The Hyperextension Varus Bicondylar Tibial Plateau Fracture

Reza Firoozabadi, MD, MA[1]*; Jason S. Schneidkraut, MD*[2]*;*
Daphne M. Beingessner, MD, FRCS(C)[1]*; Robert P. Dunbar, MD*[1]*;*
David P. Barei, MD, FRCS(C)[1]*;*
[1]*Harborview Medical Center, Seattle, Washington, USA;*
[2]*Elite Orthopaedics and Sports Medicine, Wayne, New Jersey, USA*

Purpose: Classification systems used to identify tibial plateau fracture have been developed to help recognize common injury patterns and help guide treatment as well provide a means to perform research. The authors have identified a certain subset of tibial plateau fractures—hyperextension varus bicondylar tibial plateau fractures. The primary aim of this study was to describe this specific fracture pattern and associated soft-tissue injuries that can accompany this injury.

Methods: A retrospective review of prospectively gathered data at a regional Level I orthopaedic trauma center was performed to identify patients who had bicondylar tibial plateau fractures (OTA 41C). Preoperative radiographs and CT scans were reviewed to identify patients sustaining bicondylar tibial plateau fractures with combined hyperextension and varus displacement patterns. Specifically, sagittal plane imaging was assessed for osseous compression failure of the proximal tibia anteriorly and tension failure posteriorly, with loss of normal posterior slope of the proximal tibial articular surface. Coronal plane imaging was assessed for a medial articular injury and an apex lateral or varus coronal plane deformity. Patients were included if they had the above-stated deformity on both planes.

Results: 212 bicondylar tibial plateau fractures were identified in 208 patients during the study period (May 2000-August 2010). 25 fractures in 23 patients satisfied the radiographic criteria described above and formed the study population, with an average age of 58 years. The remaining185 patients with 187 fractures who had non-varus hyperextension bicondylar tibial plateau fractures were an average age of 41 years. Mechanisms of injury included: 6 falls from standing, 5 falls from height, 11 involved motorized vehicles. Three patients were lost to follow-up. 32% of the fractures (8/25) demonstrated significant associated injuries. Three patients (13%) had a popliteal artery disruption that required repair. Four patients (17%) had an either partial or complete peroneal nerve injury. Three patients (13%) developed leg compartmental syndrome that required emergent four-compartment fasciotomies.

Conclusion: The hyperextension varus bicondylar tibial plateau is a unique fracture. Low-energy trauma can cause this fracture pattern and the associated injuries can be devastating. Specifically, the relatively high rate of popliteal artery disruption, which can result in limb loss if not identified.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.