

CASE REPORTS

Anterior Cruciate Ligament Ganglion Cyst: A Case Report

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Abstract

A ganglion is a cystic formation close to joints or tendinous sheaths, frequently found in the wrist, foot or knee. Intra-articular ganglia of the knee are rare, and most of them are located in the anterior cruciate ligament. The clinical picture for these ganglia comprises pain and movement restrictions in the knee, causing significant impairment to the patient. Symptoms are non-specific, and anterior cruciate ligament ganglia are usually diagnosed through magnetic resonance imaging. Not all ganglia diagnosed through magnetic resonance imaging need to undergo surgical treatment: only those that cause clinical signs and symptoms do. We present the case of an 18-year-old woman with a presumed ganglion cyst associated with the anterior cruciate ligament (ACL), demonstrated by MRI.

Key words: *Knee, Ganglion, Anterior cruciate ligament (ACL), Magnetic resonance imaging (MRI).*

Introduction:

A ganglion is defined as a cystic formation, close to joints or tendinous sheaths, frequently found in the wrist and foot. It can be single or multi-lobed,

with clear gelatinous, colloid or mucinous content¹. Ganglia located at the dorsum of the foot or the wrist, and those close to the inter-phalangeal articulations are of easy clinical diagnosis, commonly found in clinical practice and usually called synovial cysts¹. However, deeper ganglia, such as those found in the forearm, in the pericetabular region or in the supra-scapular notch and intra-articular knee ganglia, are difficult to diagnose clinically, especially when not palpable. These are accidentally found when magnetic resonance imaging scans are performed^{2,3}. Intra-articular ganglia of the knee are rare and most of them (62.6%) are located in the anterior cruciate ligament¹. Its etiology remains unknown. The clinical picture of knee ganglia consists of pain and sometimes restriction in the final degrees of extension⁴⁻⁷. These symptoms are especially disturbing to the patient, which makes diagnosis and specific treatment necessary.

Case report:

An 18 year-old woman was referred for magnetic resonance imaging (MRI) of her Right knee due to persistent knee pain spanning for 3 years. She

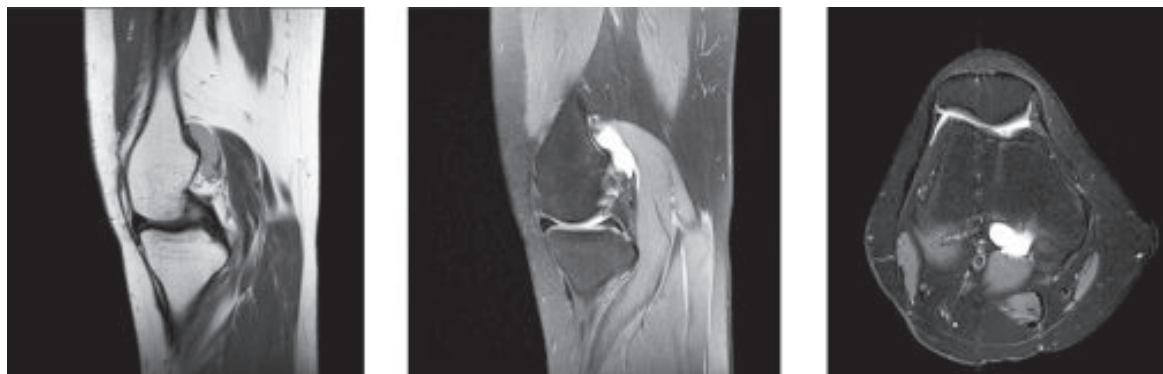


Figure : 18 years old women with ACL ganglion cyst (From Left to right). i) Sagittal T1WI shows the ganglion cysts as a hypointense oval region paralleling the fibers of ACL. ii) Sagittal T2WI shows the ganglion cysts as a hyperintense oval region paralleling the fibers of ACL. iii) Axial STIR image shows a portion of bright cyst in the region of ACL.

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reported no history of trauma, nor any symptoms of infection. The MRI showed cystic lesion embedded within the ACL fibers. The cyst was well-circumscribed and of high signal intensity on T2 and STIR weighted images and low signal intensity on T1 weighted images. The PCL and menisci were normal. There was mild joint effusion but no bone marrow edema. Based on imaging findings the presumptive diagnosis of an ACL ganglion cyst was made. The patient was not surgically treated, nor was the cyst aspirated.

Discussion:

Ganglion cysts are cystic structures, which contain a yellow viscous fluid surrounded by a thin capsule⁸. They are commonly found around the joints with a particular affinity for the wrist⁸⁻¹⁰. They are much less common in and around the knee and when found, are most often associated with the joint capsule or meniscus. Additional reported locations include the tendons, muscles, bone and the infra patellar fat pad⁹⁻¹². Though rare, there is also an association with both the ACL and PCL^{8,9,13}. In most cases this is unilateral, although there is at least one reported case of bilateral cruciate ligament cysts, which appears to be an exception¹⁴. While it is unclear how or why ganglion cysts originate, theories include: displacement of synovium into the surrounding tissue, which may occur during development, herniation of synovium into the surrounding tissues, or degenerative and proliferative changes of pluripotential mesenchymal cells following trauma^{9,13}. A common factor linking the development of cruciate ligament ganglion cysts may be trauma, which can cause the release of hyaluronic acid, a mucinous substance¹⁴. The hyaluronic acid is thought to dissect through the tissue planes producing capsular ducts and eventually coalescing into a cystic structure. Since the ACL is an extrasynovial structure, irritation or trauma to the synovium covering the ACL may initiate the release of hyaluronic acid and the production of mucin causing the development of a ganglion cyst within or adjacent to the cruciate ligament¹⁵.

Common clinical findings associated with cruciate ligament ganglion cysts include pain, decreased range of motion, swelling and joint effusion. In one study of 15 patients, there was no identifiable association with joint instability. Symptoms suggesting internal derangement of the joint, however, are possible^{8,13}. The most common presenting complaint is pain and it may be

associated with a meniscal tear^{8,16}. If the cyst is large enough, it may mechanically obstruct the knee during motion. Cysts anterior to the ACL tend to limit extension, while those posterior to the PCL may limit flexion^{8,17}. Unfortunately, history and physical exam alone are not enough to make the diagnosis. Therefore, MRI is needed to further evaluate the joint and correctly diagnose these lesions. On MRI, ganglion cysts of the cruciate ligaments appear much like any other cystic structure. On T1-weighted imaging they are hypointense in relation to muscle and on T2-weighted imaging are predominately homogeneously hyperintense, while of intermediate signal intensity on proton-weighted sequences. If there is heterogeneity on the T2 images, this is thought to be caused by hemorrhagic debris within the cyst. The cysts vary from lobulated to fusiform in shape and may contain internal septations or be multiloculated^{8,9,13}. The most common associated abnormality found with a ganglion cyst of the cruciate ligament is a meniscal tear, and less often a joint effusion^{8,9,13,16}. Cysts associated with the ACL tend to be fusiform and oriented parallel to its fibers. Despite the intimate association with the ACL fibers, ganglion cysts are infrequently associated with ACL tears^{8,9,13}. Curative or symptomatic treatment can be accomplished by either open or arthroscopic resection or drainage. Less invasive treatment can be accomplished by CT-guided aspiration. If the cyst is asymptomatic, conservative treatment should be strongly considered^{8,18}. There are other cystic changes that occur in the knee, the most common being ganglion cysts associated with the meniscus. These are diagnosed when there is a cystic structure contiguous with a meniscal tear. Location should aid in separating these lesions from cruciate ligament ganglion cysts^{8,19}. There are also cysts which occur at the attachments of the cruciate ligaments. These are an uncommon finding and unlike true cruciate ligament ganglion cysts, may be associated with tears of the ligament in a minority of cases¹⁹. Another differential diagnosis to consider is cystic or mucoid degeneration of the ACL, which may coexist with ganglion cysts of the cruciate ligaments. In mucoid degeneration of the cruciate ligaments the ligament fibers may be poorly defined on T1 and proton density weighted images, but may be more apparent on T2-weighted imaging. There are no discrete cystic areas in mucoid degeneration, which should help to separate it from the more defined ganglion cyst²⁰. A final

cystic lesion consideration includes popliteal cyst, but this should be easily differentiated based on location.

In conclusion, we have presented a presumed case of a ganglion cyst of the ACL. The patient did not have any surgical treatment so we do not have a definitive tissue diagnosis, but we feel that the imaging features are unique enough to support our diagnosis. While rare, ganglion cysts associated with the cruciate ligaments should be easily recognized based on location and imaging characteristics. Finally, if symptomatic, these lesions are often amenable to treatment.

References

1. Goldstein RC, Manacés EL. Intra-articular ganglion cyst. Comportamento clínico-patológico. *Rev Bras Ortop* 1999; 34:159-64.
2. Bui-Mansfield LT, Youngberg RA. Intra-articular ganglia of the knee: prevalence, presentation, etiology and management. *AJR* 1997; 168:123-7.
3. Burk DL, Dalinka MK, Kanal E, et al. Meniscal and ganglion cysts of the knee: MR evaluation. *AJR* 1998; 150:331-6.
4. Wilson A Jr., Marchetto A, Amaral GH. Ganglion de ligamento cruzado anterior simulando lesão de menisco lateral: relato de caso. *Rev Bras Ortop* 2001; 36:47-8.
5. Brown MF, Chir B, Dandy DJ. Intra-articular ganglia of the knee. *Arthroscopy* 1999; 6:322-3.
6. Deutsch A, Veltri DM, Altchek DW, et al. Symptomatic intra-articular ganglia of the cruciate ligaments of the knee. *Arthroscopy* 1994; 10:219-23.
7. Yasuda K, Majima T. Intra-articular ganglion blocking extension of the knee: brief report. *J Bone Joint Surg (Br)* 1998; 70:837.
8. Huang GS, Lee CH, Chan WP, Taylor JA, Hsueh CJ, Juan CJ et al. Ganglion cysts of the cruciate ligaments: MR findings with clinical correlation. *Acta Radiol* 2002; 43: 419-24.
9. Recht MP, Applegate G, Kaplan P, Dussault R, Schweitzer M, Dalinka MK, Resnick D. The MR appearance of cruciate ganglion cysts: a report of 16 cases. *Skeletal Radiol* 1994; 23: 597-600.
10. Andrikoula SI, Vasiliadis HS, Tokis AV, Kosta P, Batistatou A, Georgoulis AD. Intra-articular ganglia of the knee joint associated with the anterior cruciate ligament: a report of 4 cases in 3 patients. *Arthroscopy* 2007; 23: 801-6.
11. Yilmaz E, Karakurt L, Ozercan I, Ozdemir H. A ganglion cyst that developed from the infrapatellar fat pad of the knee. *Arthroscopy* 2004; 20: 65-8.
12. Jacobson JA, Lenchik L, Ruhoy MK, Schweitzer ME, Resnick D. MR imaging of the infrapatellar fat pad of Hoffa. *Radiographics* 1997; 17: 675-91.
13. Bui-Mansfield LT, Youngberg RA. Intra-articular ganglia of the knee: prevalence, presentation, etiology, and management. *Am J Roentgenol* 1997; 168: 123-7.
14. Noda M, Kurosaka M, Maeno K, Mizuno K. Case report ganglion cysts of the bilateral cruciate ligaments. *Arthroscopy* 1999; 15: 867-70.
15. Roeser WM, Tsai E. Ganglion cysts of the anterior cruciate ligament. *Arthroscopy* 1994; 10: 574-5.
16. Parish EN, P Dixon, Cross MJ. Ganglion cysts of the anterior cruciate ligament: a series of 15 cases. *Arthroscopy* 2005; 21: 445-7.
17. Dinakar B, Khan T, Kumar AC, Kumar A. Ganglion cyst of the anterior cruciate ligament: a case report. *J Orthop Surg* 2005; 13: 181-5
18. Antonacci VP, Foster T, Fenlon H, Harper K, Eustace S. Technical report: CT-guided aspiration of anterior cruciate ligament ganglion cysts. *Clin Radiol* 1998; 53: 771-3.
19. McLaren DB, Buckwalter KA, Vahey TN. The prevalence and significance of cyst-like changes at the cruciate ligament attachments in the knee. *Skeletal Radiol* 1992; 21:365-9.
20. Bergin D, Morrison WB, Carrino JA, Nallamshetty SN, Bartolozzi AR. Anterior cruciate ligament ganglia and mucoid degeneration: coexistence and clinical correlation. *Am J Roentgenol* 2004; 182: 1283-7.