Isolated Coronal Fracture of Trapezium-
A Case Report with Review of Literature

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What to Learn from this Article?
Rare presentation of isolated Trapezium fracture: diagnosis and management

Abstract

Introduction: Isolated trapezium fractures accounts for 3-5% of all carpal fractures, are often missed on initial presentation. Trapezial fractures should be treated early given its importance in grip and pinch. We report a rare isolated coronal fracture of trapezium, following fall on an outstretched hand.

Case Report: A 40-year-old right lady presented with pain in right hand due to fall on outstretched hand. The radial half of wrist and lower forearm were swollen. Tenderness over trapezium and 1st metacarpal base with terminal thumb movements restricted. X-Ray revealed undisplaced incomplete coronal fracture of the trapezium. CT scan confirmed coronal split fracture of the trapezium with a major volar fragment and a dorsal fragment without articular involvement. The patient refused operative intervention. Fracture was treated conservatively. The follow-up radiographs showed normal articular relationship of the trapezium with the base of first metacarpal and scaphoid. The fracture healed with no complications.

Conclusion: Carpal fracture diagnosis requires high clinical suspicion. X-Rays and CT scans define pattern orientation and understanding.

Keywords: Trapezium, Trauma, Fractures, Coronal, X-Ray, CT.

Introduction

Isolated coronal fracture of the trapezium is rare and accounts for only 3-5% of all carpal fractures [1]. Vertical sagittal split fractures of the body of trapezium occur rarely in isolation and accounts for 20% of these fractures. [2]. Trapezium Fracture is not commonly seen after fall on an outstretched hand. These fractures often go unrecognized and are missed on initial presentation. These are important fractures to detect and treat early given the importance of the trapezium in the carpometacarpal joint in actions such as grip and pinch but a universal protocol for its treatment is lacking[2]. We report a rare isolated coronal fracture of trapezium, following fall on outstretched hand.

Case report

A 40-year-old right hand dominant female patient presented to the Out Patient Department with pain in the right hand due to a fall on the outstretched hand. Swelling present on radial half of the wrist and lower forearm (Fig 1 & 2). She had pain over the radial side of
the wrist, tenderness over the trapezium and base of first metacarpal with no tenderness in the anatomical snuff box with no crepitus or abnormal bony movements. Movements of her thumb was only restricted in the terminal range, palmar flexion and radial deviation were painful and her neuro-vascular status was intact.

Investigations: A plain radiograph of the left hand revealed an incomplete fracture trapezium similar to Walker Type-1 but is incomplete with intact 1st CMC Joint (Fig 3 & 4). CT scan confirmed the coronal split fracture of the trapezium with a major volar fragment and a dorsal fragment without articular involvement (Fig 5)

Treatment: The patient refused operative intervention. A Cock up back slab was given for 5 days in emergency room to relieve pain and swelling. Fracture was treated conservatively. Under general anaesthesia, a below elbow plaster cast was done for 8 weeks, later converted to synthetic cast at 4th week due to patient’s discomfort with the regular cast.

Outcome and follow-up: Physiotherapy initiated at 8 weeks. She resumed normal activities assisted with a planned physiotherapy regimen at end of 8 weeks. At 3 month and 6 month follow-up the patient reported good functional outcome. At 6 months, she had a painless and complete range of motion of the left thumb (Figs 6, 7 & 8) and wrist, compared to the uninjured side. The follow-up radiographs showed normal articular relationship of the trapezium with the base of first metacarpal and scaphoid. The fracture healed with no complications (Figs 9 & 10). Though we did not formally score his function, she reported satisfactory return to all her normal activities of daily living including writing, dressing and lifting. Her grip strength was normal.

Discussion

Main mechanisms for Trapezium fractures described are: a fall on the hand with the wrist extended and radially deviated (Manon) and direct commissural trauma combined with various degrees of shearing described by Monsche. Though there are various types (ridge, body, vertical, transverse, coronal and comminuted), it is the indirect force mechanism that has been attributed to fractures of the trapezium body2. The clinical presentation can be quite variable depending on the displacement of the fracture and the involvement of the carpometacarpal joint. It could be minimal, with no gross deformity and almost full range of movements of the wrist and fingers and impairment of the terminal range of opposition of the thumb. Other injuries reported in association include fracture of the proximal pole of the scaphoid, fracture of the thumb metacarpal, fracture of the distal radius, fracture of other metacarpals and fracture of other carpals, including trapezoid and capitate3. Occasionally there may also be associated ligament damage (anterior oblique ligament, dorsoradial ligament, intermetacarpal ligament, posterior oblique ligament). Thus, it is important to have a high clinical suspicion based on history and mechanism of injury2. Trapezial fractures often are unrecognized lesions; their diagnosis can only be made by radiographs with specific projections4. Imaging consists of plain radiographs, but often undisplaced fractures can be missed on these. A true anteroposterior view (Robert’s view), done with the hand in full pronation, is a good way of visualizing the trapezium and the base of the first metacarpal clearly on plain radiographs2. Computerized Tomography or bone scintigraphy is helpful in finding out the amount of displacement and the size of the fragments and also in fractures not visualized in the plain films.

The literature reports several management options. It is important to determine the stability of the joint before treatment. Especially in cases with associated dislocation, rupture of the surrounding ligaments and the dorsal joint capsule may result in instability even if the fracture itself is appropriately stabilized and these may require repair. Reconstruction of the inter-metacarpal and capsular
structures, such as an inter-metacarpal abductor pollicis longus augmentation may be required\textsuperscript{5}, especially in isolated dislocations. However, as it is the universally accepted orthopedic principle that fractures involving an articular surface require accurate reduction, most authors adhere to treatment involving accurate restoration of the articular surface. This is supported by two series\textsuperscript{5,6} which highlighted the need for accurate reduction of the articular surface with displacement > 2mm. Inston et al\textsuperscript{7} reported very good success rate using Herbert screw which gave dynamic compression of the fragments. One article\textsuperscript{8} reported successful conservative treatment of most undisplaced trapezium fractures in plaster cast only.

Most of the literature recommends open reduction and internal fixation of vertically displaced intrarticular fractures of the trapezium. Cordrey and Ferrer-Torrells\textsuperscript{9} were the first to recommend this and they used Kirschner wire-fixation for a series of five patients. Foster and Hastings\textsuperscript{10} recommended this and they used Kirschner wire-fixation for a series of five patients. Foster and Hastings\textsuperscript{10} recommended this and they used Kirschner wire-fixation for a series of five patients. Foster and Hastings\textsuperscript{10} recommended this and they used Kirschner wire-fixation for a series of five patients. Foster and Hastings\textsuperscript{10} recommended this and they used Kirschner wire-fixation for a series of five patients. Foster and Hastings\textsuperscript{10} recommended this and they used Kirschner wire-fixation for a series of five patients. 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Carpal Fractures not always are accompanied with obvious clinical signs; hence High degree of suspicion is required for diagnosing these fractures. X-Rays supplemented with CT scan is required to understand fracture pattern orientation. Universal treatment protocol for trapezial fractures is not standardised. Undisplaced coronal non-articular fractures can be managed by conservatively. Physiotherapy plays important role in rehabilitation and recovery.

## Conclusion

Carpal bone fractures require high degree of suspicion for diagnosis and early treatment. This is a report of rare coronal pattern of trapezial fracture that we encountered.

## Clinical Message

Carpal bone fractures require high degree of suspicion for diagnosis and early treatment. This is a report of rare coronal pattern of trapezial fracture that we encountered.

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