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Broken Kirschner Wire Elbow- Removed Successfully by Cannulated Drilling Technique

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ABSTRACT

Kirschner wires (K-wires) are widely used in orthopaedic surgery as they are readily available, reliable, and cost-effective. Kirschner wires (K-wires) are used for old unreduced elbow dislocations, inserted through the olecranon and into the humerus, if the joint re-dislocates easily. K-wire breakage during removal is rare. 11 yrs male having 4 month old unreduced elbow dislocation was treated with open reduction and ulnohumeral K wire & above elbow slab was applied. After 2 weeks K-wire broke during removal in outpatient department with the proximal piece completely retained in distal humerus intraarticularly. Elbow flexion & extension was restricted. The Broken K wire was removed in operation theatre with patient under anaesthesia. In our case, there was no obvious cause of breakage, and the patient denied postoperative trauma. K-wire fixation is a simple method for bony stabilisation but can be a demanding procedure with complications often overlooked. It is important to be aware of the potential sequelae.

KEYWORDS: K wire, Broken K wire, Intraarticular, Neglected elbow dislocation, Cannulated drilling technique

INTRODUCTION

Kirschner wires (K-wires) are widely used for fixation of fractures and if required in dislocations as they are readily available, reliable, and cost-effective [1]. K wire breakage during removal is rare with one reported case in the literature [2]. We present a case of broken K-wire, which required retrieval due to intraarticular & restriction of Elbow flexion & extension. A 11-year male having old unreduced elbow dislocation was treated with open reduction and ulnohumeral K wire & above elbow slab was applied. Two weeks postoperatively, patient came for K wire removal in outpatient department, during the removal, the K wire broke. Broken K wire was removed in operation theatre under Anaesthesia. A review of the literature demonstrates that K-wire complications occur relatively infrequently but being aware of possible management options should be known to operating surgeon.

CASE PRESENTATION

A 11-year-old school going male had fall while playing and sustained injury to left elbow, which was treated by bonesetter. Patient came to OPD for persistant swelling & inability to lift weight, 4 month after injury. X-ray showed a displaced posterolateral dislocation of elbow (Figure 1**(a) and (b)**). This elbow dislocation was treated with open reduction and ulnohumeral K wire & above elbow slab was applied (Figure 1 **(c) and (d)**). Two weeks postoperatively, patient came for K wire removal in outpatient department, during the removal, the K wire broke. Due to restriction of flexion & extension, the retained K-wire being intrarticular required removal. The patient was taken to operating theatre and general anaesthesia was given.

Entry of broken K wire was assessed with similar new K wire (Figure 2**(a) and (b)**). Cannulated drill of 3.2 mm (Figure 2**(c))** (after checking cannulation from piece of broken K wire). Cannulated drilling done in olecranon through same track (Figure 2**(d))**. Cannulated drill was engaged in distal end of broken K wire (Figure 3 **(a)**). Cannulated drill was advanced further till most of broken K wire was engaged (Figure 3 **(b)**). Retrograde and reverse drilling was done, which was suggestive of broken K wire

being withdrawn back with cannulated drill (Figure 4**(a)**). Cannulated drill was withdrawn fully with broken K wire inside. Elbow range of movements flexion, extension was full and broken K wire was removed (Figure 4 **(b, c)**).

Figure 1: X-ray showing posterolateral dislocation of left elbow (a,b), which was treated with open reduction & ulnohumeral K wire fixation (c,d)

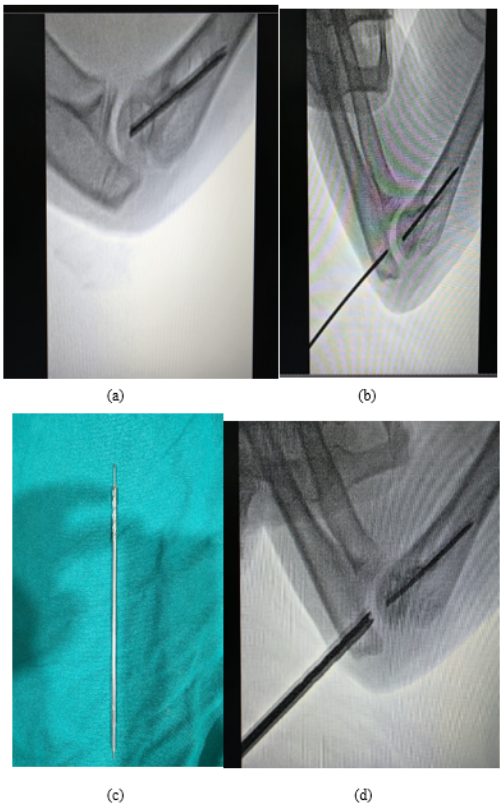

Figure 2: (a) Radiographic view showing intraarticular broken K wire. (b) Similar K wire inserted in same track through ulna olecranon process. (c) 3.2 mm cannulated drill bit. (d) Advanced through olecranon

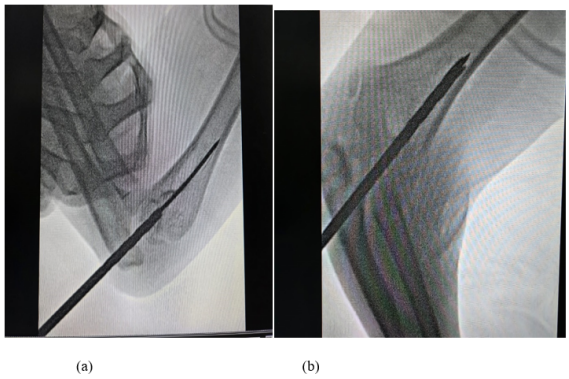

Figure 3: (a) Radiographic view showing, cannulated drill engaged in distal end of broken K wire. (b) Cannulated drill advanced further till most of broken K wire engaged

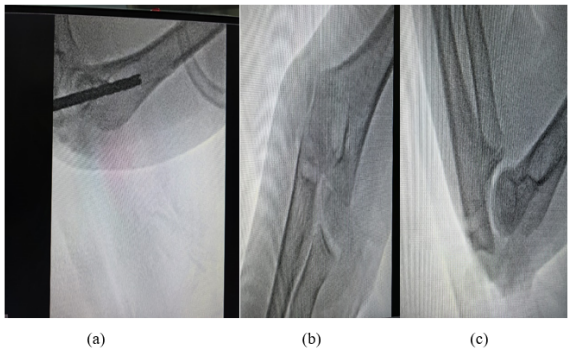

Figure 4: (a) Radiographic view showing broken K wire being withdrawn back with cannulated drill. (b,c) Elbow after removal of broken K wire

DISCUSSION

K-wire fixation is recommended in old unreduced elbow dislocations, if the joint re-dislocates easily, insertion of Kirschner wire through the olecranon and into the humerus is recommended. It is therefore not surprising that K-wire breakage is rare. In a prospective review of 11,856 orthopaedic procedures to determine the frequency of intraoperative instrument breakage, Pichler et al. reported K-wire breakage in only 14 cases (0.1%) [3]. Literature it is documented complications have been reported in up to 18% of such cases including infection, pin loosening, loss of reduction, and pin migration [1, 4]. K-wire breakage during removal is rare with one reported case in the literature [2]. Broken K wire in joint may lead to catastrophic sequelae in short to long term time, like injury to adjacent neurovascular bundles, restriction of joint movements, stiffness, migration of K wire [5, 6]. In our case, we have come to conclusion that possibly K wire can break due to young and active child even though supported by plaster it is difficult to have total immobility in elbow, that may cause repetitive stress on wire leading to metal fatigue [7]. Other possible cause of breakage could be smaller diameter of K wire leading to early fatigue. We believe that even though patient denied postoperative trauma or attempts to mobilise elbow joint,

but we cannot relay totally on it. Treating surgeon should not underestimate this rare & uncommon complication which requires removal to avoid untoward and dreaded complications [5–7]. Removal of intraarticular K wire requires meticulous planning and execution. We found cannulated drilling technique to be useful. Large diameter K wires can minimise risk of breakage [7]. Literature supports that as purpose of K wire is served, for which it was inserted then it should be removed to avoid potential complications [8].

CONCLUSION

K wire may break even though it is inserted for short time stability/ stabilization of joints. Once breakage is confirmed it should be removed to avoid future catastrophic sequelae of retained broken implant. Cannulated drilling technique is useful technique for removal of broken, retained K wire. However, arthrotomy of joint may be required if technique is not successful.

DISCLOSURE

Competing interests: The author(s) declare that they have no competing interests.

Consent: Patient has given their informed consent for the case report to be published.

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