

Traumatic Miki Type 2 Dislocation of Interphalangeal Joint of Great Toe – A Case Report and Review of Literature

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Abstract: Dorsal dislocation of the interphalangeal joint of great toe is rare. Most reported cases are of dislocation of metatarsophalangeal joint of great toe due to greater mobility and longer lever arm. Dorsal dislocation of IP joint of hallux results from hyperextension injury. Closed reduction is the first line of treatment and the standard treatment of Open reduction is used when closed reduction is failed. We report a case of Miki type 2 dislocation and review the literature pertaining to this condition.

I. Introduction

Case report: A 30 yr old female met with an RTA and presented to the emergency department with pain, swelling & deformity over right arm with no external wounds. Neurovascular examination revealed no abnormality. The case was diagnosed as fracture shaft of humerus, middle one third after radiographs were taken, for which she underwent ORIF with narrow DCP under brachial block. Post operative period was uneventful. One week later she complained of deformity of the great toe, inability to plantar flex the great toe. On examination dimpling over the dorsum of the great toe was found with resistance to passive movements, moderate swelling was present. Radiographs revealed dorsal dislocation of the interphalangeal joint of the hallux, which was missed during initial evaluation in the EMD. Under regional anaesthesia (Ankle block) closed reduction was attempted by using traction and manipulation without success. Again closed percutaneous reduction by using 1.2mm k-wire was attempted



1. Clinical picture showing the deformity. 2,3,4. Fluoroscopy images showing the classical Miki type 2 dislocation with sesamoid incarceration in various views.

Fluoroscopy revealed increased joint space and an unacceptable reduction. The joint was opened using standard dorsolateral approach. Arthrotomy shown the plantar plate with its sesamoid bone between the phalanges. The interposed structures were moved in the plantar direction while the distal phalanx was under traction. After relocation of the plantar plate, the joint was stable. Fracture of the proximal phalanx head was noticed due to the difficulty in manipulation of the joint. The joint was immobilised with 1.5mm k-wire placed axially, which was removed 4 wks later. The dorsal incision was closed using interrupted sutures. At one year follow up the patient had developed stiffness which did not affect her daily activities. Radiographs shown joint congruity



1. Postoperative radiograph showing Fixation with k-wire. 2. Radiograph at one year follow up

II. Discussion

Dorsal displacement of IP joint of hallux is a rare injury. Anatomy of the joint makes closed reduction difficult. Miki et al classified dislocation of the hallucaeal IP joint into 2 types (a) Miki type 1 - Toe is slightly elongated with a widened joint space, with gross alignment and the sesamoid is within the joint. (b) Miki type 2 - Sesamoid is located over the proximal phalanx head, joint is hyperextended and a skin depression is noted. The Sesamoid bone – the name sesamum was first used for this bone by Galen in approximately AD 180 due to its resemblance to sesame seed (*Sesamum indicum*). The sesamoid bone is known, however, to be associated with several clinical pathologies ranging from relatively minor painful hyperkeratotic plantar lesion to irreducible IP joint dislocation. Sesamoid dorsal surface has 2 facets predominately cartilaginous, major facet articulating with condyle of the proximal phalanx, minor facet with the base of the distal phalanx. The nonarticulating part is osseous and firmly embedded within the plantar capsule of IP joint – the plantar plate. Loose connective tissue spans between the plantar plate and the flexor hallucis tendon proper, whether or not the bone is contained within the fibers of flexor tendon remains controversial, complicating the discussion, since a sesmoid bone by definition must be located within the substance of a tendon. Furthermore in upto 44% of patients, the IP sesmoid is invisible radiographically leading to difficulty in diagnosing sesmoid incarceration and confirming a successful reduction. A cadaveric study performed by Miki et al showed that the plantar plate is connected to the proximal distal volar plate is detached from either the proximal or distal phalanx, dislocation is possible but the volar plate still cannot invaginate into the joint. It is only when the attachment to both phalanges is disrupted that the plantar plate can dislocate into the joint space.

III. Conclusion

Combination of short lever arm on the rigid construct, and the requirement for complete detachment of volar plate makes this dislocation a rare occurrence, which should not be missed in the primary survey as happened in this case. Most cases require open reduction with dorsal/ dorsolateral approach, but should follow initial attempts at closed reduction with or without percutaneous technique. Care should be taken not to cause iatrogenic injury due to the forceful manipulation to achieve reduction. Consensus is that after reduction, the volar plate need not be repaired and regardless of the method of treatment adopted, the prognosis is excellent in most if not all cases.

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