CASE REPORT

Ganglion cyst arising from the infrapatellar fat pad in a child

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Abstract : A ganglion cyst is a cystic lesion containing myxoid matrix and lined by a pseudomembrane. A ganglion cyst arising from the infrapatellar fat pad is very rare, with only a few reports appearing in the literature, and the present case is the first report of this lesion in a child. A 10-year-old boy presented with right knee pain that showed no improvement despite resting from sports activity for 1 month. Magnetic resonance imaging revealed a multilobular mass between the infrapatellar fat pad and anterior cruciate ligament. Arthroscopic excision of the mass was performed. The mass was noted to arise from the infrapatellar fat pad and was filled with myxoid matrix. The histological diagnosis was a ganglion cyst. In active pediatric patients with pain or limited range of motion in the knee, physicians should consider the possibility of a ganglion cyst from the infrapatellar fat pad, despite its rarity. J. Med. Invest. 62 : 245-247, August, 2015

Keywords **:** *ganglion cyst, infrapatellar fat pad, child, arthroscopy*

INTRODUCTION

A ganglion cyst is a cystic swelling containing myxoid matrix and lined by a pseudomembrane (1, 2). These cysts sometimes occur in the knee, mainly arising from the synovial membrane of ligaments. The prevalence of intra-articular ganglion cyst of the knee ranges from 0.2% to 1% as determined by magnetic resonance imaging (MRI) and 0.6% as determined by arthroscopy (3). A ganglion cyst arising from the infrapatellar fat pad is very rare ; only a few cases have been reported to date (4, 5) and age in these cases ranged from 22 to 77 years. Here, we describe the case of a pediatric patient with a ganglion cyst arising from the infrapatellar fat pad, which was treated by arthroscopic excision.

CASE PRESENTATION

A 10-year-old boy complained of right knee pain without any triggers. He had no traumatic or infectious history in the affected knee. He was physically active ; he practiced the martial art Shorinji Kempo and played golf. He consulted a family doctor when the pain did not improve for 1 month. MRI revealed an intra-articular mass in the right knee, and the patient was referred to our department for further examination.

At presentation to us, alignment of the lower limbs was normal. Range of motion (ROM) of the right knee was slightly limited in extension compared with the opposite side. The patellofemoral joint line was tender, but there was no swelling or localized warmth on the knee. The McMurray, Lachman, and varus/valgus stress tests were all negative. Although plain radiographs were normal, MRI showed a multilobular cystic lesion between the infrapatellar fat pad and anterior cruciate ligament (ACL) (Figure 1). The mass measured approximately 30 mm×15 mm×20 mm and was well circumscribed, with low intensity on T1-weighted images and high to iso-intensity on T2-weighted and fat-suppressed T2-weighted images. The origin of the mass was unclear. The ACL showed no abnormal intensity on MRI.

We considered ganglion cyst, parameniscal cyst, lipoma, hemangioma, pigmented villonodular synovitis (PVNS), and synovial sarcoma as a differential diagnosis. We considered this lesion was unlikely to be synovial sarcoma because the multilobular cystic lesion existed intraarticularly and has no calcification in this case. For diagnostic treatment, arthroscopic excision of the mass was performed. Superolateral, anterolateral, and anteromedial portals were used. At the beginning of the operation, we inserted the arthroscope into the superolateral portal to observe the entire mass in one field with reference to the preoperative MR images. Arthroscopy revealed a multilobular cystic mass covered with a thin capsule. It arose not from the ACL but from the infrapatellar fat pad. The mass was filled with myxoid matrix with a jelly-like consistency. No injuries to the cartilage, ligaments, or meniscuses were evident. The synovial tissue was hyperplastic around the anterior and lateral spaces of the groove. We also confirmed the impingement of the mass between the femur and infrapatellar fat pad during the knee extension. The cystic lesion and the hyperplastic synovial tissue were excised or ablated piecemeal from the normal fat pad and articular capsule as much as possible (Figure 2). When excising the mass and hyperplastic synovia in the lateral and medial articular cavities, we used the anterolateral and anteromedial portals, respectively, to insert the endoscope. At the end of the operation, we again observed the articular cavity from the superolateral portal to confirm complete excision of the cystic mass.

Postoperative histological evaluation revealed the cystic wall to be composed of collagen fibers and mono-layered epithelial tissue. Vascular proliferation and chronic inflammatory cell infiltration into the wall were evident (Figure 3). The diagnosis was a ganglion cyst. The postoperative course was uncomplicated and the patient began walking on postoperative day (POD) 1. He was discharged on POD 7 without knee pain. At 1 month postoperatively, he had no complaints and repeat MRI indicated no residual lesion of the mass (Figure 4). At 2 months after surgery, he returned to active sports.

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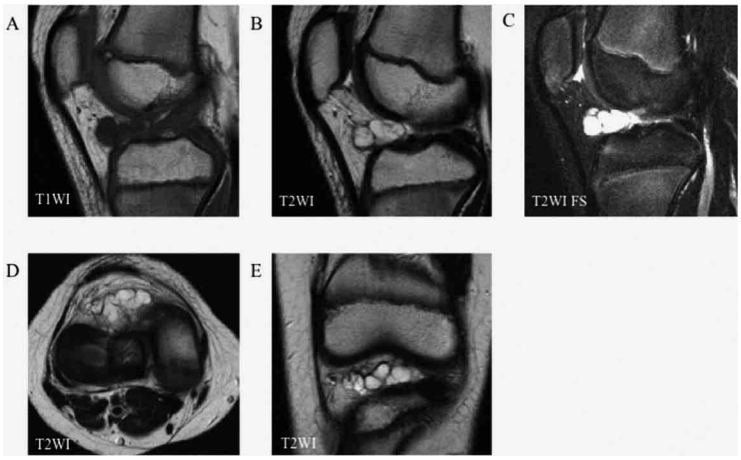

Figure 1 : Preoperative magnetic resonance imaging (MRI) findings. A multilobular cystic lesion with a thin membrane is apparent between the infrapatellar fat pad and anterior cruciate ligament. The well-circumscribed mass shows low-intensity on T1-weighted imaging (T1WI) (A) and high or iso-intensity on T2-weighted (T2WI) and fat-suppressed T2-weighted images (T2WI FS) (B-E).

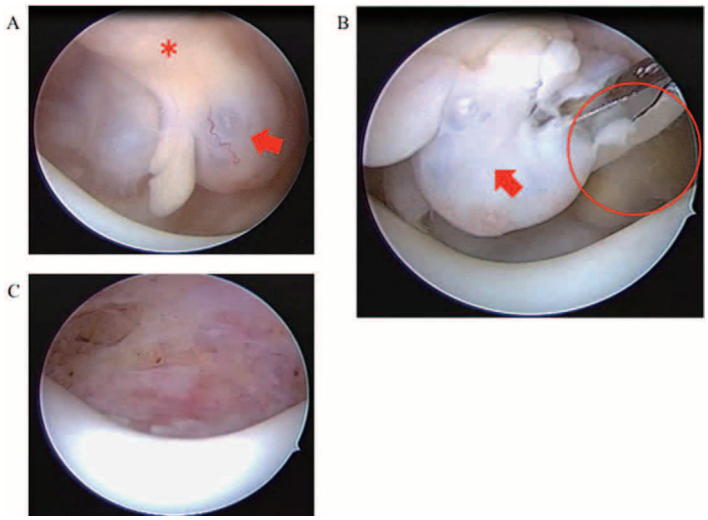

Figure 2 : Arthroscopic views from the superolateral portal. The mass (arrow) clearly arises from the infrapatellar fat pad (asterisk) (A). Myxoid matrix, circled red, fills the cystic mass (arrow) (B). Piecemeal excision or ablation of the mass and hyperplastic synovial tissue to the maximum extent possible (C).

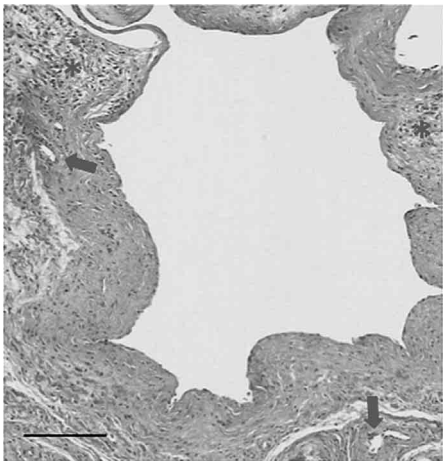

Figure 3 : Histological evaluation reveals a cyst wall composed of collagen fibers and mono-layered epithelial tissue. Vascular proliferation (arrow) and chronic inflammatory cell infiltration into the wall (asterisk) are evident. Scale bar 200 μm, HE stain.

DISCUSSION

This case of a rare ganglion cyst arising from the infrapatellar fat pad is, to our knowledge, the first to be reported in the pediatric population.

Generally, ganglion cyst is commonly seen in women in teens and 20's originating near tendons or joints such as dorsum of the hand. The pathogenesis of ganglion cysts remains unclear. They may arise from herniation of the synovium into the surrounding tissue, displacement of synovial tissue during embryogenesis, mucinous degeneration of connective tissue after trauma, or proliferation of pluripotent mesenchymal cells (2). Since ganglion cysts do not seem to have a clear relation to degenerative change, it is possible that the ganglion cysts in the infrapatellar fat pad in previous cases, all of which involved adults, may have developed in childhood or adolescence.

MRI is useful for identifying intra-articular ganglion cysts, but final diagnosis depends on histological findings. In cases where MRI fails to show the clear origin of the lesion, arthroscopy is helpful since it provides direct visualization that enables the lesion to

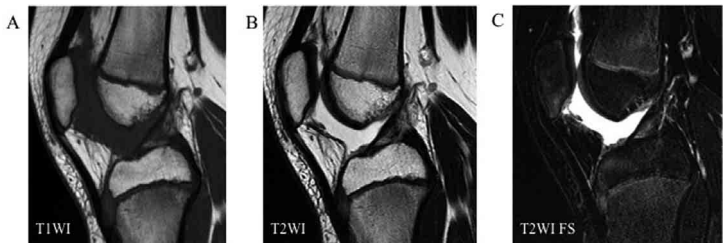

Figure 4 : Postoperative MRI after 1 month. The mass was completely removed and there is no evidence of recurrence on T1-, T2-, or fat-suppressed T2-weighted images (A-D). Only hydroarthrosis, which may be postoperative, is apparent.

be characterized. In the present case, whereas preoperative MRI indicated a multilobular mass caught between the infrapatellar fat pad and ACL, arthroscopy revealed the mass arose from the infrapatellar fat pad without a connection to the meniscus or ACL. When the mass was excised by forceps in a piecemeal fashion, the cystic cavity leaked myxoid jelly-like contents, which are specific findings for ganglion cysts. The diagnosis was then confirmed by histology : the capsule consisted of fibrous connective tissue and multifocal areas of mucoid degeneration were evident.

Previous reports on ganglion cysts have described only anterolateral or anteromedial arthroscopic views (4, 6, 7). However, we used an additional superolateral portal because we considered it would be easier to view the entire mass in a single field via this portal and ensure its complete excision, which proved successful.

The differential diagnosis for knee pain and limited ROM in children is large. Discoid meniscus is one of the most frequent diagnoses for active children. ACL injury, synovial plica syndrome (8) and sports injuries such as Osgood-Schlatter disease, osteochondritis dissecans, and desmitis of the patella (9) also occur frequently. In cases where multilobular tumors and tumor-like lesions in the knee are seen on MRI, synovial sarcoma, PVNS, hemangioma, lipoma, parameniscal cyst, and ganglion cyst from the ACL should be considered (10).

In a report of 25 cases of Hoffa's fat pad tumor that were followed for over 6 months after pathological diagnosis (11), 23 cases (92%) were benign and 2 cases (8%) were malignant. Both malignant cases were diagnosed as synovial sarcoma and occurred in patients younger than 16 years of age. The most common benign tumor was PVNS (12 cases ; 48%) ; ganglion cysts were diagnosed only in 2 cases (both in patients aged over 40 years). However, among patients aged under 16 years, all 4 cases of benign tumors were diagnosed as hemangioma. Thus, ganglion cysts in the knee in pediatric patients, as encountered in the present case, are very rare.

When active pediatric patients present with pain, limited ROM, and abnormal MRI findings in the knee, we generally tend to consider the aforementioned diseases in initial differential diagnosis. However, given the present, albeit very rare, case, we should also consider the possibility of a ganglion cyst arising from the infrapatellar fat pad.

CONFLICT OF INTEREST

We have no conflict of interests to disclose.

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