107 Removal of a bent tibial intramedullary nail: a rare case report and review of the literature
Sameer Aggerwal, Ashwani Soni, Uttam C. Saini, et al

111 Neglected reverse Essex-Lopresti injury with ulnar nerve compression
Ajay Pal Singh, Ish Kumar Dhammi and Anil Kumar Jain

114 Emergent management of penetrating trauma of aortic arch in a countryside hospital
DI Dong-mei, ZHANG Xiao-ying and JING Hao-jun

117 Painful locking of the knee due to bucket handle tear of mediopatellar plica
HE Rui, YANG Liu and GUO Lin

120 Grade 4 renal injury: current trend of management and future directions
Yiu Ming Ho and Michael Schuetz

123 Unusual combined fracture dislocation of the wrist and metacarpophalangeal joints: a case report and review of the literature
Mohamed Faouzi Hamdi

126 Treatment of degloving injury of three fingers with an anterolateral thigh flap
YU Guang, LEI Hong-yu, GUO Shuang, et al

Edited by LIU Gui-e
Painful locking of the knee due to bucket handle tear of mediopatellar plica

HE Rui, YANG Liu* and GUO Lin

【Abstract】A case of swelling and anterior painful knee due to tear of mediopatellar plica is reported. The patient also felt clunk of the patellofemoral joint and knee locking. Under arthroscopic examination, a thick and fibrous plica was found medial to patellar, and a bucket tear along the plica from medial patellar retinaculum to infrapatellar fat pad. Polarized microscopic examination showed collagen fiber fragment and loss of light reflecting property. Neuroimmunohistology suggested up-regulation of synovial plica innervation in the area around the crack. This may be related to the pain. The bucket tear of mediopatellar plica-caused pain and lock of knee are more common than previously reported.

Key words: Knee injuries; Arthroscopy; Patellofemoral joint

The mediopatellar plica runs from medial patellar retinaculum to infrapatellar fat pad in the coronal plane. In the literature, the morbidity of the mediopatellar plica is from 19% to around 70%. Considering that the mediopatellar plica is a normal structure of the knee, it is questionable whether it can cause symptoms. Some authors reported that thickening and fibrosis of mediopatellar plica are the common cause of patellar pain syndrome.¹

The syndrome consists of a mechanical internal derangement of the knee, in which medial patellar pain is the most constant sign. It is always present during physical activities but may be present at rest as well. Repeated flexion and extension motion increase the extent of pain. The exact location of tenderness is not medial femorotibial but rather medial to the patella, above the joint line. Other signs include swelling, clunks, crepitation, popping, and sometimes functional instability with insecurity or giving way (incidence: from 9% to 64%).²

We reported a case of tear of mediopatellar plica. His patellofemoral joint dashed on gauge board at 90° knee flexion, with typical symptoms and some microscopic findings by neuro-immunohistology.

CASE REPORT

A 33-year-old male patient struck against a rock when he was driving a car. His left knee crashed on the gauge board at 90° flexion. He felt pain immediately and complained of swelling, clunk and locking of the knee 3 days after injury. The pain aggravated when he went downstairs. One month later, he felt instability and giving way of his left knee.

By physical examination, range of motion was from 0° to 110°. The medial McMurray test was positive. By palpation, there was a trabs of one fingerbreadth medi ally to the patella and ran parallel to the medial edge of the patella, which caused tenderness when he flexed the knee. The pain aggravated when he pushed the patellar laterally and relieved when pushed medially. Without any pressure, we observed patellar medial clunk when he flexed knee at 50°.

Three months after injury, the patient was checked by direct magnetic resonance arthrography. The contrast enhancer was Gadopentetate Dimeglumine Magnevist solution (Gd-DTPA injection, Schering, Germany) and was diluted to 2 mmol/L by normal saline. About 40 ml enhancer was injected into the knee joint from the point next to the lateral patellar. Low signal was seen between the patellofemoral joint. Sagittal scan
showed low signal line from superior to inferior of the media patella, and a crack with low signal running down into the infrapatellar fat pad (Figure 1). Axial scans revealed that the integrity of the linear low-signal images was between the patellofemoral joint with 20° knee flexion. If the media plica was embedded between the patellofemoral joint, the signal of the plica was separated into two parts (Figure 2), suggesting longitudinal tear of the mediopatellar plica.

Under arthroscopic examination, a thick large fibrous mediopatellar plica was found from the medial wall of the capsule into infrapatellar fat pad, parallel to medial edge of patella. Some parts of plica were congested. A bucket tear was found in the midline of the plica (Figure 3). At 50° knee flexion, the lesion straddled on medial femoral condyle with lateral part pushing into patellofemoral joint. The medial part was dragged into the medial recess. When genuflex continued, the lateral part was dragged out of patellofemoral area when a clunk happened at the same time. The other interior parts were normal.

We resected the mediopatellar plica entirely. Polarized microscopic examination showed collagen fiber fragment and loss of light reflecting property of the plica tissue (Figure 4). Slices were examined semiquantitatively for nerve fibers. The results showed that the SP-immunoreactive fibers were distributed around the torn region (Figure 5). Nerve fibers immunoreaction to substance P included two main appearances: nerve bundles and free nerve fibers. Both of them were most commonly associated with blood vessels and ran parallel to the longitudinal axis of the connective fibers. Measurements were done in 50 random visual areas at 400-fold magnification. The density of SP immunoreactive fibers was 299.14 cm²±86.58 cm².

The symptoms were relieved after surgical resection and the patient was satisfied with the result. The lock of knee and medial patellar clunk immediately and completely disappeared. Anterior knee pain relieved obviously, but not disappeared until 4 weeks later.

**DISCUSSION**

In the literature, some authors consider that the mediopatellar plica becomes pathologic after a history of blunt trauma, with localized hemorrhage followed by secondary fibrosis and possible metaplasia. The synovium therefore thickens and develops inflammatory changes. Relevant symptoms appear because its pathologic changes induce chronic impingement on the medial femoral condyle, with friction and erosion.3,4
Some authors consider that the plica has never contacted with the patellofemoral articular surfaces. It would interfere with the extensor apparatus, which itself would induce secondary chondromalacia patellae, and then pain happened.\textsuperscript{2,5}

This case was a type D mediopatellar plica classified in 1939.\textsuperscript{6} The separated plica is more likely to be blocked into patellofemoral joint causing the clunk of patella. White\textsuperscript{7} and Kerimoglu et al\textsuperscript{8} described five cases of a bucket-handle tear of the mediopatellar plica. These cases also have almost same symptom and physical sign like this case. The reason for origin of pain in type D is still unclear.

In this case, even we found no lesion of cartilage as well as mis-tracking of patellar, the bucket tear of mediopatellar plica still produced anterior knee pain. We deduce that the sensory nerve in the mediopatellar plica is of important role in generation of pain. Substance P exerts proinflammatory effects and transmits the sensation of pain. Greater number of substance P-immunoreactive nerve fibers contributes to greater level of pain. The number of substance P immunoreactive fiber upgraded in this case, which was higher than the number of nerve fibers that Farkas\textsuperscript{9} had reported in a study with 10 symptomatic mediopatellar plica syndrome patients.

In conclusion, the innervation of afferent nerve fiber is the cause of pain, and a number of SP immunoreactive fibers proliferate probably as a consequence of the tear. But further work is required to confirm it.

REFERENCES


(Received July 8, 2010)

Edited by SONG Shuang-ming