Case Report

Traumatic isolated dislocation of the trapeziometacarpal joint: A rare case report

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ABSTRACT

Isolated dislocation of trapeziometacarpal (TMC) joint is a rarely seen entity among hand injuries. It often develops after axial loading on thumb at partial flexion. It may eventually result in TMC arthritis, pain and dysfunction in thumb due to TMC joint instability if treated inadequately or left untreated. Here, we aimed to present successful outcome in a case who presented with acute instable dislocation of TMC joint and underwent dorsoradial carpal and volar oblique ligament repair after two years of follow-up.

KEY WORDS: carpometacarpal joint, dorsoradial ligament, thumb, volar oblique ligament

INTRODUCTION

Isolated dislocation of trapeziometacarpal (TMC) joint is a rarely seen entity among hand injuries. It often develops after axial loading on thumb at partial flexion. Although reduction is easy, instability is commonly seen following reduction. It may eventually result in TMC arthritis, pain and dysfunction in thumb due to TMC joint instability if treated inadequately or left untreated. Despite the presence of four stabilizer structures, dorsoradial carpal ligament is considered as the primary stabilizer in TMC joint. Dorsoradial carpal ligament is accepted as the primary structure that prevents dorsal dislocation of TMC joint. In addition, it is known that volar oblique ligament is involved in the anterior stabilization of TMC joint. The management is still controversial in dislocation of TMC joint with no optimal treatment method established in acute cases. Primarily, three therapeutic modalities are employed for management of TMC joint dislocations: closed reduction plus cast; close or open reduction plus pinning; and ligament repair plus capsulorrhaphy. However, ligament repair is considered as the only treatment option in instable dislocation. Here, we aimed to present successful outcome in a case who presented with acute instable dislocation of TMC joint and underwent dorsoradial carpal and volar oblique ligament repair after two years of follow-up.

CASE REPORT

A 22-year-old patient who crashed into an abiding object while riding a bike was examined at the Emergency Department. In physical examination, it was found that the thumb of the right hand was deformed and that there was swelling and tenderness at carpometacarpal joint level (Figure 1). In radiological assessment, it was seen that TMC joint was partially dislocated (Figure 2). Reduction in TMC joint was performed in the Emergency Department but the TMC joint was found to be unstable in Torque test. Thus, the patient underwent surgery under general anesthesia. The joint was exposed via Wagner approach and it was seen that TMC joint was displaced and that subluxation was relapsed after reduction. In addition, it was seen that dorsoradial carpal ligament was avulsed from base of metacarpal bone whereas oblique ligament was avulsed over trapezium (Figure 3). After reduction, both ligaments were repaired at avulsion site by 2.0
Anchor sutures. Then, capsulorrhaphy was performed and TMC joint was stabilized by two K-wires. The surgery was completed by closing the surgery site using the appropriate technique. The short-arm splint was applied for thumb. Postoperative radiological assessment revealed successful reduction in TMC joint (Figure 4). The K-wires were removed at week 3, while splint was removed at week 6 after surgery. Rehabilitation program was initiated thereafter. On control visit at year 2, it was observed that TMC joint was stable without degenerative changes (Figure 5) and that VAS pain score was “0” and range of motion was comparable to contralateral side.

**DISCUSSION**

Several mechanisms regarding trauma exposed have been defined in dislocation of TMC joint. Among these, the most common mechanism is dislocation caused by axial loading during mild flexion of thumb\(^2\), while the second most common mechanism is shearing force on first web\(^8\). In our case, dislocation occurred due to latter mechanism of injury. The injury occurred due to shearing force applied on first web by handlebar when the patient crashed into an abiding object with a bike.
In the dislocation of TMC joint, the diagnosis is generally made by radiographs, which also show avulsion fractures that may accompany the dislocation. Besides, instability should be assessed at clinical assessment. Torque test is widely used for this purpose. Magnetic resonance imaging (MRI) can be used in acute cases, if diagnosis couldn’t be established by radiographs or those with delayed presentation. The MRI will help to define injuries of capsule and ligaments that may accompany the dislocation, and it might be useful in very limited cases. In our case, radiography was sufficient to establish diagnosis. The dislocation was established and no avulsion fracture was observed on radiographs. The torque test after closed reduction showed presence of instability. No advanced imaging modality such as MRI was needed as radiographs established diagnosis. Also, computed tomography would be more helpful for diagnosis if a fracture occurred with the dislocation.

In these cases, one should be careful and may need to use different therapeutic modalities in order to achieve stable and functional joint due to anatomy of TMC joint. Capsule and ligament damages can be present at varying rates in acute unstable dislocations of TMC. Thus, early repair of ligaments is recommended in unstable dislocations. However, closed reduction plus casting or pinning can be preferred in the absence of instability. We preferred open reduction and repair in dorsoradial carpal, and volar oblique ligaments as well as capsule due to instability following closed reduction. End-to-end repair is possible in primary cases, while anchor suturing provides better outcome if ligament damage occurs via avulsion injury. In our case, both ligaments were repaired at avulsion site by 2.0 Anchor sutures; dorsoradial carpal ligament was avulsed from base of metacarp whereas oblique ligament was avulsed over trapezium. In addition, temporary fixation by K-wire is recommended if there is doubt in ensuring stability after ligament and capsule repair. In order to enhance stability, we also performed fixation by two K-wires, which were removed at week 3 after surgery. Ligament reconstruction will be warranted in cases with delayed presentation, failed conservative treatment or those with instability, since primary ligament repair is impossible. Ligament reconstruction is a more invasive and challenging surgical technique. Thus, one should attempt to ensure stable joint in acute cases. In the literature, there are a lot of controversies about management such as closed reduction and casting, closed reduction and pinning or open reduction and ligament reconstruction. The surgeon must decide on the treatment based on the instability of the joint and the level of injury (acute or chronic).

Prognosis will be better in cases with dislocation of TMC joint when acute treatment is provided. However, secondary arthritis development seems inevitable in cases with instability and ongoing subluxation despite treatment. In our case, no arthritic change was observed after two-year follow-up, as joint stability was achieved.

CONCLUSION

Acute dislocation of TMC joint is a rare entity and they are often unstable injuries. A stable and functional joint should be aimed due to anatomy of TMC joint. Thus, ligament repair and capsulorrhaphy should be preferred in acute unstable TMC dislocation, which will provide better prognosis.

REFERENCES


