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Ganglion cysts of the cruciate ligaments detected by MRI

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Abstract Eight patients with ganglion cysts arising from the cruciate ligaments of the knee joint underwent arthroscopic excision after the MR examination. The MR findings, clinical features and arthroscopic findings were evaluated comparatively.

Résumé Après un examen IRM, huit patients présentant des kystes se développant à partir des ligaments croisés du genou, ont subi une excision arthroscopique. Les résultats de l'examen IRM, de l'examen clinique et de l'examen arthroscopique ont été comparés.

Introduction

Ganglion cysts arising from the cruciate ligaments are rare. We have treated eight ganglion cysts arthroscopically. We present these cases, focusing on the usefulness of MRI in the diagnosis and plan of management.

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Patients

There were two men and six women, with an average age of 20 (11–30) years. The preoperative MR examination was performed on all patients, and the diagnosis of a ganglion was confirmed by histological examination of the fragments resected at arthroscopy. No patient had a history of trauma or had ligamentous laxity.

On physical examination, seven of the eight patients had tenderness at the medial or lateral joint lines, and the McMurray test caused pain in six patients and a click in four patients.

Arthroscopy revealed that three patients had cartilage injury, and only one patient had a lateral menisceal injury (Table 1).

In seven patients, MRI demonstrated a sharply demarcated intra-articular lesion, which had an intermediate signal on T1-weighted images (TR/TE 600/15) and a high signal on T2-weighted images (TR/TE 1500/80). Generally, the size of the cyst on MRI was much larger than the size estimated by arthroscopy. The average size was 19 mm×26 mm×19 mm.

It was difficult to determine the ligament of the origin precisely. The ganglions were large and often attached to both cruciate ligaments. Three lesions were located mainly anterior, whilst five lesions were located posterior, to the cruciate ligaments.

Seven knees developed a limitation in either extension or flexion or both. All cysts were excised arthroscopically, and the viscous fluid was exuded from the cysts. Recovery was good in all patients, and all regained a normal range of knee motion postoperatively during the follow-up period, which ranged from 12 to 78 months (mean 51.2).

Table 1 Cases with a ganglion cyst of the cruciate ligaments

Case	Sex	Age	Trauma	Tenderness at joint line		McMurray test		Combined injury
				Medical	Lateral	Pain	Click	
1	F	22	No	+	+	–	–	Cartilage
2	M	21	No	+	–	+	–	
3	F	30	No	–	–	–	–	
4	F	25	No	–	+	+	+	Cartilage
5	F	11	No	+	+	+	+	
6	F	15	No	+	+	+	+	
7	F	19	No	–	+	+	+	Cartilage
8	M	14	No	–	+	+	–	Lateral meniscus

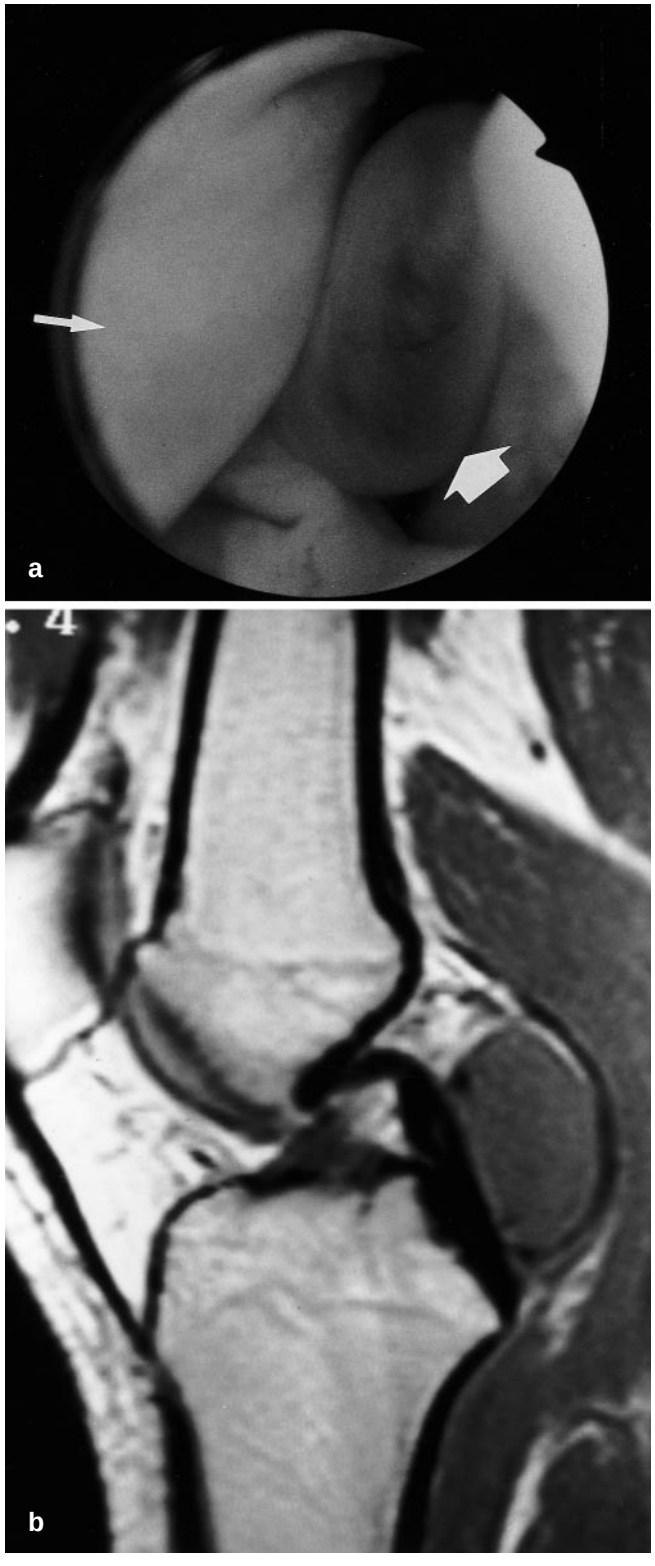

Fig. 1 **a** Arthroscopy shows a small cyst (*large arrow*) between the posterior cruciate ligament (PCL) and the medial femoral condyle (*small arrow*) in the left knee. **b** On MRI, the cyst, which is located posterior to the PCL, is depicted as much larger than it seemed when observed by arthroscopy. T1-weighted image demonstrates a round, intermediate-signal area

Discussion

Prior to the arthroscopy, MRI yielded valuable information not only on the diagnosis but also on the location and size of these ganglion cysts. MRI generally depicted a well-demarcated and relatively round mass in the knee joint. On T1-weighted images it showed an intermediate signal, while it showed a high signal on T2-weighted images [1]. One cyst, which was depicted posterior to the PCL on MRI, could not be observed by anterior approaches on arthroscopy. We added a postero-medial approach and were eventually able to find the cyst posterior to the PCL.

Previous articles [1–6] described the origins of a ganglion as the ACL or the PCL. However, it was difficult to distinguish whether the origin was the ACL or the PCL, because we could often observe only a part of the cyst by arthroscopy, and on MRI the cyst was often seen to be attached to both ligaments. Having compared the arthroscopic findings with the MR findings, we concluded that it was not as easy to determine the original ligament as some investigators have reported on the basis of their arthroscopic findings.

In one case, the ganglion shrank while the patient was waiting for his operation. It is suggested that some of these cysts may shrink or disappear altogether when they are treated conservatively.

The symptoms and signs of a gangion cyst include pain, swelling, joint line tenderness, a positive result of the McMurray test and limitations in the range of motion. These can also be suggestive of other intra-articular lesions, such as a menisceal tear, a cartilage lesion or a free body, although the limitation in the range of knee motion is relatively greater than with other lesions.

The limitation of knee motion seemed to be influenced by the location of the cyst. Cysts located mainly anterior to the cruciate ligaments tended to limit extension of the knee, whereas those located mainly posterior to the cruciate ligaments tended to limit flexion. One possible reason for this tendency is that a cyst located anteriorly could have been impinged between the ACL and the intercondylar roof, resulting in an extension block, whereas a cyst located posterior to the ligaments could have been impinged between the PCL and the intercondylar roof, resulting in a flexion block.

However, one cyst located anterior to the ligaments limited both knee flexion and extension, and four cysts located posterior to them limited knee extension as well as flexion. The limitation cannot be completely explained by the location of the cyst only. Changes in the length and torsion of the cruciate ligaments with knee motion may provoke traction or compression on the cyst, which may offer another explanation for limitations in knee motion. In any case, these excessive compression or traction forces on the synovial membrane around the ganglion may stimulate nerve endings, and the knee may be positioned in such a way that the synovial membrane is relaxed, resulting in a limitation in knee motion.

In summary, MRI yielded preoperative information that was useful in the diagnosis and surgical treatment planning for ganglion cysts of the cruciate ligaments. If possible, an MR examination should be performed before the operation. Based on the MR findings, cysts located mainly anterior to the cruciate ligaments tend to limit extension of the knee, whereas cysts located mainly posterior to the cruciate ligaments tend to limit flexion.

References

1. Garcia A, Hodler J, Vaughn L, Haghighi P, Resnick D (1991) Case report 677. Skeletal Radiol 20:373–375
2. Johnson WL, Corzatt RD (1993) Ganglion cyst of the anterior cruciate ligament. Am J Sports Med 21:894
3. Kaempffe F, D'Amoto C (1989) An unusual intra-articular ganglion of the knee with interosseous extension. J Bone Joint Surg [Am] 71:773–775
4. Recht MP, Applegate G, Kaplan P, Dussault R, Schweitzer M, Dalinka MK, Resnick D (1994) The MR appearance of cruciate ganglion cysts: a report of 16 cases. Skeletal Radiol 23:597–600
5. Roeser WM, Tsai E (1994) Ganglion cysts of the anterior cruciate ligament. Arthroscopy10:574–575
6. Yasuda K, Majima T (1988) Intra-articular ganglion blocking extension of the knee: brief report. J Bone Joint Surg [Br] 70: 837