Chopart's Fracture-dislocation - rare Cases Management

Anvar P Khan¹, M Raffic¹

Abstract

Among the uncommon midfoot injuries, Chopart fracture-dislocations are the most severe injuries and the most difficult foot injuries to diagnose and manage [1]. We are presenting clinical and radiological data and the outcome of two rare cases of Chopart fracture dislocation. Two adult males who sustained Chopart’s fracture dislocation were treated by open reduction and internal fixation with k-wires under anesthesia on an emergency basis. K-wires removed after 3 weeks and patients were mobilized after 6 weeks and returned to their work by 10th post-operative week. We recommend adequate evaluation on initial presentation and early accurate diagnosis and emergency management of Chopart’s [2] injuries, because missed or delayed diagnosis and treatment are associated with significant long-term morbidity.

Keywords: Calcaneocuboid, Chopart, dislocation, foot, fracture, midtarsal, reduction, Talonavicular

Introduction

Midtarsal joints (namely the Talonavicular and Calcaneo-cubid) known as the Chopar’s joints[1]. Disarticulations were done through this joint by French surgeon Francois Chopart (1743-1795), for treatment of distal foot tumors and necrosis. Injuries involving chopart joints are rare, because they are firmly stabilized by the plantar periarticular ligaments and requires significant force to disrupt. The incidence of midfoot injuries is around 3.6/100,00/year [12]. Also chopart fracture-dislocations are missed or misdiagnosed in upto 40% of cases. Patients presenting with such an injury are mostly young, with an average age of 37 years (range, 14-89 years). These fracture dislocations are caused most commonly by motor vehicle accidents and fall from height, and often have injuries in the polytrauma patient. Avulsion fractures localised to the midfoot area are typically due to low energy trauma, eg, sports injuries or sprain. Concomitant fractures occure in approximately 75% to 90% of Chopart injuries, and only 10% to 25% of the Chopart dislocations are purely ligamentous. Based on the direction of dislocation it can be a dorsal midtarsal dislocation (it is the most often reported direction of dislocation due to the frequent mechanism of a dorsally directed force to the forefoot) or a plantar midtarsal dislocation (accounts only for less than 7% of midtarsal dislocations) or their variants[11].

Case Reports

Case 1

A 42-year-old male sustained an injury to the left foot following a road traffic accident (fall from bike after a hit by a car, foot got trapped between gear shift lever and footrest) patient had a deep lacerated wound over left heel which was debrided and sutured from local hospital and was put on below knee slab for pain and swelling of foot with a diagnosis of ankle sprain after initial X-ray (Fig. 1) (which actually showed a midtarsal malalignment). He also had facial bone fractures and pneumocephalus (without loss of consciousness) for which he was referred to the higher center for neurosurgery consultation. On the 2nd day of admission in our neurosurgery unit, we got an orthopedic consultation for severe pain in the left foot. On our examination of left foot after removing the plaster, we found a sutured wound over the heel and gross edema of the whole foot with maximum tenderness over midfoot joints. Painfull and...
restricted movements especially, midfoot and forefoot joints. There were no distal neurovascular deficits. X-ray and computed tomography foot (Fig. 2 and 3) showed a Choparts fracture-dislocation left foot (talonavicular fracture dislocation (plantar) with calcaneocuboid fracture subluxation (lateral). Under sedation, closed manipulation and reduction attempted from the treatment room, but failed. Closed reduction attempted again under general anesthesia in operation room, (Fig. 4) but failed. So proceeded with open reduction of the talonavicular joint through an anteromedial approach [3] (Fig. 5).

Reduction not achieved due to some soft tissue/bony interposition. Hence, calcaneocuboid joint also opened through an anterolateral incision. Soft tissue interposition cleared. Reduction obtained by manipulation (knee flexion, ankle plantar flexion, and followed by distraction of hindfoot and inversion). Reduction maintained using 4 K-wires, (2 K-wires transfixing the talonavicular joint in a crossed pattern, 1 K-wire for navicular fracture fixation, and 1 K-wire transfixing the calcaneocuboid joint). Identified torn ligaments and capsule repaired using 1-0 polyglycolic acid sutures. Postoperatively a below knee plaster cast was given (Fig. 6). The patient was asymptomatic after 3 weeks. Check X-ray satisfactory. All the k-wires removed on post-operative day 21 (Fig. 7) and put back on below knee cast for 3 more weeks, without weight bearing. Patient allowed partial weight bearing after 6 weeks (Fig. 8) and full weight bearing after 8 weeks with plaster. Plaster removed on 10th post-operative week. Initially, he had some difficulty in walking due to prolonged immobilization, but was totally asymptomatic after 16 weeks of treatment.

Case 2
A 28-year-old male had a fall from 8 feet height and landed on his left foot, presented to casualty with severe pain and swelling of the left foot without any neurovascular deficits. X-ray foot was taken (Fig. 9). There were no other significant injuries. Emergency closed manipulation and reduction done. However, the reduction was unstable. Based on the degree of displacement and disruption of ligamentous structures, we proceeded with open reduction of midtarsal joint. An anterolateral approach was used to expose the talonavicular joint and dislocation reduced by plantar flexion of forefoot and inversion. Ligaments repaired. Reduction checked under C-arm (Fig. 10). Postoperatively a below knee plaster cast was applied (Fig. 11). K-wires removed after 3 weeks post-
operative. Plaster removed and allowed full weight bearing after 10 post-operative weeks [4]. However, the patient had pain on total weight bearing. Hence, total weight bearing continued with plaster for 2 more weeks and then removed on the 12th week.

Discussion

Chopart joints are the transverse tarsal joints, namely talonavicular and calcaneocuboid joints. Among the uncommon midfoot injuries, Chopart dislocations or fracture-dislocations are the rare and most severe injuries [5]. They predominantly occur in high energy motor vehicle collisions and fall from heights. Chopart dislocations (especially fracture-dislocations) are still problematic in both diagnosis and treatment. A missed or delayed diagnosis of such an uncommon injury will result in a high degree of long-term morbidity [6].

Anatomy of the Chopart joints is critical for understanding the mechanism of injury and the rationale for appropriate treatment. Anatomic closed reduction may be difficult in Chopart fracture-dislocations, and an open procedure may be required [7]. In the delayed setting, the surgical correction of the length and shape of the longitudinal arch is important and technically challenging (especially in combined Chopart-Lisfranc fracture-dislocations). The arterial anatomy is critical because the anterior tibial artery has an intermetatarsal branch, which has an anastomosis with the plantar circulation [8]. A rupture of this anastomosis can cause major hemorrhage and compartment syndrome. The anastomosis may be damaged with repeated closed reduction maneuvers with high force. If anatomic reduction and sufficient stability are attained with closed manipulation, conservative treatment can be opted. Check X-ray taken after 1 week. Non-weight bearing with BK cast or rigid foot cast for 4 weeks, followed by partial weight bearing for next 2–4 weeks. When the closed reduction was successful, but the joint appears unstable or if reduction lost in 1st week check X-ray, internal fixation with 1.6–2.0-mm K-wires or percutaneous 3.5-mm cortical screws. Hardware removal was performed after 3–5 weeks (depending on the fracture pattern and physical condition of the patient) and then graded weight bearing allowed (with plaster up to 10–12 weeks and followed by removal of plaster). Open reduction, internal fixation was done when the closed reduction was insufficient [9]. Repair of the ligamentous constraints is very important, failure of which will result in unstable joint and chronic problems. In case 1, the deforming force was directed toward plantar aspect, and resultant displacement was plantar fracture dislocation of talonavicular joint. In case 2, at the time of landing the forefoot was plantar flexed on hindfoot. Perhaps the resultant plantar flexion force sustained at the midtarsal joint, without concomitant plantar flexion

Figure 6: X rays taken after 6 post-operative Weeks

Figure 7: X-ray showing Chopart’s injury

Figure 8: Intraoperative and post operative images (Anterolateral approach to Calcaneocuboid joint, C-arm image, post operative X-ray)

Figure 9: Treatment Algorithm
of the ankle, might have injured the dorsal and plantar ligaments and joint capsule of midtarsal joints [2].

**Summary**

Timely diagnosis, early anatomic reduction, stable fixation, and regular follow-up are the key for best clinical outcome in these rare foot injuries [10]. Repeated closed manipulations must be avoided due to the risk of vascular injury (maximum two attempts). Where ever possible, soft tissues must be repaired. Emergency orthopedic surgeons must be aware of this debilitating injury.

**References**