ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 04 | April - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MANAGEMENT OF AN ISOLATED TRAPEZOID FRACTURE IN AN ELDERLY PATIENT: A RARE CASE REPORT

Orthopaedics

Dr. Sarang Shete* Assistant Professor, Department of Orthopedics, KAHER, JNMC Belagavi 590010. *Corresponding Author

Dr. Anmol RS Mittal Junior Resident, Department of Orthopedics, KAHER, JNMC Belagavi 590010.

ABSTRACT

Isolated trapezoid fractures are one of the rarest entities in orthopaedics. They account for only 0.4% of all carpal injuries. Clinically, they mimic scaphoid fractures which is the most common carpal bone injured (68.2%) owing to anatomical snuff box tenderness observed in both the fractures. Along with this, the superimposition of trapezoid on overlapping carpal bones on plain radiographs, makes it difficult for an orthopaedic surgeon to diagnose it radiologically. The recommended treatment is conservative, except for severely displaced or comminuted fractures. Through this case, we report an isolated trapezoid fracture in an elderly patient wherein, the evidence for management is bleak in the orthopaedic literature due to its rarity.

KEYWORDS

Trapezoid Fracture, Carpal, Wrist, Hand surgery, Elderly

INTRODUCTION

Trapezoid is a key-stone shaped carpal bone located in the distal carpal row. Carpal fractures constitute only 2.8% of all fractures out of which trapezoid fractures account for a miniscule 0.2-0.4% [1] i.e. 0.0056-0.0112% of all fractures. It is most commonly considered to be a consequence of an indirect bending or loading axial force transmitted through the 2nd metacarpal. It has also been reported to be caused due to direct trauma [2]. Diagnosis of an isolated trapezoid fracture is of prime importance as it can lead to mal-union, non-union and result in chronic pain, restricted range of motion (ROM) and grip strength [3], in turn reducing the quality of life especially if the dominant hand is involved. As it mimics a scaphoid fracture with relation to its presenting signs, symptoms and history, it is difficult to diagnose clinically as scaphoid is the most common carpal to be fractured. Plain radiography (X-Ray) in the postero-anterior (PA) or antero-posterior (AP) view with ulnar deviation at the wrist (Scaphoid view) aided by oblique and lateral view (Scaphoid series) are most commonly recommended, but more often than not, fail to show an occult fracture [2]. A spectrum of treatment protocols has been advocated for trapezoid fractures, ranging from conservative and surgical fixation to excision. However, the literature is devoid of reports of these fractures in the elderly population, its management and subsequent effects.

CASE REPORT

A 56-year-old male patient presented to the Out-Patient department, with complaints of pain from base of the second metacarpal to the wrist and swelling at the base of first and second metacarpal. He also complained of pain increasing on movement. He gave a history of self-fall, from standing position, on his outstretched, dominant right hand, one week ago. Based on the history, the position of hand upon fall, was hyper-flexed at the wrist. The patient gave a history of sudden onset pain and oedema for which he applied ice to the affected area and sought no further treatment. The swelling decreased initially but the pain persisted which also disturbed sleep at night. There is no history of any known co-morbidity.

On examination, there was minimal swelling over the palmar and dorsal aspect of the base of second and third metacarpal. Active range of movements at the wrist, first, second and third carpo-metacarpal joints was restricted. Point tenderness was noted in the anatomical snuff box and scaphoid tubercle. There was no neurovascular deficit. The passive ROM were 40^0 extension, 30^0 flexion, ulnar deviation 30^0 and radial deviation 10^0. There was difficulty in opposition, flexion and extension of the thumb. The patient described pain on rest as 6/10, upon active movement as 8/10 and upon passive movement as 9/10 with 0 being no pain and 10 representing the worst pain ever as per visual analogue scale (VAS)[4].

A clinical diagnosis of scaphoid fracture was made and the patient was asked to get plain radiographs of the hand and wrist in the PA view with ulnar deviation, oblique view and lateral view (Figure 1). However, there was no conclusive evidence of any kind of fracture based on the radiographic films. Hence, magnetic resonance imaging (MRI) of the right wrist and hand was done for further evaluation. It revealed bone marrow edema and trapezoid bone fracture, (Figure 1). This was followed up with a computerised tomography (CT) scan on advice of the institutional radiologist. It confirmed a trapezoid fracture which was 2 part, minimally displaced, non-comminuted, with fracture line through the middle and directed superio-inferior as appreciable in the sagittal view (Figure 1).

Figure 1: *(1) X-rays in PA view with ulnar deviation, Oblique and Lateral views (scaphoid series) (2) T2 weighted MRI with FATSAT sequence showing hyperintensities indicative of minimally displaced fracture of the Trapezoid in axial and sagittal views. (3) CT scan confirming fracture in sagittal view*

Accordingly, a cast in mild wrist dorsiflexion was applied for a period of 6 weeks. Upon removal of the cast, swelling and pain had subsided. The patient was advised active ROM exercises for the immobilized joints and muscular strength. At 8 weeks follow up, the ROM and stiffness had improved and he was advised to continue exercises. At 12-weeks follow-up, he had no neurological complaints, and had completely regained his ROM at the wrist joint (65^0 extension, 85^0 flexion, 25^0 radial deviation and 35^0 ulnar deviation) along with opposition and a better grip. At 20-weeks of follow-up, his ROM were 70° wrist extension, 90° wrist flexion, 40° radial deviation and 40° ulnar deviation and full opposition (Figure 2). Grip was comparable to the contralateral side. CT scan was done and the fracture was confirmed to be united (Figure 3). He was able to resume his daily

activities with no residual morbidity or complication.

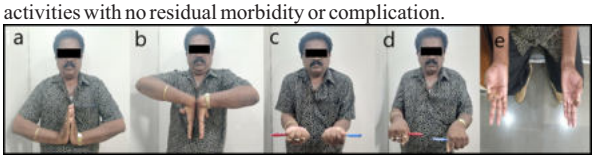

Figure 2: *ROM at 20-weeks follow-up: (a) Flexion (b) Extension (c) External rotation (d) Internal rotation (e) Opposition*

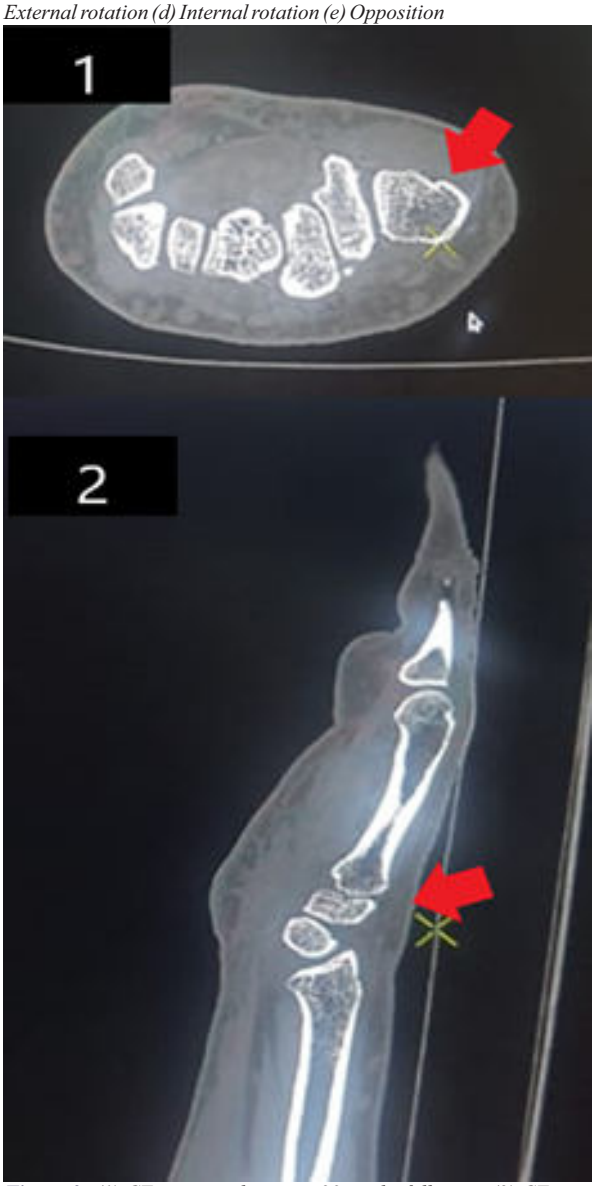

Figure 3: *(1) CT scan axial view at 20 weeks follow up (2) CT scan sagittal view at 20 weeks follow up*

The patient was also evaluated using Disabilities of Arm, Shoulder and Hand (DASH) score on presentation, at 6 weeks (when the cast was removed) and further at 8 weeks, 12 weeks, 16 weeks, and at 20 weeks. The DASH score showed progressive improvement with every follow-up after the removal of the cast, and was comparable to the contralateral side after 20 weeks (Table 1).

Table 1: DASH Score Compilation At Presentation And Over 5 Follow-ups

Follow-UP	PRESENTATION	6 WEEKS	8 WEEKS	12 WEEKS	16 WEEKS	20 WEEKS
Dash Score	77.7	78.8	62.5	33.7	3.8	0

DISCUSSION:

Trapezoid fractures are most commonly undisplaced with very few reports of a displaced fracture such as those by Blomquist et al [4], and Garcia-Elias et al [5]. The fracture patterns may be coronal, sagittal or comminuted. These fractures are extremely rare, as aforementioned, but their mismanagement can be potentially debilitating for the patient and warrant prolonged and more frequent hospital visits due to the residual morbidity. Avascular necrosis though possible, is very unlikely owing to the good vascular supply from the branches of different arches entering into the palmar and dorsal non-articulating surfaces. The mechanism is often described as an axial load, or bending stress transmitted indirectly to the trapezoid through the second metacarpal even though its strong ligamentous attachment gives the idea that a high energy trauma is needed. This might be a consequence of a fall on an outstretched and either in hyperflexion or hyperextension as reported by Miyawaki et al [6], Watanabe et al [7], Afifi et al [8] or due to a punch as reported by Sadowski et al [9] and Jeong et al [10]. It can be a consequence of sports injuries such as hitting a ball with a clenched hand as described by Gupta et al [11], Blomquist et al [4] or due to an impact when stopping an onrushing ball as described in another case by Blomquist et al [4]. It can also occur in contact sports due to entanglement such as the third case reported by Blomquist et al in their case series[4]. Malshikare et al [14], have reported trapezoid fractures to be caused following direct trauma whereas Motor Vehicular Accidents (MVA) caused the same in the cases attended to by Nijs et al [12]. Isolated dislocation of the trapezoid is even more rare and has been reported by Ting et al[13] following an MVA.

The extensive soft tissue coverage, coupled with overlapping carpals makes this fracture imperceptible on X-Ray, especially when it occurs in the coronal plane [2]. Waizenegger found that out of 84 patients with snuffbox pain and normal radiographs, 6 had fractures of the trapezium or trapezoid detected by X-Rays [15]. MRI and CT scans have proved to be highly sensitive and specific for the conclusive diagnosis in any plane, with the former also detecting accompanying soft tissue injuries. Various authors have described the use of advanced imaging techniques such as Trispiral tomogram after obtaining a positive Technetium 99m MDP scan or the use of Radionuclide bone scintigraphy [16]. However, these investigations are costly and have shown to exhibit lower sensitivity which precludes their use in normal settings.

Although they gave tangible evidence of its use, we preferred not to use it in our patient as it required high level of individual expertise, is cumbersome for detecting accompanying soft tissue injuries and is painful for the patient especially when the probe is pressed against the tender points. Hence, we suggest CT or MRI, for the detection for occult trapezoid fractures due to their high diagnostic rates (80%) and ability to detect associated injuries without causing pain [17]. A suggestible treatment protocol can be charted based on previous reports with immobilization in a short arm cast/ scaphoid cast/ thumb spica or a short volar slab in wrist dorsiflexion, for a period of 6-8 weeks, being the primary treatment modality in an undisplaced and minimally displaced ($\leq$ 2mm) trapezoid fracture. Dislocations can be reduced can be reduced under anaesthesia and immobilized as described above [19]. Fractures that are displaced more than 2 mm or are severely comminuted can be treated by Closed Reduction and fixation by K wires, Open Reduction and Internal fixation or by excision, depending on the level of comminution [7,9,19,20].

After extensive literature research, we presume that this is one of the only studies to report management of an isolated trapezoid fracture in an elderly patient, (after Afifi et al [8] who reported the same in a 45-year-old lady). We suggest that CT scan and MRI are imperative in such cases and give conclusive evidence for the diagnosis of an occult fracture and/or associated soft tissue injuries. We would recommend conservative management, followed by physical therapy, as a reliable treatment modality for such a fracture, even in patients with advanced age.

CONCLUSION

Modalities such as CT and MRI are conclusive for the diagnosis of an isolated trapezoid fracture and associated injuries. We strongly suggest the consideration for conservative management in an undisplaced or a minimally displaced trapezoid fracture (by immobilization in a volar dorsal slab or a cast, with the wrist in slight dorsiflexion), even in elderly patients.

REFERENCES

1. Papp S. Carpal bone fractures. Orthop Clin N Am 2007;38:251–60.
2. Duckworth A.D. and Ring D.; Carpus fractures and dislocations; Rockwood and Green's fractures in adults; Wolters Kluwer publication; 8E, Volume 1; p1033.

3. Taleisnik J. The ligaments of the wrist. J Hand Surg Am. 1976;1:110–118.
4. Blomquist GA, Hunt TR III, Lopez-Ben RR. Isolated fractures of the trapezoid as a sports injury. Skelet Radiol 2013. 42:735–739.
5. Garcia-Elias M. Carpal bone fractures (excluding scaphoid fractures). In : Watson K, Weinzweig J, eds. The Wrist. Lippincott Williams & Wilkins, Philadelphia, 2001, pp 173-186.
6. Miyawaki T, Kobayashi M, Matsuura S, Yanagawa H, Imai T, Kurihara K. Trapezoid bone fracture. Ann Plast Surg. 2000;44 (4):444–6.
7. Watanabe H, Hamada Y, Yamamoto Y. A case of old trapezoid fracture. Arch Orthop Trauma Surg. 1999;119(5–6):356–7.
8. Afifi N, Lu JJ. A rare isolated trapezoid fracture. West J Emerg Med. 2011. 12(4):523–524
9. Sadowski RM, Montilla RD. Rare isolated trapezoid fracture: a case report. Hand (N Y). 2008;3(4):372–4.
10. Jeong GK, Kram D, Lester B. Isolated fracture of the trapezoid. AmJ Orthop (Belle Mead NJ). 2001;30(3):228–30.
11. Gupta P K, Gupta K, Vashisth I, Rathi N. Fracture of the trapezoid bone: An unusual fracture; Journal of orthopaedics and applied sciences; 2015; Volume 3; Issue 1; p28-30.
12. Nijs S, Mulier T, Broos P. Occult fracture of the trapezoid bone: a report on two cases. Acta Orthop Belg. 2004;70(2):177–9.
13. Ting M.H., Tompson J.D., Ek E.T. Isolated Dislocation of the trapezoid. World Scientific Publishing Company; Hand Surgery, Vol. 17, No. 3 (2012) 391393.
14. Malshikare V, Oswal A. Trapezoid fracture caused by assault. Indian J Orthop. 2007;41(2):175–6.
15. Waizenegger M, Wastie ML, Barton J, Davis TRC. Scintigraphy in the evaluation of the "clinical" scaphoid fracture. J Hand Surg Br 1994;19B(6):750–3.
16. Sadowski RM, Montilla RD. Rare isolated trapezoid fracture: a case report. Hand (N Y). 2008;3(4):372–4.
17. Kain N, Heras-Palou C. Trapezoid fractures: Report of 11 cases. J Hand Surg Am. 2012;37:1159–1162.
18. Ault DL, Jokerst AR, Kettner NW; Occult isolated fracture of the trapezoid diagnosed by ultrasonography; Journal of Ultrasound;2018; https://doi.org/10.1007/s40477-018-0308-3.
19. Pruzansky M, Arnold L. Delayed union of fractures of the trapezoid and body of the hamate. Orthop Rev. 1987;16(9):624–8.
20. Nanno M, Sawaizumi T, Ito H. Dorsal fracture dislocations of the second and third carpometacarpal joints. J Hand Surg Eur Vol. 2007;32:597–598.