CASE REPORT

Asymptomatic non-union of capitate 14 years postfracture

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SUMMARY

We report the unusual complication of non-union 14 years following a capitate fracture in a right-hand dominant man. Our patient fell and sustained an injury to his left wrist 14 years ago. At that time he had a swollen painful left wrist. His symptoms subsequently settled and he went back to his normal activities. He lost some power for bench-pressing and had slightly restricted range of motion but remained essentially pain-free. He presented 14 years later with another wrist injury when the original non-union was revealed.

BACKGROUND

Isolated capitate fracture is a rare condition.^{1–4} Owing to the complexity of the carpus and the inherent difficulty in identifying abnormalities with routine imaging, the likelihood of under-reporting of these fractures must be considered. More detailed imaging is typically only suggested in cases with unresolved symptoms, primarily wrist pain, and may facilitate identification of other damaged structures.⁴

Capitate non-union is a recognised complication which may require surgical intervention. Only a few cases have been reported of established non-union several months post-trauma.

CASE PRESENTATION

A 40-year-old right-hand dominant man presented with left wrist pain caused by a fall onto his hand. He was otherwise fit and healthy and his job involved mainly office work. Initial radiographs (figure 1A,B) did not reveal any obvious bony injury. Subsequent CT (figure 2) showed an old

non-united fracture in the capitate. His history included an incident 14 years earlier; he had sustained a closed injury to his wrist after a simple mechanical fall, which caused immediate pain and swelling. However, his symptoms settled down within a few weeks and he was content to return to his normal activities without the need for any further investigation or treatment. He reported only mild loss of power while bench-pressing and minimal reduction in wrist motion, neither of which was of concern to the patient.

INVESTIGATIONS

Wrist radiographs in anteroposterior and lateral views did not show the fracture and they were reported as normal (figure 1A,B). However, the CT scan images, which were obtained later, clearly revealed the area of non-union in the capitate (figure 2).

OUTCOME AND FOLLOW-UP

In this particular case, our patient has been diagnosed with an isolated fracture to the capitate, which he had had for about 14 years ago. Despite some residual symptoms, the patient's daily activities have not been affected. The clinical examination did not reveal any significant functional deficit. Plain radiographs failed to disclose the fracture; however, the CT scan images showed the fracture non-union with a radiological evidence of pseudoarthrosis. The management options were discussed with the patient. His level of function was not particularly compromised; hence, it was mutually agreed to follow the conservative management option. We therefore decided that there was no need for further diagnostic work-up (ie, MRI scan), unless he developed symptoms later in life. The patient was then followed up in the fracture clinic for 15 months. Apart from mild loss of

Figure 1 (A) Plain anteroposterior radiograph reveals no bony damage. (B) Plain lateral radiographs reveal no bony damage.

Figure 2 CT reveals an old fracture non-union of the capitate.

To cite: Hamed Y, Ashwood N, Fogg Q, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-009031

power while bench-pressing, which he was not concerned about, he had no other symptoms. He was then discharged from the clinic.

DISCUSSION

Wrist anatomy is probably the most complex of the whole body; therefore, making a diagnosis after a wrist injury can be challenging.⁵ Only a few cases of isolated non-union have been reported and are typically diagnosed within months of the initial injury.²⁻⁶ Interestingly, these cases were treated surgically with internal fixation and autologous bone grafting to enhance healing. After extensively searching the literature, we found a few isolated capitate fractures in skeletally immature patients presented as case reports.⁷⁻⁹

Revascularisation has been reported in necrotic cases. Avascular necrosis of the capitate is less common compared to high risk bones, such as the scaphoid. The infrequency of AVN of the capitate is thought to be related to its relatively protected position in the centre of the carpus. Although the majority of the reported cases have been associated with an acute traumatic event, other aetiologies have included repetitive microtrauma, dorsal instability and gout.¹⁰ The capitate has a variable blood supply, but is most commonly a combination of palmar and dorsal vessels which form an extensive intraosseous network.¹¹ In all patterns, vascular supply to the proximal pole is in a retrograde fashion. Thus, the blood supply to the proximal pole of the capitate is tenuous, and analogous to that of the scaphoid.¹²

Capitate non-unions are stable in most cases. This is in part due to the central position of the bone within the carpus. Throughout all mid-carpal joint motions the capitate is loaded from radial, ulnar and proximal directions. Loading from the hand or finger motion provides a distal source of load, thus keeping the fractured segments closely aligned. It is this relationship that is most likely to have allowed the current case to persist for 14 years with only slight decrease in function.

Should the non-union result in avascular necrosis of the capitate, the result would be dramatically different. Perilunate disorders account for a large percentage of degenerative wrist disorders that impair global wrist function. These typically progress with collapse of the capitate into either the scapholunate or, less commonly, the lunotriquetral space. There is usually a gradual progression of displacement and subsequent diminished function. Loss of the capitate, however, more quickly influences global wrist function, regardless of carpal mechanic model.¹³

Albeit rare, the potential seriousness of capitate non-union renders this worthy of investigation in cases with prolonged

central wrist pain. The case presented demonstrates that non-unions of the capitate are not necessarily unstable, and may be suited to conservative treatment. However, the surgeon should be aware of the potential dangers that exist with fractures of the capitate, as with other carpal bones.

Learning points

- ▶ Isolated capitate fracture non-union can be asymptomatic.
- ▶ A plain radiograph may not be enough in order to diagnose capitate fracture.
- ▶ Capitate fracture can be treated conservatively provided that the patient is symptoms free.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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