Isolated Trapezium Fracture: A Rare and Challenging Diagnosis

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Abstract: Isolated trapezium fractures are a rare type of injury, accounting for approximately 4% of all carpal fractures. Due to their nonspecific symptoms and difficulty in detection with conventional radiography, these fractures are often underdiagnosed. This case report details a 22-year-old male who sustained a trapezium fracture after a motorcycle accident. The patient presented with wrist pain and mild edema, but radiographs were normal. However, computed tomography (CT) revealed a small fracture in the dorsal portion of the trapezium. Conservative treatment with wrist immobilization was administered, resulting in full recovery. The article discusses the rarity of trapezium fractures, their mechanisms of injury, diagnostic challenges, and treatment options. The use of imaging techniques such as CT and magnetic resonance imaging plays a crucial role in diagnosis, as they can detect fractures that may not be visible on plain X-rays. Early detection and treatment are essential to prevent complications such as arthritis, nonunion, and loss of thumb function. While there is no consensus on the optimal treatment approach, conservative management with immobilization or surgical interventions such as open reduction and internal fixation or closed reduction with pin placement are commonly used.

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Introduction

Isolated trapezium fracture is a rare condition, occurring in only approximately 4% of carpal injuries. Its diagnosis requires high suspicion, since the symptoms are non-specific and identification on plain X-rays is more difficult, requiring computed tomography (CT) or magnetic resonance imaging (MRI) (Nammour et al., 2019). Early detection and treatment are extremely valuable, given the important function of the trapezium in promoting pinching and grasping actions in the carpometacarpal joint. Therefore, trapezium injuries should not be ignored (Ramoutar et al., 2009). The ideal method of treatment is still a matter of debate in the literature, and it is up to scientific discussion and clinical assessment to define the best approach for each case (Roy et al., 2022).

This article will report a case diagnosed as a trapezium fracture, in order to explore the condition, its causes, consequences and resolution.

Case report

A 22-year-old male presented with right-hand pain for seven days following a motorcycle accident. He reports worsening pain when riding a motorcycle or performing hand movements since the incident.

On physical examination, mild wrist edema and tenderness were observed, particularly in the radial region, with pain during thumb movement. There were no visible hematomas or signs of joint instability.

The hand radiograph did not reveal any bone or joint abnormalities. However, CT showed a small fracture line in the dorsal portion of the trapezium bone, confirming the diagnosis of a trapezium fracture (Figure 1).

The treatment was conservative, with wrist immobilization using a splint for four weeks. Physical therapy was not required. After the immobilization period, the patient reported complete resolution of symptoms.

Discussion

The carpus is a complex structure composed of eight bones that interact to facilitate movements such as flexion and extension. The trapezium is part of the distal row of the carpus, along with the trapezoid, capitate, and hamate. Among them, the trapezium is considered the most mobile and, by forming the carpometacarpal joint, it plays a crucial role in pinching and grasping actions (Kaewlai et al., 2008; Ramoutar et al., 2009).

Fractures isolated to the trapezium are rare due to its position and anatomical shape, accounting for approximately 4% of carpal bone injuries. Its diagnosis is extremely challenging, and management may also be complex. The longer the time without detection, the lower the chance of recovering normal thumb movement (Nammour et al., 2019; Roy et al., 2022).

Isolated trapezium fractures typically result from high-energy trauma to the hand, which causes displacement of the bone. This injury can occur, for example, from an impact on the hand with the wrist hyperextended and radially deviated in a vertical longitudinal pattern, or from direct trauma (Roy et al., 2022; Aldeeb et al., 2023).

The signs and symptoms are usually nonspecific, as most patients only report pain and edema in the area, which can often be confused with scaphoid injuries. Furthermore, on physical examination, the presentation is typically minimal, with mild edema, no deformities, or joint effusion (Nammour et al., 2019; Aldeeb et al., 2023).

Imaging exams that aid in the diagnosis include CT and MRI, as it is rarely possible to detect the injury through plain radiography (Aldeeb et al., 2023).

The diagnosis relies on a high clinical suspicion to properly request imaging exams, which in turn leads

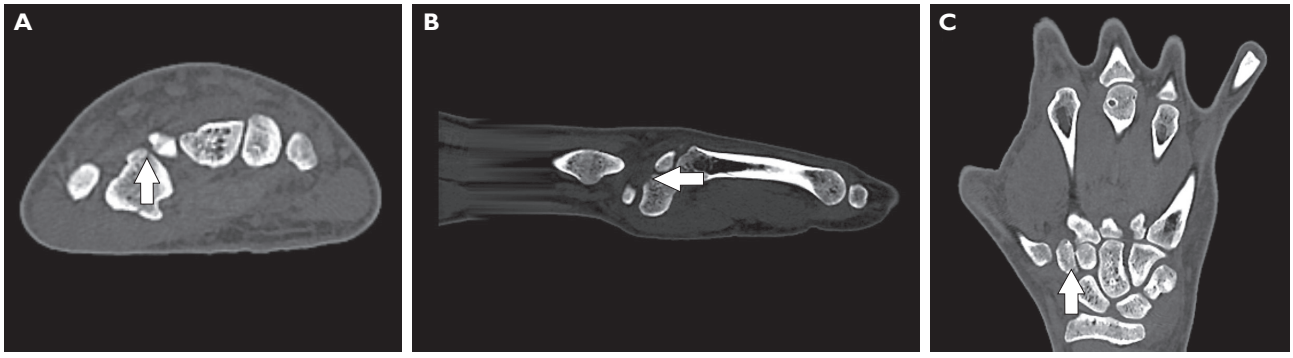

Figure 1: Wrist computed tomography scan in axial (A), sagittal (B) and coronal (C) sections demonstrating the trapezium fracture (white arrow).

to the detection of the trapezium fracture and the initiation of early treatment (Ramoutar et al., 2009; Nammour et al., 2019; Roy et al., 2022).

Complications of a delayed diagnosis and treatment of a trapezium fracture include a range of conditions such as nonunion, arthritis, malunion, decreased grip and pinch strength, pain, and osteonecrosis (Nammour et al., 2019; Aldeeb et al., 2023).

There is still no consensus in the literature on the best treatment for trapezium fractures. However, many professionals recommend open reduction and internal fixation for intra-articular trapezium fractures, a technique initially described by Cordrey and Ferrer-Torrels. Alternatively, closed reduction and pin placement, as recommended by Foster and Hastings, is also commonly used (Aldeeb et al., 2023).

Conclusion

In conclusion, isolated trapezium fractures, being rare and nonspecific, present a significant diagnostic and therapeutic challenge. Early identification through advanced imaging techniques, such as computed tomography and magnetic resonance imaging, is essential to avoid treatment delays and minimize impacts on thumb functionality. Although there is no definitive consensus on the best therapeutic approach, techniques such as open reduction with internal fixation or closed reduction with pin placement have been widely used to preserve mobility and restore function of the affected limb.

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