Kienböck Disease in a 66-Year-Old Man after Distal Ulna Fracture

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Abstract

Keywords

- elderly Kienböck disease
- Kienböck disease
- lunate
- ulnar variance

Kienböck disease after fracture-dislocations around the wrist is a rare occurrence. This case report presents a case of a 66-year-old man who developed Kienböck disease 18 months after his distal ulnar fracture. The patient developed negative ulnar variance after union of the distal ulnar fracture. Nonsurgical treatment was not effective in relieving his pain. Radial shortening osteotomy was performed based on the negative ulnar variance that developed. One year postoperatively, visual analog scale improved to 0, grip strength improved to 25 kg, and flexion-extension arc improved to 150 degrees. The patient achieved satisfactory clinical outcomes. This is a therapeutic level IV study.

Introduction

Kienböck disease is most prevalent in patients aged between 20 and 40 years. The occurrence of Kienböck disease in elderly patients is uncommon. There is limited literature on Kienböck disease in elderly patients. Many cases of elderly patient with Kienböck disease may be found in the large case series describing Kienböck disease.^{1–9}

Kienböck disease after fracture-dislocations around the wrist is a rare occurrence. This case report presents a case of an elderly patient who developed Kienböck disease 18 months after distal ulnar fracture.

Case Report

A 66-year-old man sustained a right distal ulnar fracture in a road traffic accident 2 years ago. He was a right-handed water engineer working with computer and mouse for several hours per day. The radiographs at the time of the accident demonstrated a distal ulnar fracture with a neutral ulnar variance (►Fig. 1). He was treated with cast immobilization. Six months before, the patient complained from a constant right wrist pain localized on the lunate bone. The pain visual analog scale (VAS) of the right wrist was 7 (VAS range: 0: no pain; 10: severe pain). The pain intensified

with manual work. The grip strength of the right hand was 20 kg and that of the left hand was 28 kg. Flexion-extension arc of the right wrist was 100 degrees and that of the left hand was 140 degrees.

At the time of examination, the right wrist radiographs demonstrated a united distal ulnar fracture, 3-mm negative ulnar variance due to recession of the ulna at the site of fracture, increased density of the lunate bone, and decreased the lunate height (►Fig. 2). The T1-weighted magnetic resonance imaging (MRI) demonstrated a homogenous low signal intensity of the lunate bone (►Fig. 3). The T2-weighted MRI demonstrated high signal intensity of the lunate bone (►Fig. 4). The diagnosis was compatible with Lichtman stage IIIA Kienböck disease. The patient was managed with a wrist splint and pain killers for 3 months, but his pain was not resolved. We offered and performed a radial shortening osteotomy based on the negative ulnar variance that developed. The osteotomy was performed through a dorsal approach, and a 3-mm wafer of radius was removed. The osteotomy site was fixed with a six-hole 3.5-mm dynamic compression plate. The radioulnar joint got leveled after radial shortening (►Fig. 5). Six months postoperatively, the patient had no pain at the wrist and osteotomy site and refused to obtain wrist radiographs. One year postoperatively, VAS improved to 0, grip strength improved to 25 kg, and flexion-extension arc improved to 150 degrees.

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Fig. 1 Anteroposterior radiograph of the right wrist at the time of the injury demonstrates a fracture of distal ulna, neutral ulnar variance, and normal configuration of the lunate bone.

The patient achieved satisfactory clinical outcomes. Although we urged the patient for follow-up examinations, he was reluctant and did not come further for follow-up examinations.

Discussion

In 1922, Hulten suggested that negative ulnar variance is a risk factor for Kienböck disease. It is hypothesized that the shortened ulna shifts and increases the load stress along the intermediate column and lunate, which affects the intraosseous circulation of some of the lunates. The role of negative ulnar variance as a risk factor for the development of Kienböck disease is controversial in elderly patients. Tsujimoto et al studied 572 middle-age and elderly Japanese women with Kienböck disease. The mean age of the study population was 64.8 ± 10.5 years. Out of the 572 patients, 7 (1.2%) had a mean age of 70.6 years. They indicated that the difference of ulnar variances was not statistically significant between the affected and unaffected wrists and the normal group. The authors suggested that the negative ulnar variance was not a contributing risk factor for Kienböck disease in middle-aged and elderly Japanese women.⁶ Taniguchi et al studied 14 patients (15 wrists) with the aged-onset Kienböck disease. The mean age at onset was 65 years (range: 61–73 years). Two out of 15 wrists had negative ulnar variance. They indicated that there was no relation between

Fig. 2 Anteroposterior radiograph of the right wrist 2 years after the injury demonstrates negative ulnar variance due to ulnar recession and increased density and sclerosis of the lunate bone.

Fig. 3 The T1-weighted MRI (magnetic resonance imaging) demonstrates homogenous decreased signal intensity of the lunate.

Fig. 4 The T2-weighted MRI (magnetic resonance imaging) demonstrates increased signal intensity of the lunate.

negative ulnar variance and Kienböck disease in their study.⁴ Yoshida et al identified the aged-onset Kienböck disease when the first symptom of the disease was presented at the age of 50 years and older. They studied 15 cases with a mean age of 58.3 years (range: 54–64 years). They hypothesized that negative ulnar variance and osteoporosis were important risk factors in elderly patients with Kienböck disease.⁷ Taniguchi et al on follow-up radiographs of three patients with a history of Colle's fracture incidentally diagnosed Kienböck disease. The patients were 73, 57, and 45 years old, respectively, and had asymptomatic stage IV Kienböck disease. The authors did not mention about the ulnar variance and time interval between Colle's fractures and the development of Kienböck disease.⁸ In our case, we observed the association of negative ulnar variance due to recession of the fractured ulna with the development of Kienböck disease.

Kienböck disease in young and elderly patients is a progressive disorder, but clinical findings do not necessarily correlate with the radiographic findings. In elderly patients with Kienböck disease, nonsurgical treatments have been advocated because the patients usually are less demanding, and the disease has less severe symptoms and may even be asymptomatic. Surgical treatments may be offered if the pain does not ameliorate with nonsurgical managements.^{1–9} Taniguchi et al operated on 2 out of 15 wrists of elderly with Kienböck disease with excision arthroplasty and managed 13 wrists nonsurgically. All the patients achieved good and excellent clinical outcomes.⁴ In Yoshida et al's study of 15 cases with elderly Kienböck disease, 7 were managed nonsurgically, whereas 8 patients underwent different surgical procedures.⁸

Fig. 5 Postoperative anteroposterior radiograph of the right wrist demonstrates a neutral ulnar variance.

Soejima et al treated seven patients with advanced stages of Kienböck disease with lateral closing wedge osteotomy of the distal radius. The mean age of the patients was 57 years. One patient aged 47 years, whereas the rest of the patients aged between 57 and 66 years. After an average of 50 months, all the patients achieved improvement in pain, grip strength, and flexion/extension arc of the wrist joint.⁹

In the case series of radial shortening osteotomy for Kienböck disease, many elderly patients have achieved reasonable clinical results. In our case, the negative ulnar variance proved the basis for the target of subsequent radial shortening.

In this case report, we described a case of avascular necrosis of the lunate 18 months after a distal ulnar fracture. This should be differentiated from the transient vascular compromise of the lunate that may be observed after fractures and dislocations around the wrist joint in which the vascular compromise is not progressive and the bone necrosis does not occur.¹⁰

Conflict of Interest

None declared.

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