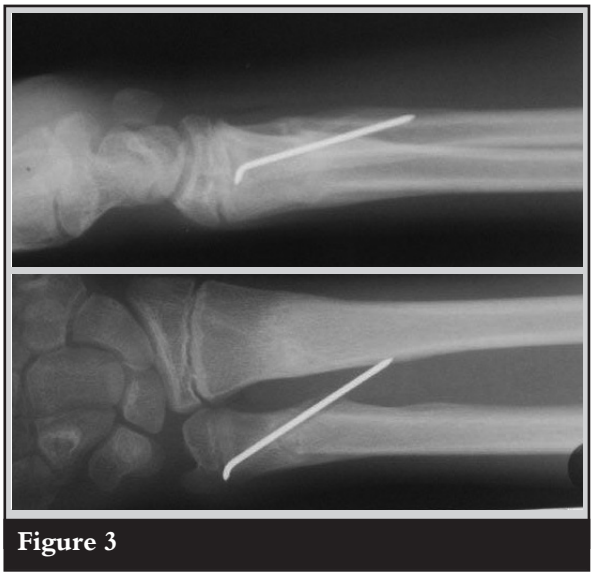

Figure 3

Figure 4

Figure 5

Kirschner wires are very versatile when used in fracture fixation

X-rays were taken of both his right wrist and right elbow. No Kirschner wire was seen on the X-rays of the wrist (*Figure 4*), but the wire could be clearly seen in the cubital fossa of the elbow (*Figure 5*).

Exploration of the elbow was performed the next day and the Kirschner wire removed without complication. The patient regained full, painless range of motion of his elbow at follow-up and no complications were noted.

Discussion

Kirschner wires are very versatile when used in fracture fixation, especially in children but also in adults. It is also a very cheap procedure when compared to other methods of fixation. The reported complication rate from Kirschner wires are reported to be anywhere between 15 and 42%.[1-3] Complications include pin-tract sepsis, osteomyelitis, tendon rupture, nerve damage, wire loosening and migration. Some complications have been fatal.

There have been a number of case reports where Kirschner wires have migrated to distant anatomic areas, often with serious and sometimes fatal consequences such as tamponade of the heart. Areas of migration included the spinal canal, aorta, pulmonary arteries, lungs, heart, liver and other organs.[4-12]

The majority of migrating Kirschner wires have originated from joints such as the acromioclavicular or sternoclavicular joints that were fixated after injury. Wires have also migrated from the proximal humerus[14] as well as the hip.[11-13] The treatment of clavicular fractures with Kirschner wires have also led to breakage of the wires with subsequent migration into nearby thoracic and bony structures.[4] Seipel *et al* reported a case where a Kirschner wire migrated from the distal radius to the heart.[6]

A review of the available literature seems to indicate that delayed removal of Kirschner wires is the biggest risk factor for migration.[1-3] Delayed removal of Kirschner wires results in loosening, which predisposes to migration. Loosening of the wires can also be attributed to movement at the joint, muscle action or pin-tract sepsis. This was also the case with the above-mentioned patient in our case study who had been lost to follow-up and only returned months later.

It is imperative that patients be followed up regularly and the wires removed at the appropriate time in order to prevent migration

In most instances there was adequate bending of the Kirschner wire as prescribed for preventing migration. The fact that cases of Kirschner-wire migration were nevertheless reported leads to the question of how much the Kirschner wire should be bent to prevent migration. Another issue is whether the end of the wire should be left outside the skin or be buried subcutaneously.

Conclusion

It is clear that although the use of Kirschner wires is cheap and the applications numerous, the complications can often be serious and have resulted in death in the past due to wire migration. It is imperative that patients be followed up regularly and the wires removed at the appropriate time in order to prevent migration. The wire that has migrated must also be removed as soon as possible since complete recovery is often achieved and further complications can be avoided.

There is, however, still much speculation about how much the Kirschner wire should be bent to prevent migration and whether the wire should protrude from the wound or be buried under the skin.

The content of this article is the sole work of the authors. No benefits of any form have been derived from any commercial party directly or indirectly related to the subject of this article.

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