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Case Report

Total Elbow Arthroplasty Gives Good Functional Outcome in Distal Humerus Fracture with Pre-existing Chronic Elbow Dislocation
全肘關節置換對患有長期肘關節脫位的遠端肱骨骨折提供良好的功能結果

Chan Hing Shing*, Ho Sheung Tung

Department of Orthopaedics and Traumatology, Caritas Medical Centre, Kowloon, Hong Kong

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ABSTRACT

Distal humerus fracture with concomitant chronic elbow dislocation is difficult to manage by open reduction and internal fixation, while total elbow arthroplasty (TEA) is an effective treatment for acute fracture or failed internal fixation of distal humerus fracture in elderly patients with osteoporosis. We present a case of an 86-year-old woman who suffered from acute distal humerus fracture in the presence of chronic elbow deformity from elbow dislocation since childhood at the age of 10 years. This was treated with TEA using Coonrad/Morrey prosthesis with long stem and long flange humerus components and cerclage wiring of humeral condyle. Postoperatively, elbow mobilization was started early within a hinged elbow brace. There was no operative complication. At the last follow-up 22 months after surgery, there was no pain and good elbow motion (20–130° flexion–extension arc, full supination and pronation to neutral) was obtained. The Mayo Elbow Performance Score was 100. There was incorporation of the bone graft at the anterior flange with no radiographic loosening of the prosthesis. This case shows that TEA can yield a gratifying clinical result and efficiently resolves two problems with one solution.

中 文 摘 要

遠端肱骨骨折並伴有長期肘關節脫位是難以開放復位及內固定處理，而全肘關節置換是一個用於老年及骨質疏鬆症患者的急性遠端肱骨骨折或骨折內固定失敗的有效治療。我們報告一位從10歲 起患有長期肘關節脫位及畸形，86歲時發生急性遠端肱骨骨折。使用長桿和長凸緣肱骨組件的Coonrad/Morrey人工假體和利用金屬線環紮肱骨髁進行肘關節置換。術後使用鉸鏈肘護托展開早期肘關節活動。手術後沒有併發症。術後22個月的最後隨訪中，沒有疼痛，肘活動良好 (20°-130° 屈曲伸展弧度、完全前旋、後旋至中立位置)。梅奧肘關節功能評分為100分。放射線造影見到凸緣處移植骨的結合而假體沒有鬆動。這個案例表明肘關節置換可提供令人滿意的臨床效果，並且可以用一個方案很好地解決兩個問題。

Introduction

Distal humerus fracture in the elderly is a surgical challenge when there is gross displacement, metaphyseal comminution, or very low fracture of the trochlea or capitellum. Even with open reduction using the gold standard internal fixation by dual column plate osteosynthesis, complications like hardware failure, nonunion, malunion, and elbow stiffness remain common in the elderly. Total elbow arthroplasty (TEA) is increasingly and commonly used for the primary treatment of selected distal humerus fractures in elderly patients. TEA is also indicated when there is pathological fracture, degenerative elbow disease, post-traumatic arthritis, and nonunion of the distal humerus.[1] Chronic elbow dislocation may be another pre-existing condition of the elbow that favours TEA for distal humerus fracture. To the best of our knowledge, this is the first report regarding the use of TEA to treat an elderly patient who presented with distal humerus fracture with chronic elbow dislocation.

Case Report

In 2002, an elderly woman presented to our orthopaedic clinic for her elbow deformity. She was known to have long-standing right elbow deformity after an injury to her elbow since the age of 10 years. She attended our clinic since 2002. Plain X-ray (Figure 1)

* Corresponding author. *E-mail:* henrychs@gmail.com.

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Figure 1. X-ray image taken during follow-up in 2008.

showed dislocation of the right ulnohumeral joint, nonunion of lateral condyle of humerus, dome shaped trochlea and slender distal humerus shaft, and degenerative changes at the radiocapitellar joint. Although she had on and off right elbow pain, this could be relieved with analgesics. She enjoyed good elbow function with independent activities of living. She could use chopsticks well, and her right hand could reach the occiput and mouth. Her elbow range was 0–130° with full supination and pronation but with gross instability. There were no symptoms or signs of ulnar neuropathy. In view of satisfactory upper limb function, she was managed conservatively with analgesics for her intermittent elbow pain.

In October 2014, the 86-year-old lady had a slip and fall accident and was admitted for right elbow injury. Physical examination showed that there was right elbow swelling and diffuse tenderness. The elbow range was limited. No neurovascular deficit was noted. Plain X-ray (Figure 2) showed a fracture at the slender portion of the distal humerus with the pre-existing chronic elbow dislocation and an ill-defined lateral condyle of humerus. Plaster of Paris slab was given with gentle reduction for immobilization (Figure 3). The elbow anatomy was studied using three-dimensional computed tomography (Figure 4). It showed a fracture at the slender pencil-shaped sclerotic segment at the diaphyseal-metaphyseal region. The lateral condyle was almost absent. A full range of Coonrad-Morrey prosthesis from Zimmer (Warsaw, IN), including extra-small ulnar components and long humerus prosthesis with long anterior flange was arranged.

TEA was performed 2 weeks after the injury to allow subsidence of the elbow swelling while waiting for the availability of the prosthesis. The patient was put in a supine position with the involved upper limb brought over a towel roll across the chest. The elbow was approached from posterior using a posterior straight midline incision with a bilaterotricepital "triceps-on" approach. Instead of resection of distal fragments of the humerus and detachment of collateral ligaments, flexor–pronator and extensor–supinator to medial and lateral condyles, the condyles were preserved for later fixation to preserve the integrity of the collateral ligaments. The olecranon was eroded with the loss of olecranon tip. The radial head was enlarged. The distal humerus shaft was thinned with the obliteration of the marrow canal. The thinned sclerotic distal part of the humerus was excised and retained as bone graft. The humerus medullary cavity was reamed and could accept a small humerus prosthesis. The flat spot of the proximal ulna was used to guide the orientation of the ulnar component in the sigmoid notch and proximal ulna. A long flange humerus prosthesis was used to bridge the distal humerus bone loss to allow the capture of the bone graft in between the anterior humerus cortex and anterior flange. A 6-inch small humerus component with long flange and a small 3-inch ulnar component were inserted for trial reduction. The proper depth of insertion of humerus prosthesis was determined by the muscle tension with the elbow in 90° flexion under axial load. Full elbow flexion and extension was obtained on table. Antibiotics-loaded cement (Palacos with gentamicin (Zimmer, Warsaw, IN)) was used. The remnants of medial and lateral condyles were wired back to the distal shaft of the humerus, and the bone graft was packed under the long anterior flange. Partial excision of the radial head was done to eliminate impingement during rotation. Subcutaneous anterior transposition of the ulnar nerve was done. A long arm plaster of Paris slab with the elbow at 50° flexion was applied in the operating theatre (Figure 5). Prophylaxis against heterotopic ossification was not given in this patient. Indomethacin was contraindicated in this patient as she had a history of duodenal bleeding in 2005.

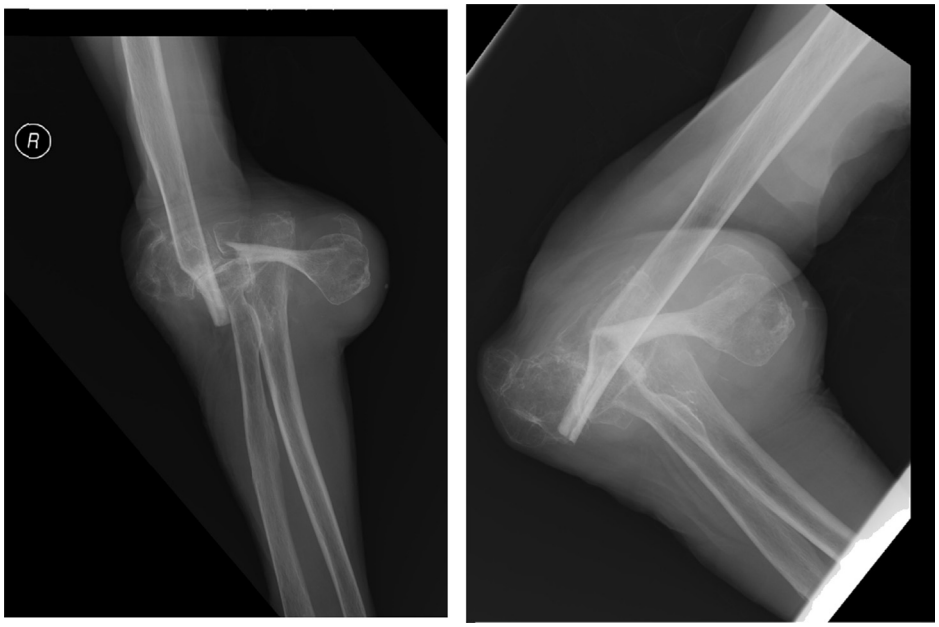

Figure 2. Postinjury X-ray image.