SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Anesthesiology and Pain Medicine

Ultrasound-guided Aspiration of a Ganglion Cyst of Anterior Cruciate Ligament in Outpatient Clinic

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DOI: 10.36347/sasjm.2022.v08i06.002 | **Received:** 14.04.2022 | **Accepted:** 25.05.2022 | **Published:** 02.06.2022

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Abstract **Case Report**

Symptomatic ganglion cysts within the knee joint are rare, and the mainstay of treatment for these cases has been surgical excision. We present a case of a ganglion cyst of the anterior cruciate ligament (ACL) treated with ultrasound-guided aspiration in an outpatient clinic. A 45-year-old woman presented to the hospital with posterior right knee pain after falling down. We were able to identify well circumscribed 2.2cm mass confined to ACL on Magnetic resonance imaging (MRI). We performed percutaneous needle aspiration of the ACL ganglion cyst under ultrasound (US) guidance. The patient's symptoms improved immediately after the procedure and she had no complications. Four weeks later, follow-up revealed that the patient's symptoms had disappeared. Six months later, a recurrence of a ganglion cyst was confirmed on follow-up and was treated in the same way.

Keywords: Ganglion cyst, anterior cruciate ligament, ultrasound.

INTRODUCTION

A ganglion cyst containing mucinous fluid commonly arises within tendon sheaths, muscles, or joint capsules [1]. It is rarely seen within knee ligaments [2,3] and is usually asymptomatic [2-5]. It is mostly found incidentally in magnetic resonance imaging (MRI) or during arthroscopic surgery [6-10]. Seldomly it can cause different symptoms depending on the location of the ganglion cyst within the knee ligament [3]. Ganglion cysts may mimic intraarticular lesions such as tears of the anterior cruciate ligament or meniscus.

The current standard treatment for a symptomatic knee intra-ligamentous ganglion cyst is arthroscopic resection, debridement, and excision [3, 5]. However, this procedure is expensive and requires hospitalization and can sometimes lead to injury of the popliteal artery, infection, or ligamentous damage [11]. Therefore, as an alternative method, percutaneous aspiration with computed tomography guidance or ultrasound-guided aspiration can be used [12, 13]. Percutaneous aspiration does not require a general anesthetic, has the advantage of a quicker recovery time and is cheap and relatively easy to perform. We present a case where a symptomatic anterior cruciate ligament (ACL) ganglion cyst was successfully treated with ultrasound (US) -guided percutaneous aspiration, recurred after 6 months and was treated again in the same manner.

CASE REPORT

A 45-year-old woman presented with posterior right knee pain that was worse with flexion and was associated with a fall a month ago. The patient stated that her pain level was 7/10 (NRS; numerical rating scale; 0, no pain; 10, most severe pain imaginable), and she was unable to participate in many of her desired activities, including pilates. She had no mechanical catching, locking, buckling, or swelling. The patient had no relevant past medical history. She stated that there had been no prior trauma to the right knee. On physical examination, there was remarkable local tenderness over the popliteal space. The active range of motion of her knee flexion was only 100 degrees, at which point increased pain occurred. The

right knee was stable, as determined by negative findings of the anterior drawer test, posterior drawer test, and Lachman test with stability to varus and valgus forces. No meniscal pathology was noted on physical examination with a negative McMurray test. The patellar articular surface was not tender, and the patellar movements were normal. She did not respond to treatments including analgesic and anti-inflammatory medications or activity modifications for a month. The initial radiographs of the right knee demonstrated no bony abnormalities or deformities of the joints (Fig. 1).

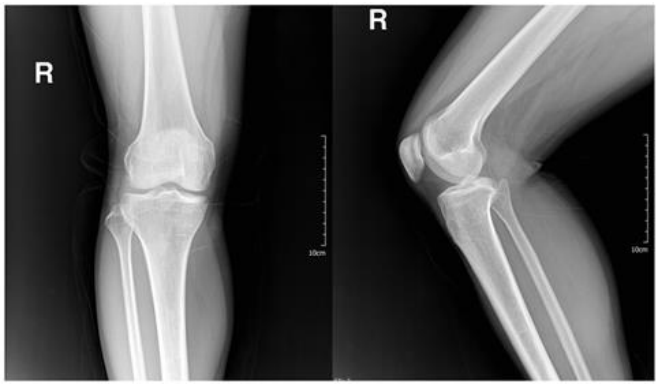

Fig-1

After the initial radiographs were found to be negative for pathologic changes, an MRI of the right knee was obtained. MRI demonstrated well-circumscribed ACL ganglion cysts characterized by low signal intensity on Tl-weighted images (T1-WI) and increased signal intensity on T2-weighted images (T2-WI) within the intercondylar notch. (Fig. 2) This collection measured approximately 2.2 cm in maximal diameter and arose from within the ACL. No effusion or other evidence of acute injury was identified. Bone and joint formation appeared to be normal. Normal-sized lateral and medial menisci were present. No ligamentous disruption or tendon tear was identified. As such, the patient's clinical presentation was believed to be principally attributable to the ACL ganglion cyst. Nonoperative and operative treatment options were discussed with the patient. After discussing the risks, benefits, and alternatives, the patient elected to proceed with percutaneous needle aspiration of the ACL ganglion cyst under US guidance.

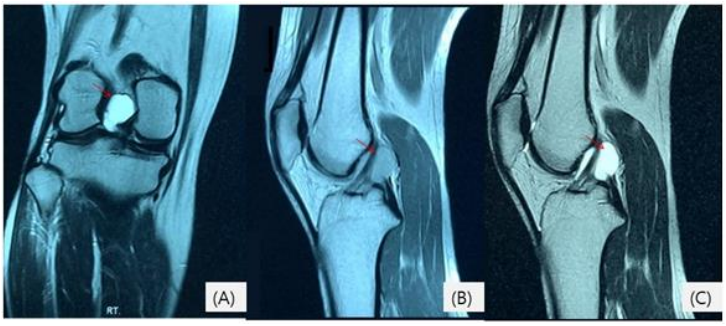

Fig-2

Prior to the procedure, the patient was placed in the prone position, and the posterior right knee was examined using a Samsung HS40 US system and a 2- to 5-MHz convex array transducer (Samsung Health care, Seoul, Korea). Preprocedural sonographic examination was performed and intercondylar cyst (maximum diameter, 1.99 cm) was confirmed (Fig. 3).

Fig-3

Local anesthesia was done with 2 mL of 1% lidocaine. 1.0-inch, 25-gauge needle under direct US guidance in the pathway between the skin entry site and the ACL ganglion cyst. The needle was removed, and through the same skin entry site, an 18-gauge, 1.5-inch needle was advanced under real-time US guidance, using a cephalad approach, in a short axis relative to the US transducer, and guided into the ACL ganglion cyst. (Fig. 4) Having confirmed the needle tip placement within the cyst, aspiration was commenced, and 2.5 mL of straw-colored, jelly like fluid was obtained. We did not inject steroids because the efficacy of combining aspiration with steroid injection is controversial. [14] There was immediate symptomatic improvement after the procedure. The procedure was performed in less than 15 min. The patient tolerated the procedure without complications.

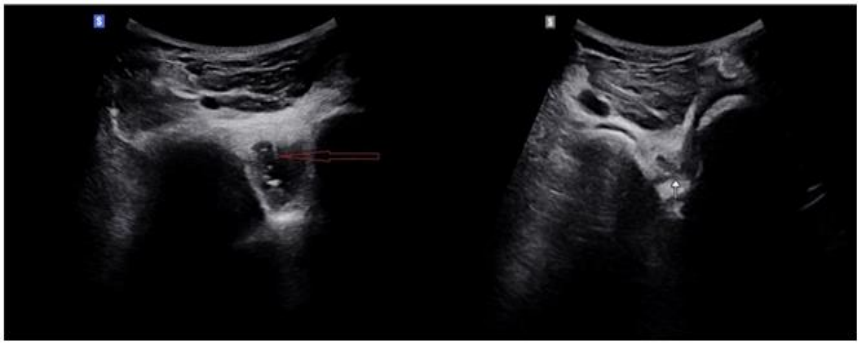

Fig-4

She returned to the clinic in 4 weeks, noting that her pain had completely resolved. The results of a follow-up physical examination were normal, including a full pain-free knee active range of motion. Additionally, ganglion cysts were not seen on ultrasound. (Fig. 5)

Fig-5

A month later, a follow-up ultrasound image showed that there was no longer a visible ganglion cyst. The patient returned for follow-up 8 months after the procedure. A cyst of the same shape as before with a maximum diameter of 1.29 cm could be confirmed, and the patient felt pain again during full flexion. (Fig. 6) At this time, on a detailed physical examination, the patient's symptoms showed tenderness in the popliteal space, which was the same as when she first visited to the hospital. In addition, the location was also limited to the ACL. Aspirations were performed again in the same way as before, and the patient was treated without complications.

Fig-6

DISCUSSION

The first case of an intra-articular knee cyst was reported by Caan in 1929 following autopsy.[15] The prevalence of knee intraarticular cystic masses is 1.3% on MRI and 0.6% following arthroscopy, of which two-thirds are present in ACL [10].

The majority of these cysts is diagnosed incidentally and is thus asymptomatic. Furthermore, it is not easy to suspect knee joint ganglion cysts because there are no typical symptoms or characteristic physical examinations. However, in some cases, their symptoms include knee pain, knee locking, a limitation of knee range of motion and limiting activities, especially walking downhill [16].

Arthroscopic resection is the most frequently performed treatment method, but percutaneous aspiration under computed tomography (CT) guidance or US guidance has recently been used to drain ganglion cysts. Arthroscopic resection requires hospitalization, which might seldom lead to severe complications, including popliteal artery or ligamentous injuries [7]. The advantage of CT-guided or US-guided aspiration is that these lesions can be treated nonsurgically. These nonoperative procedures show faster recovery periods and immediate improvement in symptoms [4]. It is possible in an outpatient clinic without hospitalization and has the advantage of not requiring fasting. Also, US-guided aspiration has the benefit of no radiation exposure compared with CT-guided aspiration [17]. Due to the development of new high-frequency ultrasound probes, it is possible to confirm the tibial nerve and popliteal vessel while performing the procedure [18]. Even so, in the present case, the ganglion cyst was limited to the ACL and was not relatively large, but it could require technically demanding aspiration depending on the location or size of the ganglion cyst.

Arthroscopic treatment has a very low rate of recurrence for ganglion cysts compared with other procedures [10]. However, in the present case, the patient did not want surgical treatment, so percutaneous aspiration was performed. The patient recurred 8 months later and was treated in the same way as before. As described above, surgical and nonsurgical treatments have distinct advantages and disadvantages, so treatment methods are commonly determined according to the patient's condition.

Some studies suggest that the combination of steroid injection can relieve pain and reduce the possibility of ganglion cyst recurrence [19]. This idea is based on the initial theory that chronic inflammation affects the pathogenesis of ganglion cysts. However, the combination of steroid injection has been debated, and it can cause complications such as fat atrophy, according to a paper analyzing cases injected with steroids on the wrist where ganglion cysts occur the most [20].

This case demonstrates the clinical course made by performing US-guided percutaneous aspiration of these uncommon ACL ganglion cysts. This case typically showed rapid recovery and immediate symptom relief without side effects and shows the disadvantages of recurrence, so it can be referred to in subsequent cases for treatment.

CONCLUSIONS

Ultrasound-guided aspiration will be a very meaningful treatment option if the symptoms can be immediately resolved for a patient who has difficulty walking. This case not only showed advantages such as rapid recovery and relatively few side effects of US-guided percutaneous aspiration but also showed limitations such as recurrence.

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