Transcuneiform Crush Injury: A Case Report

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Received date: Dec 15, 2014, Accepted date: Dec 27, 2014, Published date: Jan 02, 2015

Abstract

Introduction: Transcuneiform fracture patterns without dislocations are uncommon. In a review of the literature, numerous case reports describe transcuneiform fracture-dislocations involving either the transmetatarsal or midtarsal joint complexes due to direct trauma; however, an isolated transcuneiform fracture pattern without dislocation has not been reported.

Methods: We present a rare injury of the foot: an isolated transcuneiform fracture without associated dislocation of the tarsometatarsal joint or midtarsal joint complex.

Case: A 29 year old active duty Army male sustained direct blunt trauma to his foot when a 20 ton trailer fell onto it. His initial presentation prompted protected weight bearing after a clinical exam revealed soft tissue injury and tenderness to palpation about the dorsum of his midfoot. Due to persistent symptoms, he was referred to a musculoskeletal specialist. Radiographs and computed tomography (CT) images demonstrated a minimally displaced comminuted transcuneiform fracture involving the medial and intermediate cuneiforms without evidence of dislocation or subluxation. Treatment consisted of non-weight bearing cast immobilization with crutches for ten weeks before being transitioned into a weight bearing control ankle motion (CAM) boot. Radiographic evidence of healing was documented at 4 weeks by callus formation at the first metatarsal and medial cuneiform. The patient returned to low impact activity by 10 month follow-up without surgical intervention.

Discussion and conclusions: Blunt trauma to the midfoot can result in isolated or complex fracture patterns without the typical fracture-dislocation following high mechanism trauma. Appropriate clinical suspicion and careful physical examination can facilitate timely diagnosis and treatment. Minimally displaced transcuneiform fracture patterns without associated midfoot dislocation injuries can be treated nonoperatively with protected weight bearing, close radiographic and clinical follow up, and gradual advancement to activity with acceptable clinical outcomes.

Introduction

The tarsometatarsal joints consist of articulations between the metatarsal bases, cuneiforms and the cuboid. This joint complex is primarily stabilized by the position of the second metatarsal base into the intercuneiform recess. The second metatarsal is considered the keystone in maintaining the tarsometatarsal joint. Cuneiform fractures are rare and account for approximately 4.2% of all tarsal bone fractures [1-3]. Transcuneiform fracture patterns involve more than one cuneiform and are more commonly associated with compression injuries. In a review of the literature, numerous case reports describe transcuneiform fracture-dislocations involving either the transmetatarsal or midtarsal joint complexes due to direct trauma. There is, however, a paucity of literature describing isolated transcuneiform fracture in the absence of an associated dislocation.

Isolated cuneiform fractures are uncommon and considered high-energy injuries [2-4]. Although the medial cuneiform is the most injuried cuneiform, dislocations are very rare with the high-energy injuries due to the strong ligamentous attachment. Medial cuneiform fracture patterns are most commonly characterized as small, avulsion injuries [4]. Fracture displacement occurs through the pull of the tibiais anterior tendon. [Less commonly described crush injuries are the result of a direct blow to the dorsum of the foot] [1].

A thorough foot examination should be performed to rule out any bony or ligamentous injury. A complete plain radiographic work up can identify fractures and/or dislocations. On weight bearing radiographs, a gap sign between the first and second digits may represent intercuneiform instability [3].

Case

A 29-year-old man sustained a direct blunt injury to his left foot when a large trailer landed on it. The patient presented to the emergency department where a clinical examination revealed a 5cm dorsal midfoot laceration, surrounding swelling, ecchymosis and tenderness. He was given crutches and sent home (Figure 1).

Over the ensuing 48 hours, he continued to complain of pain isolated to the dorsal midfoot. He re-presented to an urgent clinic where non weight bearing radiographs (anterior-posterior, lateral, medial oblique) revealed a medial cuneiform fracture with no displacement of the tarsometatarsal joint and tarsals. A CT scan revealed minimally displaced comminuted transcuneiform fractures, involving the medial and intermediate cuneiforms and fractures of the first and fourth metatarsal without evidence of dislocation or subluxation (Figure 2).
Treatment consisted of non-weight bearing cast immobilization with crutches for ten weeks. He then transitioned into a CAM boot and was made weight bearing as tolerated with crutch assistance. At six month follow-up, the patient continued to have minimal pain localized to the distal aspect of the second and third metatarsals. At ten month follow-up, the patient had already transitioned into a regular shoe with the use of custom made orthotics. He returned to low impact activity at 10 months.

Discussion

Medial cuneiform fractures are extremely rare, and the diagnosis is usually delayed or missed completely. It can be difficult to diagnose subtle isolated cuneiform and trans-cuneiform fracture patterns with non-weight-bearing standard views of the foot due to the overlap of the tarsal and metatarsal bones [3,4]. Isolated and trans-cuneiform fractures may also be missed due to the higher incidence of Lisfranc’s fracture-dislocation and/or Chopart joint injuries and the greater emphasis on trying to diagnose and treat those foot pathologies. As an adjunctive diagnostic test, a bone scan using technetium has been a valuable tool in evaluation fractures especially in cases where overlapping of tarsal bones can impede the ability to interpret radiographs [2]. Although displaced medial cuneiform fractures are rare, when present, anatomical reduction is indicated when there is disruption of the joint due to dislocation or fracture.

Conclusion

High-energy crush injuries can result in a transcuneiform fracture pattern without dislocation. This injury pattern may be difficult to see on plain radiographs due to the multiple overlapping shadows on non-weight bearing views and either CT or bone scan may be necessary to evaluate the extent of injury. As demonstrated in this case report, a stable transcuneiform fracture pattern can be effectively treated nonoperatively. Although the fractures may heal in a predictable timeframe, the soft tissue component of the injury may delay return to activity over an extended period of time.

Acknowledgement:

The views expressed are those of the author(s) and do not reflect the official policy of the Department of the Army, the Department of Defense or the U.S. Government.

References: