

Muroid Degeneration of the Anterior Cruciate Ligament

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We report 2 cases of muroid degeneration of the anterior cruciate ligament (ACL). Muroid degeneration of the ACL is a very rare cause of knee pain. The first patient presented with extension block of the knee, and the second patient had simple knee pain. Both patients did not have obvious trauma history or clinical instability of the knee. After arthroscopic debridement of the lesion, both patients regained full range of motion of the knee and were pain-free at follow-up. Muroid degeneration of the ACL is suspected when an apparently thickened and ill-defined ligament with increased signal intensity on all sequences in magnetic resonance imaging is identified in a patient with physically intact ligament and no obvious trauma history. Arthroscopic debridement of the muroid degeneration of the ACL was safe and effective in these 2 patients. [*J Chin Med Assoc* 2006;69(9):449–452]

Key Words: anterior cruciate ligament, arthroscopy, MRI, muroid degeneration

Introduction

Muroid degeneration of the anterior cruciate ligament (ACL) has been described in a few reports.^{1–8} The lesion presents with knee pain and restriction of flexion. Here, we present 2 cases of muroid degeneration that were treated with arthroscopic debridement with good results.

Case Reports

Case 1

A 50-year-old male suffered from left knee pain and gradual difficulty in terminal extension. He had no previous knee injury and did not complain of giving way sensation. Examination of the knee showed loss of 15° of terminal extension without a ligamentous laxity or patellofemoral pathology. Results of both McMurray's and Apprehension's tests were negative, and the patient was able to fully flex the knee without pain. Magnetic resonance imaging (MRI) showed increased signal intensity over the ACL, but continuity of the ACL was intact. Under the impression

of internal derangement of the knee, arthroscopic examination was performed. The examination showed intact ACL and menisci, but synovial hypertrophy was found over the femoral condylar notch. Arthroscopic debridement of hypertrophic synovium was performed and physiotherapy was arranged after the operation.

Six months after operation, the patient continued to complain of left knee pain and could not fully extend his left knee. Secondary MRI showed increased signal intensity in the ACL (Figure 1) on T2- and proton-weighted images, and the continuity of the ACL was intact. Although there was no evidence of ACL laxity, the symptoms persisted. Finally, the patient underwent a second arthroscopic examination, which showed a medial meniscus degeneration tear in the middle segment and yellowish discoloration with tumor-like lesion within the ACL, especially in the posterolateral bundle (Figure 2), which impinged on the tibiofemoral joint. Arthroscopic partial meniscectomy and biopsy of the tumor were done. Pathology of the specimens was yellowish and soft grossly, with myxoid degeneration. At 2 years after the operation, the patient was free of symptoms.

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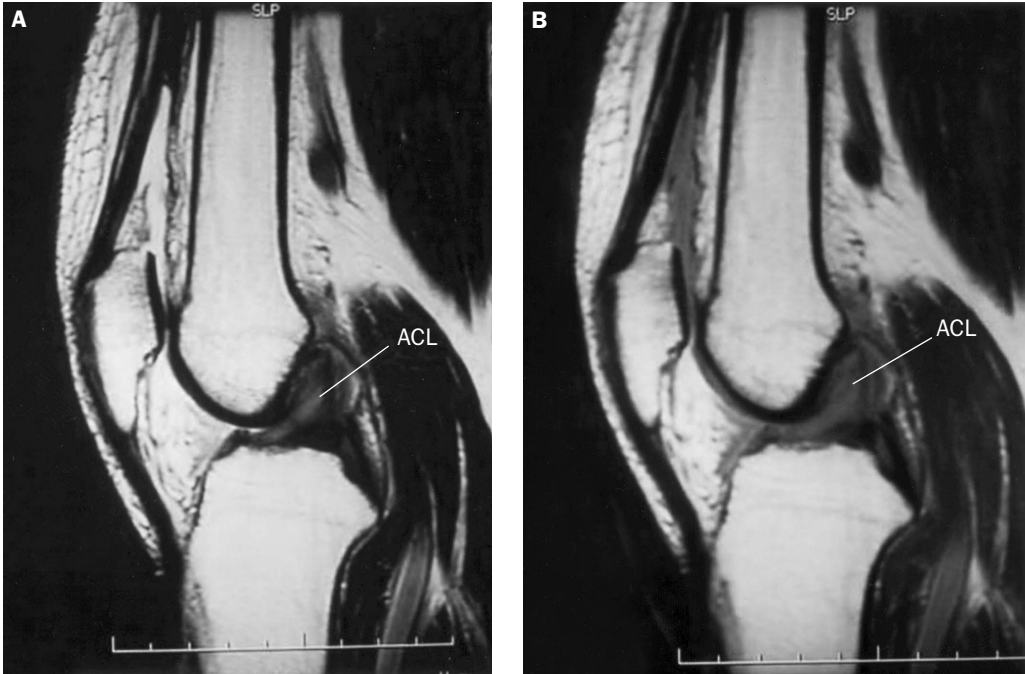


Figure 1. Case 1: (A) sagittal T2-weighted image and (B) proton density show increasing intraligamentous signal intensity of the anterior cruciate ligament (ACL) over the left knee.

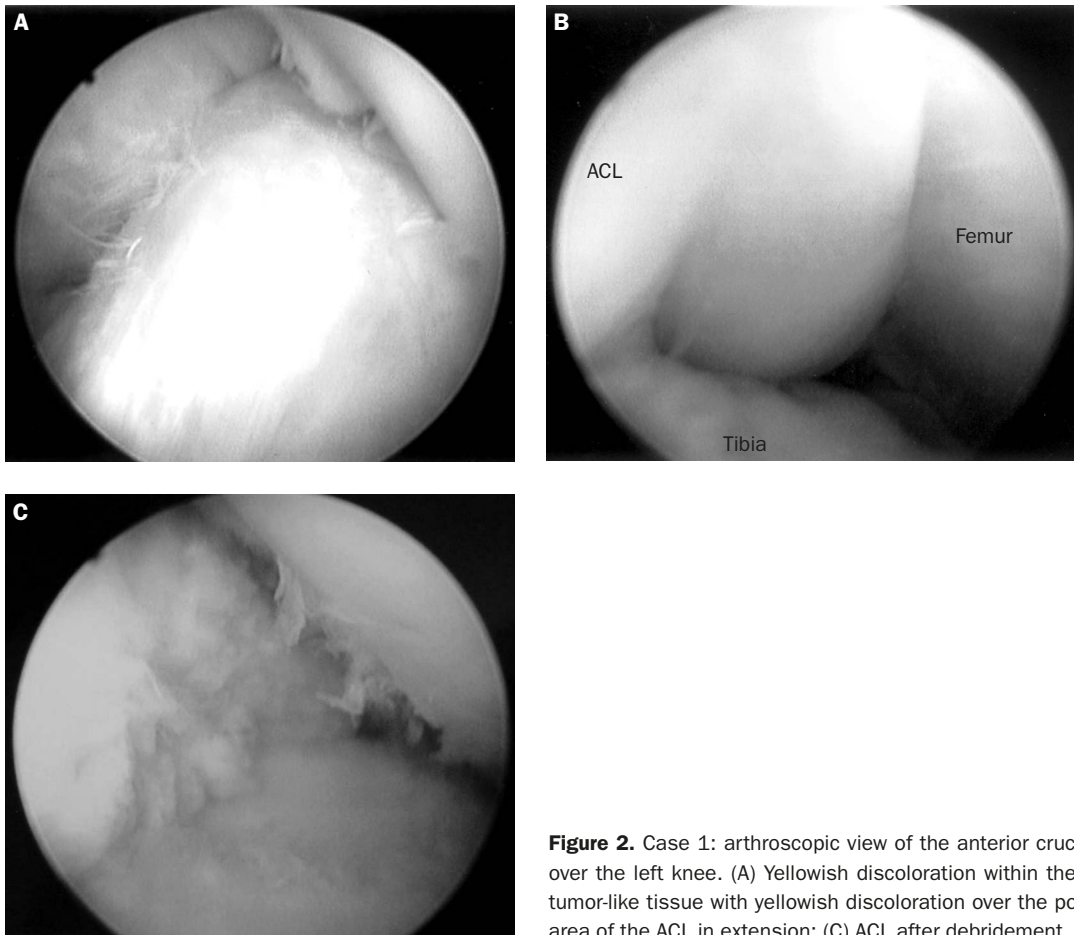


Figure 2. Case 1: arthroscopic view of the anterior cruciate ligament (ACL) over the left knee. (A) Yellowish discoloration within the ACL in flexion; (B) tumor-like tissue with yellowish discoloration over the posterolateral bundle area of the ACL in extension; (C) ACL after debridement.



Figure 3. Case 2: arthroscopic view of the anterior cruciate ligament (ACL) shows yellowish discoloration within the ACL over the left knee.

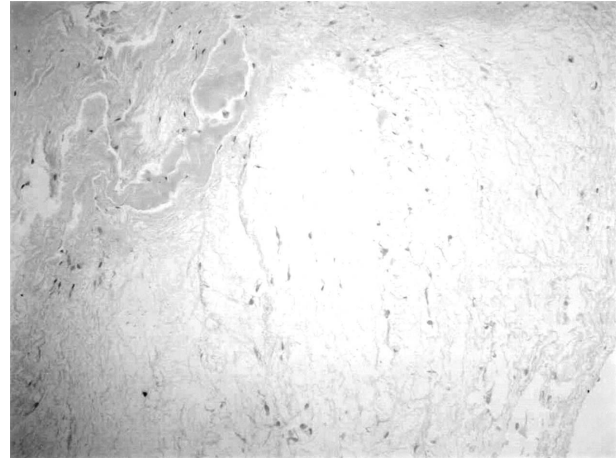


Figure 4. Case 2: histologic biopsy specimen from the anterior cruciate ligament shows normal ligamentous collagen tissue and mucoïd degeneration (hematoxylin & eosin, original magnification 40x).

Case 2

This 53-year-old laborer denied any trauma history or systemic disease, but had left knee pain for 2 years. The pain increased while working and decreased after resting. Physical examination showed that there was no swelling, ligament instability, or meniscus tear signs. A plain X-ray showed a slight degenerative change in the medial aspect of the knee. The patient received conservative treatment for months, but the condition did not improve. Finally, he was admitted for arthroscopic examination under the impression of early osteoarthritis.

Under arthroscopic examination, some yellowish content in the ACL was found (Figure 3). The yellowish content did not limit the range of motion or cause any mechanical block. This yellowish lesion of the ACL was excised. Histologic findings showed fragments of mucoïd degeneration of the ligament (Figure 4). The patient had no complaint about his left knee at the 12-month follow-up.

Discussion

Mucoïd degeneration of the ACL is a rare process that has been described in a few reports.^{1,2,4-8} The pathogenesis of mucoïd degeneration is unclear, but injury, ganglion cysts, and degenerative process have been implicated as the most likely etiologic factors in the production of this change. Ganglion cysts have also been attributed to mucinous degeneration of the connective tissue in which they arise, and mucinous degeneration is thought to be related to repeated trauma. Hodler et al,⁹ correlating between MRI appearance and histologic

findings in cadaveric specimens, found focal areas of signal increase in 29 of 38 ligaments. In 17 of these 29 ligaments, mucoïd and/or eosinophilic degeneration was found, which appeared to have caused the focal MRI signal change.

Patients usually present with knee pain without clinical knee instability. The knee pain is similar to those caused by a mass or local bone erosion.⁴ By reviewing previous reports and our cases, we made some observations. In all 13 cases, age ranged from 35 to 60 years, and none reported any major trauma history.^{1,2,4-8} All 13 patients complained of knee pain, and there was a loss of terminal flexion or extension in 8 of them. In previous studies, authors could not explain this tendency for restriction of knee joint motion. In our patients, the loss of extension was due to a tumor-like lesion within the ACL, especially in the posterolateral bundle, which impinged on the tibiofemoral joint.

On MRI, intraligamentous ganglion of the ACL may appear fluid-filled, with low T1-weighted images and high T2- and proton-weighted images, and could be sharply demarcated with homogeneous appearance. On the other hand, the finding of mucoïd degeneration of the ACL on MRI showed ill-defined ACL, increased girth compared to normal, increased signal intensity on all sequences, normal orientation of the ligament, and celery-stalk appearance.⁷ The width of the ACL may be increasing and the continuity of the ACL partially lost. That is why in both of our cases, the mucoïd degeneration of the ACL was diagnosed as a partial tear of the ACL. The first case showed increasing intraligamentous signal intensity on T2- and proton-weighted images, and the continuity of the ACL was intact. MRI is the most useful imaging modality for differentiating

between mucoid degeneration of the ACL and intra-ligamentous ganglion as well as other lesions in the knee joint. Careful review of MRI findings should be sufficient to differentiate these 2 entities and confirm the clinical diagnosis before arthroscopy.

Arthroscopic findings are usually intact ACL without any laxity, but the ACL shows external expansion or bulging appearance. In our cases, Case 1 had bulging appearance with yellowish-looking ACL and Case 2 had only yellowish discoloration of the ACL. If yellowish discoloration of the ACL is noted during arthroscopy, then mucoid degeneration of the ACL should be highly suspected. The cause of knee pain from the degeneration of the ACL is still unknown, but we have found obvious impingement of the ACL degeneration mass in the tibiofemoral joint under arthroscopy.

Mucoid degeneration of the ACL is suspected when an apparently thickened and ill-defined ligament with increased signal intensity on all sequences in MRI is identified in a patient with a physically intact ligament and no obvious trauma history. Arthroscopic debridement of the mucoid degeneration of the ACL is safe and effective according to literature reports and our experience.

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