A Colles' fracture in an elderly woman

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A 68-year-old woman presents with a painful wrist after a fall at home.

Case presentation

A 68-year-old woman who lived alone presented to the emergency medicine department with a painful and swollen right wrist after falling onto her outstretched hand in the kitchen. The pain was severe, and swelling had occurred rapidly. She called an ambulance after seeing an obvious deformity.

The patient was left hand dominant and independent with her activities of daily living. Her history included a total hip replacement four years previously on the right side. She was a cigarette smoker until four years ago, and she suffered from chronic obstructive airways disease that was well controlled.

Examination of the right wrist revealed an obvious dorsal deformity. Palpation of the distal radius and ulna revealed marked tenderness, but there was no focal tenderness in the anatomical snuffbox. The radial pulse was present and capillary return was less than three seconds. There were no distal neurological abnormalities. The general examination was otherwise unremarkable, with no evidence of trauma to other areas.

After imaging, the patient was diagnosed with a Colles' fracture (Figure 1). X-rays of the wrist (posteroanterior and lateral) revealed a comminuted fracture of the distal radius that was displaced posteriorly by 10% of the width, tilted by 30° dorsally, and impacted with shortening of 7.5 mm. There was an associated ulnar styloid fracture (Figure 2). No other imaging was required.

Comment

The classic description of a Colles' fracture is a transverse fracture of the distal radius located 4 cm proximal to the wrist crease. It has the following characteristics: dorsal tilt, impaction, and radial deviation with or without an associated ulnar styloid fracture. The radiocarpal and distal radioulnar joints may be involved.

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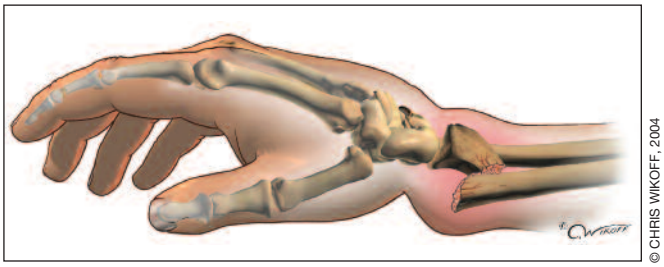

Figure 1. The classic Colles' fracture affects the radius, approximately 4 cm proximal to the wrist crease. Displacement occurs in three planes, with dorsal tilt, impaction, and radial deviation typically producing a 'dinner fork deformity'.

The typical injury is a fall onto the pronated, dorsiflexed hand. This causes excessive supination of the forearm leading to tension forces on the palmar radius and bending compression forces on the dorsal aspect of the bone. Elderly women are at particular risk because of associated osteoporosis. Younger patients with normal bone mineral density require greater kinetic energy to cause a fracture – these high energy injuries are often intra-articular and should be considered as separate to the classic Colles' fracture.

Associated injuries that should be looked for include scaphoid fractures, intercarpal ligament injury and median nerve injury. Ulnar styloid fractures occur in about 50 to 60% of cases.

Treatment

For this patient, our aim was to restore radial length and tilt. Three parameters were used to assess the need for intervention, with acceptable limits being:

- loss of normal volar angulation – up to 20°
- loss of radial inclination – less than 5°
- shortening – less than 5 mm.

Reduction and restoration of length were performed under general anaesthesia by manually reversing the deforming forces with longitudinal traction, ulnar deviation and pronation (Figure 3). After reduction, there was a 2° palmar tilt. The reduction was maintained by immobilisation in a well padded cast that was moulded with the wrist in flexion and ulnar deviation – moulding is vital in preventing loss of reduction (along with Charnley three-point pressure over the cast). Despite these measures, it is often difficult to maintain the reduction because of the decrease in swelling and dorsal comminution.

Comment

Treatment options for a Colles' fracture aim to:

- obtain reduction of any displacement
- maintain the reduction
- obtain union
- restore function.

continued

Figure 2 (left). Wrist x-ray at presentation, showing a comminuted fracture of the distal radius with an associated ulnar styloid fracture. Figure 3 (right). Wrist x-ray after surgery, showing reduction and restoration of radial length.

Colles' fractures occur on a continuum, ranging from an undisplaced fracture requiring cast immobilisation alone to intra-articular comminuted fractures requiring open surgical reduction and fixation. Treatment options are influenced by:

- the fracture – the degree of displacement, comminution and osteoporosis
- the patient – general health, compliance and premorbid functional capacity
- the surgeon – experience, skill and access to equipment.

A significant medical history, poor compliance, low functional demand and past fractures can influence the decision to accept less than anatomical results. It is important to recognise that chronological age does not always correlate with functional age, and that older patients may benefit from aggressive treatment.

Follow up and outcome

The patient had a follow up visit six days after the operation, and an x-ray showed maintenance of position. The plaster was below-elbow so as not to cause unnecessary stiffness but without compromising maintenance of the reduction. Early rehabilitation during the immobilisation period was encouraged, particularly for the shoulder joint in the affected limb. The cast should allow free movement of the metacarpophalangeal joints, and the patient was advised to move her fingers regularly.

X-rays were taken weekly for two weeks because Colles' fractures can develop radial shortening and loss of radial inclination; healing occurs in the position by two to three weeks. The cast was removed at six weeks when the fracture was clinically united, and the patient began physiotherapy immediately to minimise the risk of stiffness.

The patient was reviewed three months after the injury. She still had limitation of movement at the wrist and stiffness in the fingers, but these had resolved at the six-month visit. Her grip strength was decreased on the affected side and minor dorsal deformity remained. She was advised of the long term complications such as osteoarthritis of the inferior radiocarpal and radioulnar joints, and carpal tunnel syndrome.

Comment

Possible early complications, such as loss of reduction and instability of the fracture, tend to occur within the first two to three weeks. These may necessitate alternative treatment, such as percutaneous K wires or open reduction and internal fixation.

Intermediate to late complications include malunion related to the radial shortening and angulation. It is important to discuss the risk of residual deformity with the patient. Nonunion is rare. Loss of grip strength and reduced range of movement with associated finger stiffness can occur. Rarely, a stiff painful hand, tendinous adhesions in the flexor compartment and rupture of the extensor pollicis longus tendon may also occur. The median nerve can be compressed and carpal tunnel syndrome may develop later; ulnar or radial nerve compression is less common. Reflex sympathetic dystrophy and Volkmann's ischaemia are rare complications.

The amount of soft tissue damage can influence the likelihood of a poor outcome. In this patient's case, soft tissue damage was limited because of the low velocity nature of the injury.

Keypoints

- Distal radius fractures are common in the elderly. Patients with osteoporosis are at particular risk of fracture.
- The goal of treatment is to return the patient to normal function. Chronological age does not always correlate with functional age, and older patients may benefit from aggressive treatment. MT

Further reading

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DECLARATION OF INTEREST: None.