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Case Report

Irreducible second and third metatarsophalangeal dislocation: a rare case report

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ABSTRACT

Metatarsophalangeal (MTP) articulations are complex structures that are prone to sprains, subluxations, and dislocations. MTP dislocations are an uncommon but well documented and problematic orthopaedic injury. Once the diagnosis is certain, the dislocation should be reduced as soon as possible. Immediate reduction of the dislocation can limit numerous complications. A 24-year-old male patients came to emergency department of Sanglah Hospital with 2nd and 3rd MTP joint dislocation. Patient treated with open reduction and immobilization with pinning for 2nd and 3rd metatarsal. After several attempt of closed reduction, the dislocation can be reduce with open reduction and immobilization with k wire, after 4 weeks k wire was removed without any complication and patient can walk normally. Irreducible metatarsophalangeal dislocation of the lesser toes is unusual with third toe was the most commonly affected, followed by the second, fourth, and fifth toes. Radiographs are very useful for diagnose. Multiple procedures have been created to attempt to reduce and stabilize the MP joint. According to other studies, Kirschner wires were also only used in unstable dislocations. In this case, dorsal surgical approach is the most commonly chosen method to reduce the irreducible metatarsophalangeal joint dislocations of the lesser toes. When irreducible dislocation found and closed reduction is initially unsuccessful, we recommend a dorsal surgical approach to open reduction and using Kirschner wires for unstable dislocations.

Keywords: MTP, Dislocation, Lesser toe, Open reduction

INTRODUCTION

Metatarsophalangeal (MTP) dislocations are an uncommon but well documented and problematic orthopaedic injury. Although normally caused by low-energy mechanisms, MTP dislocations can also be caused by higher energy injuries and associated with other orthopaedic injuries. The initial management of these injuries includes prompt reduction and immobilization. If the joint is congruent and stable after the intervention, often reduction and immobilization are the only management required of these injuries. Several instances have been described in the literature of irreducible MTP dislocations, most frequently of the great toe.[1] Metatarsophalangeal dislocations are well-known injuries that are frequently seen by emergency medicine physicians. Reducing these injuries often presents a unique set of difficulties to the providers treating these patients. Difficulties with these reductions, necessitating operative interventions have been described in the literature as far back as 1914.[2] Based on AO surgical references, the indication for closed reduction internal fixation with K wire fixation is significant foot trauma, first metatarsal fractures with second through 5th row MTP dislocations and open injuries.

The reduction manoeuvre consists of axial traction and pressure over the joint in the opposite direction of the dislocation. Given the small anatomy of the phalanges, gaining adequate grip for traction is often challenging.

Previous descriptions of closed reduction techniques, although helpful, do not always adequately address the needed force required to reduce these injuries.[3] Irreducible MTP joint dislocations are operative injuries; therefore, it is important to differentiate those that are truly impossible to reduce by closed means (due to interposed plantar plate, capsule, sesamoid, or deep ligament or tendon) from those that are possible but difficult to reduce due to inadequate traction and to reliably be able to reduce those in the latter group.[1]

This study reported dislocation of the second and third MTP joint because there were not many cases documented. This patient underwent open reduction internal fixation with Kirschner wire to maintain the position.

CASE REPORT

A 24-year-old male patients came to the emergency department of Sanglah Hospital, complaining pain on his right hip and foot after got traffic accident 4 hours prior to admission. The patient was riding a motorcycle, suddenly hit by car, and patient fell down to the right-side with unclear mechanism. There is no history of unconsciousness, nausea and vomiting.

Figure 1: Physical examination of the patient (right hip region).

From physical examination on the right hip region swelling was found, no bruise, with slight flexion deformity, adduction, internal rotation, and shortening. From palpable, there was tenderness over right hip, dorsalis pedis artery is still palpable, capillary refill time was less than two seconds, oxygen saturation 99%, and active ROM knee 0/130, active ROM ankle 30/45.

From right foot region swelling was found over 2nd and 3rd MTP joint, no bruise, with deformity shortening and angulation of 2nd and 3rd toe. Tenderness was found over 2nd and 3rd MTP joint, step off also found over the dorsal side, bony prominence over plantar side, capillary refill time was less than two seconds, oxygen saturation 99%, we didn't find any nerve lesion such as numbness, active ROM 2nd and 3rd MTP joint limited due to pain. Active ROM PIP joint 0/90.

Figure 2. Pelvic X-ray AP view, Sanglah Hospital (12/09/19).

Figure 3: Physical examination of the patient (right foot region).

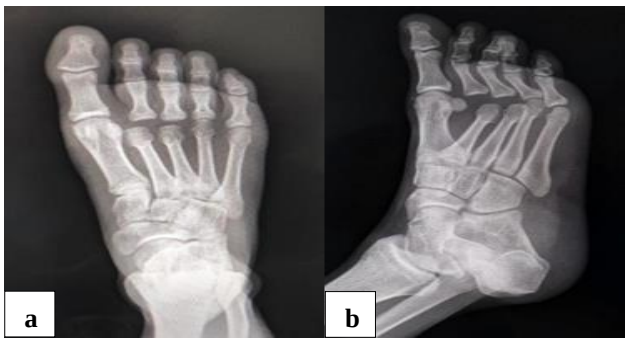

Figure 4: Right foot X-ray (a) AP view and (b) oblique view Sanglah Hospital (12/09/19).

Figure 5: Right foot X-ray lateral view Sanglah Hospital (12/09/19).

Radiographic examination showed right foot second and third metatarsophalangeal joint dislocation. There was no

neurovascular deficit of the right foot. This patient was diagnosed with posterior right hip dislocation, dislocation right 2nd and 3rd MTP joint.

This patient had posterior hip dislocation and was treated with closed reduction under GA and immobilization skin traction. Multiple attempts at closed reduction failed to reduce the dislocated second and third metatarsophalangeal joints and because of that, next we do open reduction, but we found the joint is unstable so we preferred to do immobilization with pinning Kirschner wire for 2nd and 3rd metatarsal. In operating room, patient in supine position with general anesthesia, we do longitudinal incision between MTP 2nd and 3rd from dorsal side of his right foot and the metatarsophalangeal joint were exposed with capsule entrapment and successfully reduced the second and third metatarsal heads to the metatarsophalangeal joints and after that we do insertion of K wire for immobilization.

Figure 6: Clinical picture post op.

Figure 7: Right foot X-ray (a) AP and (b) oblique view post reduction Sanglah Hospital (12/09/19).

Figure 8: Right foot X-ray lateral view post reduction Sanglah Hospital (12/09/19).

After surgery, he started ankle pump and toe motion exercises to improve swelling of the right foot and avoiding joint stiffness and after two weeks he was permitted to walk using crutches for 4 weeks with non-weight bearing. He received regular follow-up to check the wound and pin tract condition.

DISCUSSION

Rao and Banzon in 1979 first described that was an unusual irreducible metatarsophalangeal dislocation of the lesser toes. In a review of the literature, motor vehicle accident was the most common injury mechanism and other possible mechanisms included a direct blow, a fall from a height, and a sports injury. The third toe was the most commonly affected, followed by the second, fourth, and fifth toes.[4]

MTP articulations are complex structures that are prone to sprains, subluxations, and dislocations. The MTP joint is formed by the oval concave surface of the base of the proximal phalanx articulating with the corresponding convex metatarsal head. The capsule is supported medially and laterally by the collateral ligaments; plantarly, by the thick fibrocartilaginous plate and flexor tendons; and dorsally, by the thin expansion of the extensor tendons.[5]

Sagittal or horizontal plane instability of the second toe defines a crossover toe deformity. A number of theories as to the etiology of this instability have been proposed; most involve rupture or attenuation of the collateral ligaments and volar plate of the metatarsophalangeal joint. Events leading to destruction of this tissue may be trauma, synovitis secondary to rheumatoid arthritis and other arthritis, constriction from narrow toe box shoes, a long second metatarsal, or hallux valgus deformity. An imbalance between the intrinsic and extrinsic musculature is probably a result of dorsal instability (sagittal plane only), leading to attenuation of the volar plate. From the history taking, the instability of the MTP joint in this patient is caused by traumatic injury which patient was fell down to the right-side and details of the injury remained unclear.[6]

Radiographs are very useful for detecting the relationship between the heads of the joints and for excluding fractures. Magnetic resonance imaging (MRI) could be useful to describe the entity of the lesion and its characteristics. In the AP/lateral view of the right foot of this patient, it is found an isolated dislocation of 2nd and 3rd MTP joint of the right foot without any associated fracture. MRI imaging was not done to this patient.[7]

Once the diagnosis is certain, the dislocation should be reduced as soon as possible. Immediate reduction of the dislocation can limit numerous complications (e.g. ecchymosis, swelling, vascular compromise of the skin, etc.). Multiple procedures have been created to attempt to reduce and stabilize the MP joint. These range from soft-tissue reconstructions of the lateral collateral ligaments

with the interosseous tendon. Another study suggests that poor patient satisfaction can be combated by achieving successful fusion of the proximal interphalangeal (PIP) joint as a component to the flexor-to-extensor tendon transfer. Their series of 79 toes undergoing FDL tendon transfer found 89% of their patients were satisfied with the procedure and would undergo it again.[8]

Modern pedobarographic studies have shown that the lesser toes play an important role in walking. They exert a pressure equivalent to that of the metatarsal heads. By expanding the weight-bearing surface, they can relieve pressure under the metatarsal heads and lessen shear forces. In addition, the bulky deformity of a crossover toe makes shoe-fitting difficult and uncomfortable.[8,9]

This case present about 24-year-old male patients came to the emergency department of Sanglah Hospital with 2nd and 3rd MTP joint dislocation. According to other studies, Kirschner wires were also only used in unstable dislocations and Kirschner wires were seldom used in stable dislocations, in this patient we do treatment with open reduction and immobilization with pinning for 2nd and 3rd metatarsal by dorsal surgical approach that is the most commonly chosen method to reduce these irreducible metatarsophalangeal joint dislocations of the lesser toes, which allows reduction of the metatarsal head under direct vision and easy wound care.[4] We do open reduction because we fail do closed reduction for several time and after we successful do open reduction we felt the reduction is unstable so we choose k wire for immobilization. After the operation patient was admitted for 1 week because he had posterior hip dislocation and there is no complication and got an antibiotic and analgesic, for rehabilitation, patient was told to mobilization with crutch and partial weight bearing with heel gait. Armagan et al told, leaving their Kirschner wire in place for at least 4 weeks (allowing fusion of the PIP joint) and in this case patient was control to polyclinic after discharge and after 4 weeks patient feel more better and k wire was removed with no complication and no infection.

Right now patient told that he can walking normally and for last check-up there is no sign of infection such as discharge or pus around wound from the pin track and wound in his dorsal right foot incision. Active ROM of his ankle is normal, his MTP-IP slightly stiff but we already told do some passive and active exercise and also we told to control in polyclinic physiotherapy.

CONCLUSION

Irreducible metatarsophalangeal joint dislocation of the lesser toes is a rare injury, the patient may have other significant injuries found at the emergency department, and this dislocation could be easily missed as the deformity may be subtle, and so we must check the radiographs carefully. Our case presented 2nd and 3rd MTP joint dislocation of right foot by clinical examination and that has been confirmed with AP/oblique/lateral view of right foot. The patient was treated with open reduction and immobilization with pinning for 2nd and 3rd metatarsal of right foot. When irreducible dislocation found and closed reduction is initially unsuccessful, we recommend a dorsal surgical approach to open reduction and avoid damaging the plantar plate and surrounding soft tissues damaged and using Kirschner wires for unstable dislocations. The long-term outcomes of this patient require further investigations.

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