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CASE REPORT

A rare complication of tension band fixation of olecranon osteotomy: Distal migration of K-wire

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ABSTRACT

Tension band wiring (TBW) is one of the most commonly used fixation techniques to fix olecranon osteotomies. Hardware prominence has been the most commonly reported complication of TBW. However, distal migration of Kirschner (K)-wire after TBW fixation for olecranon osteotomy has not been reported. In this case report, we presented distal migration of K-wire detected nine months after initial surgery in a 46-year-old male patient. The patient was operated on for an intraarticular distal humerus fracture using an olecranon osteotomy. The osteotomy was fixed with TBW fixation. The patient missed routine follow-ups and presented to the outpatient clinic with a complaint of skin irritation at the elbow nine months after the surgery. On radiological examination, distal migration of one K-wire was detected. The K-wire was surgically removed without any complication. Physicians should be aware of possible complications of TBW and remove fixation after fracture union to avoid unexpected complications.

Keywords: Complication, distal humerus, elbow, pin migration, trauma.

Olecranon osteotomy is commonly used during surgical treatment of intraarticular distal humerus to better visualize reduction and joint surface.[1,2] Chevron and transverse osteotomies are frequently used osteotomy types.[1] Tension band wiring (TBW), plates, and, more recently, intramedullary screws are fixation options for olecranon osteotomy.[2] All fixation types have the risk of complications, such as implant prominence, implant failure, nonunion, entrapped vasculature, and loosening.[1-5] However, the need for secondary surgery to remove hardware due to implant prominence is more commonly reported in TBW.[1-5] This complication is usually caused by proximal migration of the Kirschner (K)-wire.[3] In this case report, we aimed to report the distal migration of the K-wire used to fix olecranon osteotomy.

CASE REPORT

A 46-year-old male presented to the emergency department with pain and inability to mobilize his right elbow after falling on the elbow in February 2023. The patient had been operated on for a right humerus shaft fracture 12 years ago in another hospital. Six months after the first operation, the patient underwent a second operation for radial nerve palsy in our clinic and was treated with a sural nerve graft. On physical examination, there was an incision scar on the right arm, the elbow was swollen, and there was pain and crepitation with palpation on the distal arm. Neurovascular examination was normal. On radiographic examination, there was a distal humerus fracture with articular extension and plate and screws from the previous operation (Figure 1a). A long arm splint was applied, and the patient was hospitalized.

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The next day, the patient was operated on under general anesthesia in a supine position. A standard posterior incision with a lateral curve on the elbow was performed. To better visualize the articular surface, a chevron-type olecranon osteotomy was done. The fracture was reduced and temporarily secured with K-wires. Then double plate and screws were applied on the 90-90 configuration from the medial and posterolateral sides. The reduction was checked on the fluoroscopy. Olecranon osteotomy was reduced and fixed with TBW (Figure 1b). The ulnar nerve was protected during the surgery, and anatomic layers were closed in standard fashion.

The patient was discharged uneventfully on the third postoperative day. The patient did not come to the routine follow-ups due to the earthquake on the sixth of February. However, nine months after the initial surgery, the patient presented to our outpatient clinic with the complaint of hardware skin irritation on the elbow. When we checked the previous X-rays of patients performed at an outside hospital in another city via the National Personal Health Records System (e-Nabız), there was no problem with TBW fixation in the fifth postoperative month (Figure 1c). On physical examination, the elbow range of motion was 0°-40°-100°. On the X-ray, one of the K-wires was on the forearm (Figures 2a, b). The patient had reported no trauma after surgery or discomfort on the forearm. The patient was informed about the K-wire migration, and surgical excision was planned.

The operation was performed under axillary block anesthesia in the supine position on a hand table. The level of the K-wire was marked on the skin under the image intensifier. A volar incision was performed, and the K-wire was found between the flexor digitorum superficialis and flexor carpi ulnaris tendons (Figures 3a, b). The K-wire was removed (Figure 3c), and then the rest of the TBW

FIGURE 1. (a) Initial radiograph of the patient with intraarticular distal humerus fracture. **(b)** Early postoperative radiograph. **(c)** The radiograph at five postoperative months.

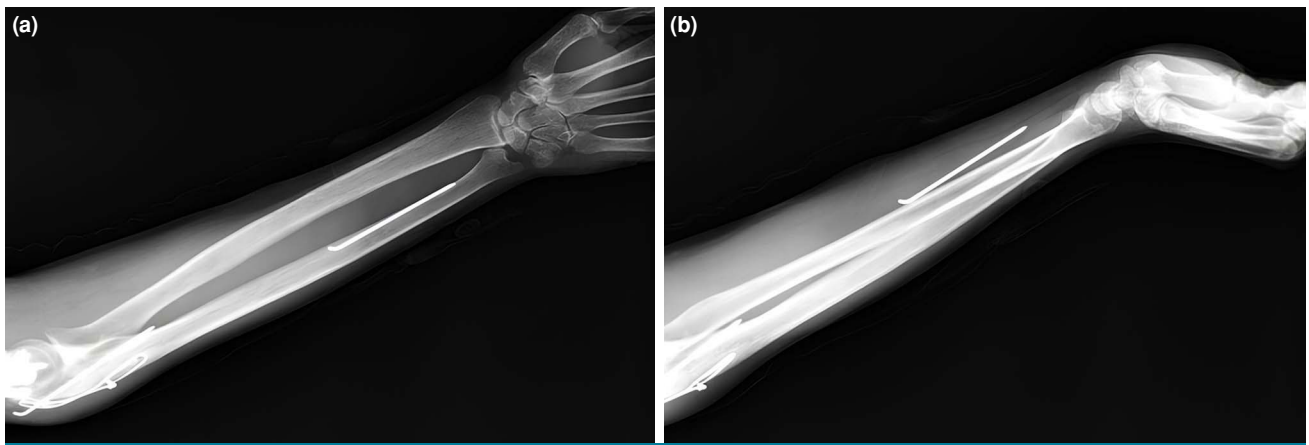

FIGURE 2. The **(a)** anteroposterior and **(b)** lateral view radiographs nine months after the operation show K-wire migration.

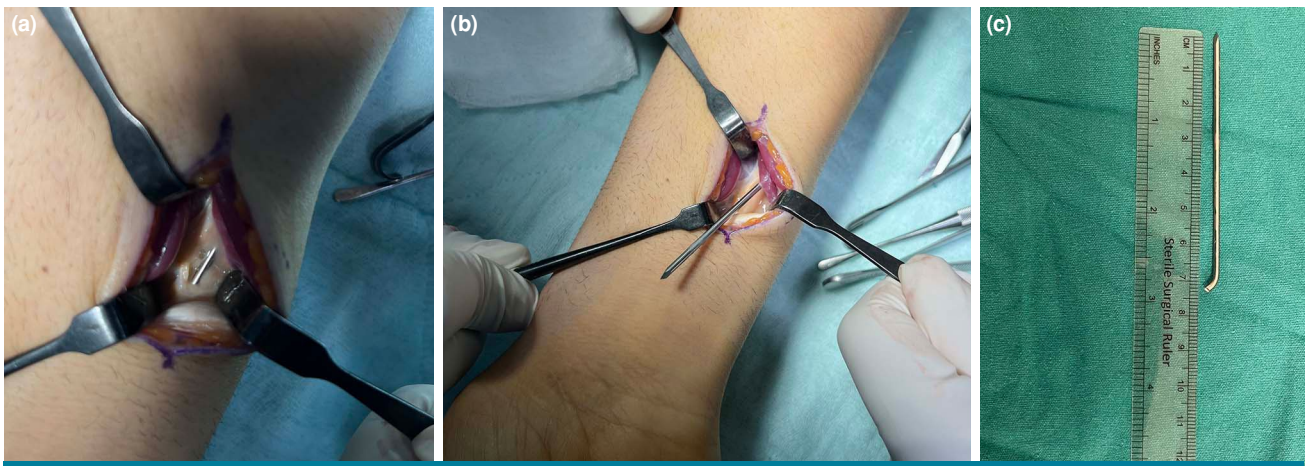

FIGURE 3. (a, b) Intraoperative view of the migrated K-wire. **(c)** The removed K-wire.

fixation on the elbow was removed using the previous incision on the elbow. The patient was discharged uneventfully and had no complaints on the last follow-up two months after surgery.

DISCUSSION

Tension band wiring is a commonly used fixation technique in orthopedic trauma surgeries, particularly for olecranon fractures and osteotomies, distal clavicular fractures, acromioclavicular separations, medial malleolus fractures, and patella fractures. K-wire migration is commonly reported in the shoulder region.[6,7] In the TBW fixation of the olecranon, proximal migration of K-wire has been reported as the most common complication and the most common cause of secondary surgery.[7] To the best of our knowledge, distal migration of the K-wire from olecranon has not been presented previously. Our case is the first case of the distal migration of the K wire used for TBW fixation in the olecranon region in the literature.[8]

In the literature, there are over 50 case reports about K-wire migration. K-wire migration has been reported most commonly after the fixation of clavicle fracture, sternum, acromioclavicular, and sternoclavicular separation.[6,9,10] However, K-wire migration has been rarely reported in the hip, patella, distal radius, and medial malleolus.[9] The direction of migration is from distal to proximal in most cases. Only one case was reported distal migration of the K-wire from the patella to the ankle.[11] In our case, K-wire migrated from the elbow to the forearm, which has not been reported previously. During our literature research, there was no certain data about the cause of K-wire migration.[1-7,11-13] Muscle contraction and gravity may be a factor for distal migration due to K-wire protrusion from the volar cortex of the ulna. Additionally, the K-wire migration in our case may be due to the shortness of the bent part of the K-wire (Figure 3b). However, we do not know the exact mechanism of distal migration. K-wire migration may be asymptomatic in some cases. However, it may cause significant complications, such as solid organ (heart, lung, and liver) penetration, bowel or colon perforation, spinal cord injury, arterial injury, nerve injury, and even death.[10,12,13] Recognition of wire migration may vary from four days to 25 years.[10] If there is any symptom, migration can be detected early, but in asymptomatic cases, migration could be detected incidentally during radiological examination. We incidentally detected K-wire migration nine months after initial surgery when we obtained an elbow radiograph since the patient had no symptoms related to wire migration.

In conclusion, physicians should be aware that K-wire fixation could cause severe complications. The patients should be informed about the importance of being closely followed up, and materials should be removed after fracture union is achieved to prevent unexpected complications.

Patient Consent for Publication: A written informed consent was obtained from patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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