Non-union ulnar fracture as a result of a remote injury

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DESCRIPTION

A 45-year-old man presented with a 2-year history of an enlarging left forearm mass. He has noted enlargement of his left forearm with associated pain with movement. The pain is worst with flexion on the lateral aspect of his forearm. The pain does not overtly limit his activities of daily living and improves with non-steroidal anti-inflammatory drugs. He denies numbness, tingling, weakness or unexpected weight loss. Patient recalled suffering an injury to his left forearm during a soccer game in Ghana at the age of 15 years. He was seen by a nurse who placed his forearm in a cast. No radiography images were obtained, and he had no further follow-up. He has never had issues with his forearm until the last few years. On physical examination, the patient has a notable deformity of the left forearm (figure 1). There was a palpable mass in the midulnar shaft without tenderness, erythema or skin break. His elbow and wrist range of motions were preserved with mild pain with supination, pronation and elbow flexion. He had normal strength and was neurovascularly intact. Plain radiography demonstrated a chronic and hypertrophic non-union ulnar diaphysis fracture with mild deformity of the radial diaphysis related to the healed fracture (figure 2). There was also moderate to severe osteoarthritis of the elbow.

Paediatric and adolescent forearm diaphyseal fractures present a treatment challenge.¹⁻³ Historically, both non-surgical and surgical treatments have been performed.¹⁻⁵ The mainstay of the management is close clinical and radiographic follow-ups. Non-unions may occur in 2%–10% of all forearm fractures and can lead to dysfunction of the upper limb and hand.¹⁻⁴ Compared with children,

Figure 2 Plain anterior-posterior (A) and lateral (B) radiographs of left forearm demonstrating chronic, hypertrophic non-union (pseudarthrosis) ulnar diaphysis fracture (arrows) with deformity of radial diaphysis consistent with a healed remote fracture (arrowheads). Moderate to severe elbow osteoarthritis is also present (open arrows).

adolescents and adults are more likely to develop malunions and non-unions.³⁻⁶ Other potential risk factors for non-unions are open fractures, inadequate stability (eg, suboptimal immobilisation or surgical fixations), associated infections and insufficient metabolic (eg, callus formation) response (eg, smoking and diabetes).¹⁻⁶ Non-union can be further categorised into hypertrophic and atrophic types. Hypertrophic non-union is characterised by

Figure 1 Left midforearm deformity (arrows) at the ulnar aspect (A and B).

Learning points

- ▶ Forearm injuries require a comprehensive clinical evaluation that should include radiographic images in most cases, particularly with any deformity or loss of function.
- ▶ Regardless of the treatment strategy, forearm fractures need close clinical and radiographic follow-ups.
- ▶ Patients with radius or ulna non-unions should be referred to orthopaedic surgery.

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adequate callus formation without adequate stability.⁶ However, atrophic non-unions occur due to the lack of callus formation usually due to inadequate vascularity or metabolic aetiologies.⁶ Despite non-union, in some cases, patients may maintain reasonable function for years.^{1 6 7} The primary goal of treatment is to restore the functional anatomy between the radius and ulna through maintaining their respective lengths and thus obtain optimum function.¹ Prolonged radial and ulnar non-union may cause significant disability due to osteoarthritis and decreased range of motion of adjacent joints.² Patients with malunions and non-unions should be referred to an orthopaedic surgeon for further evaluation and treatment.^{1 2 4 6} Our consultant orthopaedic surgeon recommended an elective ulnar open reduction and internal fixation with bone graft.^{6 8}

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REFERENCES

- 1 Boussakri H, Elibrahimi A, Bachiri M, *et al.* Nonunion of fractures of the ulna and radius Diaphyses: clinical and radiological results of surgical treatment. *Malays Orthop J* 2016;10:27–34.
- 2 Nithyananth M, Cherian VM, Amritanand R, *et al.* Childhood nonunion of ulna presenting with wrist deformity in an adult: a case report. *Arch Orthop Trauma Surg* 2008;128:717–22.
- 3 Truntzer J, Vopat ML, Kane PM, *et al.* Forearm diaphyseal fractures in the adolescent population: treatment and management. *Eur J Orthop Surg Traumatol* 2015;25:201–9.
- 4 Kloen P, Wiggers JK, Buijze GA. Treatment of diaphyseal non-unions of the ulna and radius. *Arch Orthop Trauma Surg* 2010;130:1439–45.
- 5 Passiatore M, De Vitis R, Perna A, *et al.* Extraphyseal distal radius fracture in children: is the cast always needed? A retrospective analysis comparing Epibloc system and K-wire pinning. *Eur J Orthop Surg Traumatol* 2020;30:1243–50.
- 6 Srinivasan RC, Hutson RL, Richard MJ. Forearm nonunion: characterization and management. *J Hand Surg Am* 2020;45:1055–64.
- 7 Richard MJ, Ruch DS, Aldridge JM 3rd. Malunions and nonunions of the forearm. *Hand Clin* 2007;23:235–43.
- 8 De Vitis R, Passiatore M, Cilli V, *et al.* Intramedullary nailing for treatment of forearm non-union: Is it useful? - A case series. *J Orthop* 2020;20:97–104.

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