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Introduction

Hyaluronic acid (HA) functions as a lubricant and viscoelastic shock absorber. However, excessive accumulation of HA in the extracellular matrix can dramatically increase its viscosity and alter its lubricating properties, inducing muscle stiffness which can reduce joint range of motion (ROM). Intramuscular injection of hyaluronidase, which breaks down HA, can offer an efficacious treatment for limitation of ROM. We herein report a case of hyaluronidase injection enhancing ROM in a patient with heterotopic ossification (HO) after traumatic fracture.

Case report

A 9-year-old boy visited the emergency room after falling down a slide and was diagnosed with the left medial epicondyle fracture of distal humerus and fracture of neck of radius. In emergency surgery, open reduction was performed through elbow medial and lateral incisions. During surgery, medial collateral ligament rupture was also confirmed but no damage to the ulnar nerve and radial nerve was identified. After replacement with a long arm cast, the patient was discharged home. Post-operative outpatient physical examination revealed limitation of ROM at elbow flexion, extension and especially supination, and computed tomography (CT) revealed HO at the anterior aspect of the ulna and medial aspect of the radial head (Fig. 1). Surgery was performed to remove the HO, and stiff tissue release was performed to improve elbow ROM. Even after surgery, limitation of ROM persisted and forearm supination was impossible on physical examination at the initial outpatient visit to the rehabilitation department. Afterwards, a total of 600 units of hyaluronidase were injected at the left biceps, pronator teres, brachialis, brachioradialis and supinator muscles. After seven weeks, 1200 units of hyaluronidase were injected at the same manner. After two injections, ROM improved as follows: elbow flexion to 130 degrees, elbow extension to -15 degrees and forearm supination to 20 degrees. The hyaluronidase injections were combined with occupational therapy to improve ROM, which included passive ROM exercise and forearm supinator muscle strengthening exercises. On 12 January 2024, another surgery was performed to remove additional HO. On 5 February 2024, he was admitted and received 400 units of hyaluronidase injections in the biceps, pronator teres, and supinator muscles and additional 300 units were injected in the pronator teres, quadratus, and biceps muscles on 16 February 2024, along with intensive occupational rehabilitation therapy. The ROM at the left elbow improved as follows: elbow flexion to 140 degrees, elbow extension full ROM, forearm pronation to 90 degrees and supination to 55 degrees (Table 1).

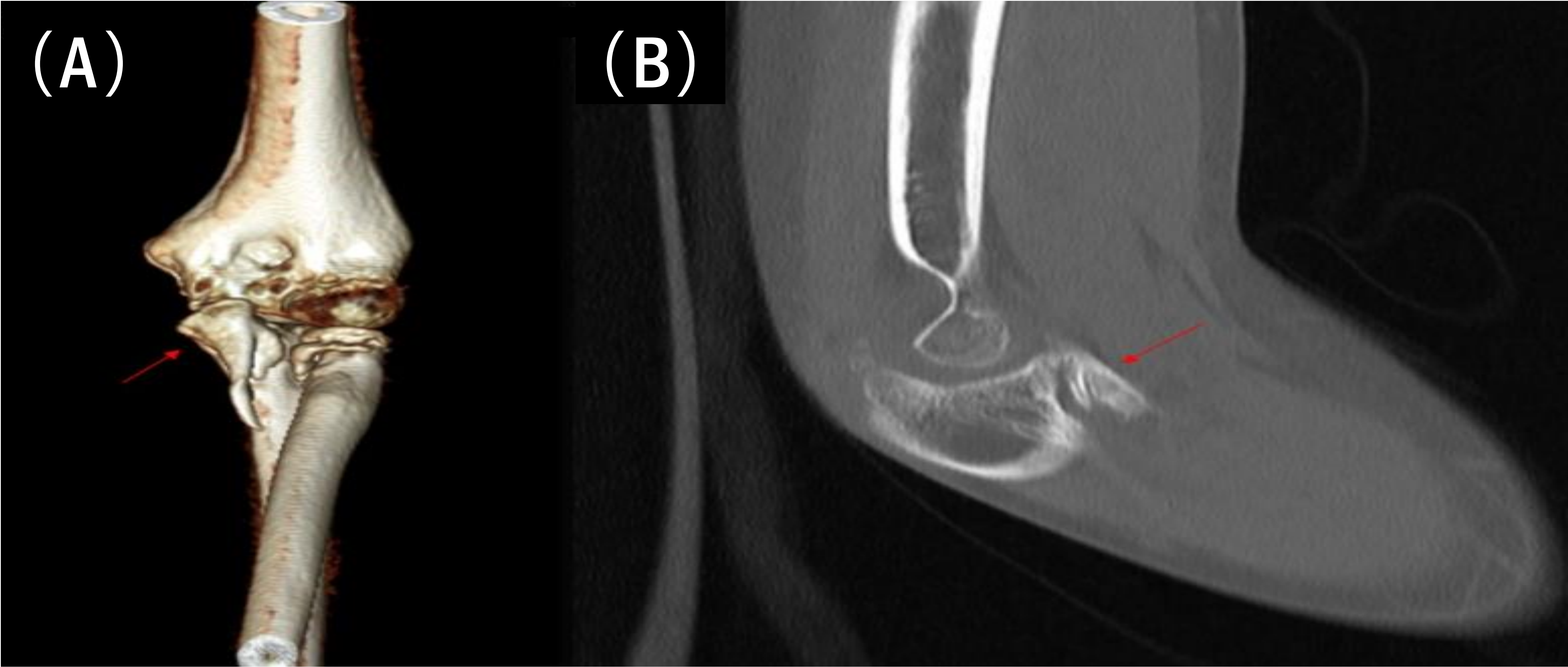


Figure 1. CT scan of the left elbow. (A) 3-dimensional CT scan revealed HO at the anterior aspect of the ulna and medial aspect of the radial head (arrow). (B) The sagittal view of the CT scan revealed HO (arrow).

Table 1. Change in ROM on the left elbow joint

| | Initial | #1 injection | #2 injection | #3 injection | #4 injection |
|------------------------|---------|--------------|--------------|--------------|--------------|
| Elbow flexion (°) | 100 | 110 | 130 | 140 | 140 |
| Elbow extension (°) | -45 | -20 | -15 | 0 | 0 |
| Forearm supination (°) | 0 | 20 | 20 | 55 | 55 |

ROM; range of motion.

Conclusion

Hyaluronidase injection combined with rehabilitation treatment and can safely improve joint mobility and functional outcomes without muscle weakness. In patients with limited joint mobility due to HO following fracture, hyaluronidase injection is an option to consider.

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