Clinical Practice

Tibial Plateau Fracture with Bucket-handle Tears of Both the Medial and Lateral Menisci

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Tibial plateau fractures represent approximately 1% of all fractures which have been reported to commonly accompany soft tissue injuries.1 Neglect or missed diagnosis of such soft tissue injuries have negative effects on clinical outcome. In this article, we report a rare case of tibial plateau fracture combined with extensive soft tissue injuries, including bucket-handle tears (BHTs) of both the medial meniscus (MM) and the lateral meniscus (LM). The patient also had an anterior cruciate ligament (ACL) tibial avulsion fracture, which led to the formation of a loose body in the joint. If left untreated, all of these concomitant injuries could cause unpleasant residual symptoms, such as joint locking and loss of extension.

A 28-year-old male patient was admitted to our hospital complaining of pain in his left knee caused by a motorcycle accident that had occurred three hours before. On physical examination, the injured knee had extensive pain around the entire joint. Sensation and pulse were intact. Radiographs showed a Schatzker Type II tibial plateau fracture and an ACL tibial avulsion fracture with a fragment trapped in the intercondylar notch [Figure 1a and 1b].

Magnetic resonance imaging (MRI) was performed due to the extensive pain around the knee. We were surprised to find BHT of both the MM and LM in the same knee; furthermore, both of the displaced menisci were stuck in the intercondylar notch [Figure 1c]. A curved ACL was found in the intercondylar notch with a fragment attached to it. The medial collateral ligament was also injured based on the MRI findings which could be treated conservatively [Figure 1c].

After the soft tissue was stabilized (nine days after the accident), we decided to perform open reduction and buttress plate fixation for the tibial plateau fracture and open repair of the LM BHT and to subsequently repair the MM BHT and fix the ACL tibial avulsion fracture arthroscopically.

The open procedure was performed first and a standard anterior-lateral approach for lateral tibial plateau fracture was used. With the lateral compartment exposed, a displaced, twisted LM BHT was observed. We reduced the LM BHT by rolling the displaced meniscus. Four vertical mattress sutures were placed at the peripheral rim and tied to the capsule. Direct visualization of the lateral tibial plateau was obtained after the LM BHT had been fixed. A standard tibial plateau fracture reduction procedure was performed. After reduction of fracture was done, an anatomic locking buttress plate (Synthes Inc., Oberdorf, Switzerland) was used for rigid fixation.

A thorough arthroscopic examination was performed after fracture fixation. Gravity inflow was used to decrease the possibility of compartment syndrome. Standard anteromedial and anterolateral views were established. The LM was found to be stable after the open repair. An MM BHT was observed at the peripheral rim and was displaced within the intercondylar notch [Figure 1d]. The displaced MM was reduced with an arthroscopic blunt probe. The peripheral rim of the meniscus was sutured to the capsule by the horizontal mattress method with three OmniSpan stitches (DePuy Mitek Inc., Raynham, MA, USA) [Figure 1e].

The displaced fragment of the ACL avulsion fracture was comminuted into several pieces, and one large piece of loose body from the non-weight bearing area was removed. Two

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high-strength sutures placed anterior and posterior to the ACL were used to fix the fracture. After tying the sutures through the tibial tunnel, the tension of the ACL was restored. No severe complications occurred after the surgery. Postoperative radiographs and MRI showed satisfied results [Figure 1f-1i].

Concomitant soft tissue injuries are not always drawing attention to orthopedic surgeons. Here, we have described a rare case of tibial plateau fracture combined with extensive soft tissue injuries, including BHT of both the MM and LM, and ACL tibial avulsion fracture that led to the formation of a loose body in the joint. Both of the displaced menisci and the fragment of the ACL avulsion fracture were trapped in the intercondylar notch. Neglect or missed the diagnosis of the soft tissue injuries would have led to joint locking and/or loss of extension, both of which could have caused disastrous effects.

Currently, arthroscopy-assisted surgery for the management of fractures is becoming increasingly popular[1] and has been suggested to have various advantages over traditional open surgery. However, what situations indicate arthroscopic examination is still unclear. What is particularly in our case was extensive pain around the entire knee joint, but the fracture was mainly limited to the lateral tibial plateau. In such scenarios, we suggest routine arthroscopic examination.

BHT has been encouraged to repair due to the high healing potential, especially when it is treated in the acute phase.[2-4] Interestingly, fractures may be a positive factor which will help the meniscus to heal. Ruiz-Ibán et al.[2] reported a 100% complete healing rate of peripheral longitudinal meniscal tears associated with tibial plateau fractures after meniscal repair. The reason for this higher healing rate may be that the existing fracture aiding in the healing of the meniscal tear through the same mechanism as microfracture used to treat osteochondral lesions.

In conclusion, tibial plateau fracture can occur in combination with extensive soft tissue injuries that can lead to unpleasant residual symptoms. Arthroscopy may be highly valuable for the management of concomitant soft tissue lesions in fracture cases.

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Conflicts of interest
There are no conflicts of interest.

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