

## Case Report

# Arthroscopic decompression and debridement for the treatment of anterior cruciate ligament ganglion cyst in a 45-year-old female

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## ABSTRACT

Anterior cruciate ligament (ACL) cysts are infrequently encountered in clinical practice, with limited reported cases. These cysts usually present with chronic knee pain and clinical examination is usually unremarkable except for knee tenderness. Due to the lack of characteristic symptoms and deficiency of precise clinical techniques to diagnose the condition, timely diagnosis requires a high index of suspicion, supported by magnetic resonance imaging (MRI). Hence management of ACL ganglion cysts poses unique challenges for healthcare providers. We present a case study of a 45-year-old female with an ACL ganglion cyst successfully treated with arthroscopic decompression and debridement. This article outlines the clinical presentation, diagnostic workup, surgical intervention, and post-operative outcomes of this case, providing insights into the effective management of this uncommon condition. Furthermore, we provide a comprehensive review of the existing literature on ACL ganglion cyst, emphasizing findings and treatment outcomes reported in previous studies. This case underscores the importance of considering ACL cysts in the differential diagnosis of knee pain and discomfort. Early identification and appropriate management, such as arthroscopic cyst excision, can lead to favorable outcomes and complete recovery.

**Keywords:** ACL ganglion cyst, Arthroscopic decompression and debridement, Knee pain, Review of literature

## INTRODUCTION

Anterior cruciate ligament (ACL) ganglion cysts are infrequent intra-articular lesions, typically characterized by the presence of mucoid fluid filled cyst within the ACL sheath. The exact pathogenesis of the condition is still unknown, although several theories of cyst development have been proposed, such as mucinous degeneration of connective tissue, synovial herniation, congenitally displaced synovial tissue, and trauma leading to degeneration and cyst formation.<sup>1,11</sup>

The majority of the patients present with knee pain, although other mechanical symptoms, like locking, snapping, and giving away, are present occasionally. Given the fact that knee pain can be caused by a variety of conditions, diagnosis of ganglion cyst can rarely be made

on clinical grounds alone, and frequently it is the magnetic resonance imaging (MRI) findings that lead to the diagnosis.<sup>1</sup>

## CASE REPORT

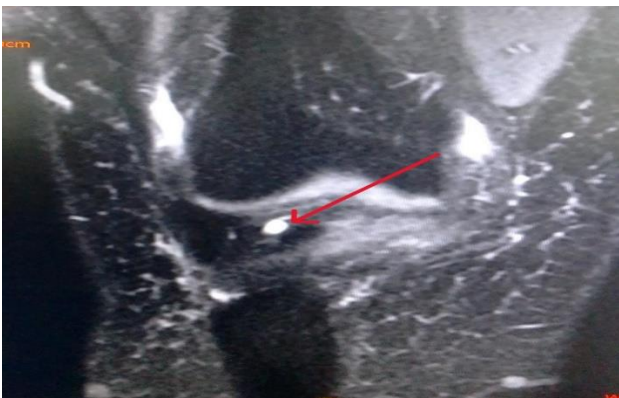
A 45-year-old female presented with a six-month history of progressive knee pain and swelling. The pain was localized to the anterior aspect of the right knee and was exacerbated during physical activities and extreme knee movements.

Physical examination was unremarkable except for evidence of joint effusion and tenderness over the anterior aspect of the right knee. Magnetic resonance imaging (MRI) of the knee revealed a well-defined cystic lesion within the ACL sheath, confirming the diagnosis of an

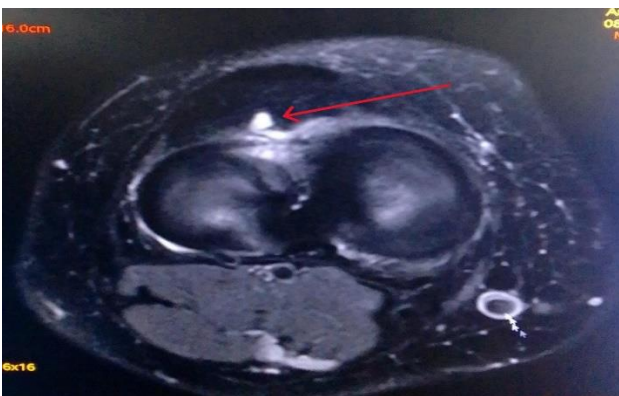
ACL ganglion cyst. The MRI also provided valuable information about the cyst's size, location, and its relation to the ACL (Figures 1-3).



**Figure 1: MRI image of ganglion cyst.**



**Figure 2: MRI image of ganglion cyst.**



**Figure 3: MRI image of ganglion cyst.**

After confirming the diagnosis, a multidisciplinary team consisting of orthopaedic surgeons, radiologists, and anaesthesiologists decided to proceed with arthroscopic decompression and debridement as the treatment of choice.

Under spinal anaesthesia, the patient was positioned supine on the operating table, and a tourniquet was applied

to the upper thigh. Arthroscopic portals were established to access the knee joint. The arthroscopic examination revealed a ganglion cyst attached to the ACL (Figure 4 and 5).

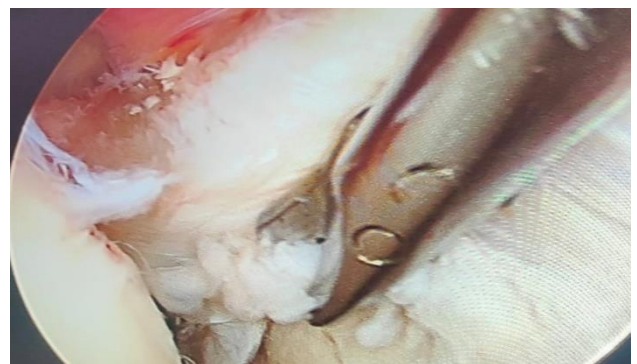
The ganglion cyst was carefully decompressed and debrided while taking special care to preserve the integrity of the ACL during the procedure (Figure 6). The patient underwent a structured rehabilitation program that focused on regaining knee range of motion, strengthening the quadriceps, and improving proprioception under the guidance of a physical therapist. At the six-month follow-up, the patient reported significant improvement in knee pain, stability, and function.



**Figure 4: Arthroscopic image of ganglion cyst.**



**Figure 5: Arthroscopic image of ganglion cyst.**



**Figure 6: Arthroscopic decompression of ganglion cyst.**

## DISCUSSION

Ganglion cysts are cystic structures, which contain a yellow viscous fluid surrounded by a thin capsule.<sup>2,10</sup> They are commonly found around the joints with a particular affinity for the wrist.<sup>2-4,10</sup> 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 infrapatellar fat pad.<sup>3-6,10</sup> Though rare, there is also an association with both the ACL and PCL.<sup>2,3,7,10</sup> Ganglion cyst of cruciate ligaments was first described in 1924 by Caan in a cadaveric specimen. Most of ligament cysts (75.4%) in the knee joint are known to be located in the anterior cruciate ligament.<sup>1,11</sup>

In most cases this is unilateral, although cases of bilateral cruciate ligament cysts, have also been reported.<sup>8-10</sup> In a study of 4153 consecutive patients referred for knee MR imaging, Huang et al found ganglion cysts of the cruciate ligaments in 12 patients (7 in PCL and 5 in ACL).<sup>2</sup> A study by Yongtao Mao et al in 8663 consecutive patients referred for knee MR imaging, 31 patients were found to have ganglion cyst of cruciate ligaments, giving an incidence of 0.36%.

The incidence of patients undergoing surgical intervention for management of this condition was 0.88% with arthroscopic resection of the cysts being performed in 11 patients.<sup>1</sup> In a similar large series on ganglion cysts reported so far, Sarimo et al found nine of 2400 knees demonstrated a cyst associated with a cruciate ligament upon arthroscopic examinations.<sup>1,12</sup> Fifteen cases of ganglion cysts (1.10% of all 1364 arthroscopies) relating to the ACL were reported by Parish in another study.<sup>1,13</sup>

Before the advent of MRI, these anterior cruciate ligament ganglia were identified only at open surgery or arthroscopy. MR imaging is a valuable tool in diagnosing cysts, especially when the patient presents without any specific history of trauma. In MR images, ganglion cysts demonstrate fluid characteristics with low signal intensity on T1-weighted images and increased signal on T2-weighted images. They are well-delineated structures, appearing as lobulated or multilobulated structures, and are easily distinguishable from Baker cysts or menisci cysts on the T2-weighted images. Usually located within or surrounding the cruciate ligament, these structures do not extend to the medial and lateral head of the gastrocnemius or are connected with meniscus.<sup>1</sup>

## CONCLUSION

ACL ganglion cysts are a rare but potentially debilitating entity, and their optimal management remains a subject of debate. Surgical intervention can offer effective relief from symptoms and promote early return to normal activities. Arthroscopic decompression and debridement, as performed in this case, is a minimally invasive approach

that allows for cyst removal while preserving the ACL's structural integrity. Healthcare providers should consider ACL ganglion cysts as a differential diagnosis when evaluating patients with knee pain and instability. This case study highlights the successful management of an ACL ganglion cyst in a 45-year-old female using arthroscopic techniques, emphasizing the importance of a multidisciplinary approach to diagnosis and treatment.

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