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Case Report

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Minimally Invasive Osteosynthesis of Isolated Coronoid Process Fracture: A Novel Technique

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Abstract

Isolated coronoid process fracture is not a commonly encountered injury of the elbow joint. Coronoid process is an important component in providing elbow stability. We present a case of isolated coronoid process fracture in a young male managed by minimally invasive osteosynthesis technique.

Keywords: Elbow, Coronoid Process, Osteosynthesis, Minimally Invasive.

INTRODUCTION

Coronoid process is an important structure for providing elbow stability [1]. The reported incidence of an isolated fracture of coronoid process is less than 1% [2]. Regan and Morrey classified this intraarticular fracture into 3 types [3]. There are numerous treatment options described but none have been universally accepted. An improper management of this isolated injury leads to elbow dysfunction. We present a case of an isolated Type II Reagan and Morrey coronoid fracture treated with our minimally invasive technique.

CASE REPORT

A 33-year-old man presented to us with a history of slip fall following which he developed severe pain and swelling over the left elbow. On physical examination, he had tenderness in the anterior aspect of elbow with no neurovascular deficit. The elbow range of movement was restricted due to pain. A radiographic evaluation showed an isolated Regan-Morrey type II coronoid process fracture with 4mm displacement [Fig 1]. Our plan was to surgically fix the fracture through a minimally invasive technique.

Surgery was performed under general anaesthesia with the patient in supine position and left arm on radiolucent side table. Ultrasound guidance was used to localise the brachial artery as digital palpation of arterial pulsation in a swollen elbow was difficult. A small incision was made on the anterior aspect of the elbow medial to ulnar artery (localised by ultrasound probe). A smooth tipped sleeve was introduced medial to artery and directed laterally (to avoid injury to median nerve) onto the fracture fragment [Fig 2]. A guide wire was inserted onto the fracture fragment through the sleeve. The fracture was reduced by manipulating the fragment with the guide wire in a joy stick manner. The guide wire was then introduced further across the fracture onto the proximal ulna under image intensifier guidance [Fig 2]. After confirming reduction and stability of fracture a cannulated drill bit was inserted over the guide wire and fracture was stabilized with a cannulated screw. A second screw was inserted in a similar fashion [Fig 2]. Satisfactory fracture reduction and post reduction elbow stability was confirmed intraoperatively.

Postoperatively, the limb was immobilized in an above elbow slab for 1 week [Fig 3] and then physiotherapy was initiated to prevent elbow stiffness. Suture removal was done at the end of 2 weeks. He had a good range of motion and the follow up radiographs showed a solid fracture union. At the last (1 year) follow up, he had a stable elbow joint with full range of motion [Fig 4, 5].

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DISCUSSION

Isolated coronoid process fracture is not very common [2]. Although it accounts for less than 1% of elbow fractures it is much more common with complex elbow injuries[4]. The small coronoid process is an important component of ulno-humeral joint providing axial, posterolateral and posteromedial stability to elbow [5, 6]. Apart from the structural stability, it is an important land mark for the attachment of ulnar collateral ligament, anterior capsule and brachialis muscle tendon[7]. Therefore, a displaced fracture of coronoid process demands an accurate reduction and fixation to prevent elbow instability. Coronoid process injuries have led to enough number of controversies regarding the need of fixation, approaches for addressing the fracture and also on the techniques of stabilization [8].

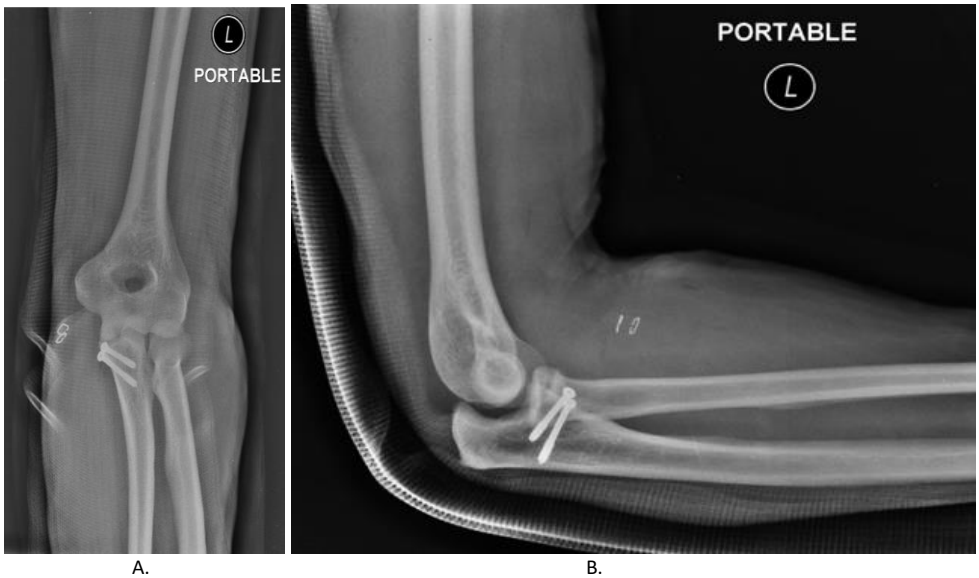
Han *et al*. [9] reported in a study on 32 patients that an anterior approach is superior to medial and posterior approach for fixation of isolated coronoid. We preferred an anterior approach which gives a direct access allowing anatomic reduction, minimizing the soft tissue dissection and an easy placement of screws. However, injury to neurovascular structures is a major concern.

A. B.

Figure 1: Preoperative AP (A) and Lateral (B) radiograph of left elbow showing displaced coronoid process fracture.

A. B. C. D

Figure 2: Intraoperative pictures (A) Anterior incision and placement of sleeve, (B) Fracture reduction with sleeve, (C) Fracture reduction and guide wire insertion across fracture, (D) Cannulated screw placement over the guide wire



A. B.

Figure 3: Postoperative AP (A) and Lateral (B) radiograph of left elbow in an above elbow slab

A. B.

Figure 4. 1 year follow up showing fracture union and screws in situ

A. B.

C. D.

Figure 5: Range of Movement achieved after surgical fixation (A) Elbow extension, (B) Flexion, (C) Pronation, (D) Supination

CONCLUSION

Our technique is simple, minimally invasive and effective in reducing postoperative pain and achieving an early recovery. However, a detailed and more extensive study on the safety and precision of the technique is needed.

Conflicts of interest: None

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