

MRI Misinterpretation of a Large Infrapatellar Fat Pad Ganglion of the knee: A Case Report and Literature Review

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Citation

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Abstract

Ganglion cysts of the infrapatellar fat pad (IPFP) in the knee are extremely uncommon and are not associated with meniscal tears. We report the case of an extensive large multiloculated IPFP ganglion cyst invading the meniscus that was associated with a meniscal tear, which to our knowledge is the first of its kind reported. In the case of a 52-year-old gentleman, clinical and radiological evidence led to the impression of a meniscal tear and a parameniscal cyst. Histopathological examination after open surgical excision refuted the suspected diagnosis and confirmed presence of an IPFP cyst. Although magnetic resonance (MR) imaging is the modality of choice, caution is advised to radiologists in differentiating these cystic lesions. We recommend consideration for the use of fat suppressed contrast-enhanced MR imaging for a more accurate diagnosis of cystic lesions of the knee.

INTRODUCTION

The Greek term 'Ganglion' was first coined by Hippocrates as a 'knot of tissue filled with mucoid flesh'. Since the time of Hippocrates first historical description, little was known with regard to the sites of involvement of cystic masses. Until in 1924, Caan first identified a ganglion within the anterior cruciate ligament during a routine autopsy of an elderly man⁽¹⁾. Intra-articular ganglion cysts in the knee are rare with cited reportings tending more often to be found within anterior and posterior cruciate ligaments⁽²⁾. Infrapatellar fat pad ganglion cysts are even more uncommon. To date, there have been very few reported cases of IPFP ganglia^(3,4,5). Ganglion cysts arise from the alar folds covering the IPFP, may be continuous with the joint capsule and have not been previously reported to be associated with meniscal tears⁽⁶⁾. MR imaging is a valuable modality in evaluating pathology within the infrapatellar fat pad of Hoffman⁽⁷⁾. It can be used to differentiate these from the more frequently found and clinically recognised meniscal cysts, which tend to occur within the periphery of the joint margin and are associated with meniscal tears^(6,8). We present a case report of a 52-year-old man with an unusual extensive large multiloculated IPFP ganglion cyst invading the meniscus and was associated with a meniscal tear. A literature review of its aetiology, clinical presentation, radiological features and treatment is described.

CASE REPORT

A 52-year-old gentleman of Hispanic descent presented to the outpatient clinic with a 7-month atraumatic history of worsening non-specific knee pain. On further questioning he denied any associated locking, clicking, grinding or giving way. There was no previous past medical complaints of knee pain. In addition, he denied use of regular medication and no significant family history. On inspection of the left knee, there was an irregular swelling, measuring 4 × 3cm on the anterolateral aspect of the left knee adjacent to the patellar tendon. On palpation, the swelling was smooth and he was exquisitely tender in the lateral joint space. There was no measurable restriction to range of motion, although there was pain on flexion beyond 95 degrees. Perhaps the single most demonstrable finding was McMurray's meniscal test, exacerbating and localising his symptoms laterally. Cruciate and collateral ligamentous tests did not illustrate instability or reproduce his symptoms.

These clinical findings led to a suspected lateral meniscus tear with consequent development of a large parameniscal cyst. The suspected diagnosis prompted further investigation with MR imaging. The MRI scan revealed an extensive multiloculated soft tissue abnormality noted in the knee anterolaterally with an absence of internal stranding. This was incorrectly reported as a parameniscal cyst, as it was seen to arise from the lateral meniscus and associated with a

tear in its anterior third (Figures 1,2 and 3).

Figure 1

Figure 1: T1 weighted image with low signal intensity around the infrapatellar fat pad.



Figure 2

Figure 2: T2 weighted image showing high signal intensity around the patellar tendon.



Figure 3

Figure 3: Multiloculated cystic collection within the infrapatellar fat pad and associated with a lateral meniscus tear on T2 weighted imaging.



During open removal, the surgical examination revealed the swelling had a definite cystic nature, with the bulk of mass intimately related to the IPFP just lateral to the patellar tendon and extending to the lateral meniscus. Samples sent for histopathological evaluation confirmed presence of a multiloculated IPFP ganglion cyst and refuted the radiological diagnosis of a parameniscal cyst. The patient went on to heal uneventfully following surgery with no post-operative complications or recurrence of symptoms.

DISCUSSION

A ganglion cyst is as a viscous mucinous fluid filled lesion that arises in soft tissues around joints and tendon sheaths⁽⁹⁾. Controversy still exists to date over their exact pathogenesis. Theories have proposed ganglions develop as an outpouching from a joint capsule due to their close proximity. In contrast, one theory describes ganglion cysts as new formations from articular tissue secondary to joint irritation. A more widely accepted pathological mechanism is the result of soft tissue irritation or chronic damage leading to connective tissue degeneration and subsequent mucinous fluid production rich in hyaluronic acid from lining cells^(10,11).

The advent of MR imaging and arthroscopy has yielded diagnostic ease, enabling delineation of specific structures involved within the knee joint. Overall, studies have

documented a prevalence of intra-articular cystic masses of the knee as 1.3% detected on MRI and 0.6% through arthroscopy⁽¹²⁾. Krudwig et al⁽²⁾ found during a study of 8000 knees examined arthroscopically over a 15-year period a total of 85 cases with intra-articular cystic masses. The commonest sites of involvement of ganglion cysts in order frequency were the ACL, followed by the PCL and then the menisci. Location of cystic masses in the medial plica and IPFP were comparatively much less frequent.

Rather than any specific symptomatic complaint or pathognomonic sign, clinical manifestations of ganglion cysts are attributable to their size and location of involvement^(13,14). Reported cases of intra-articular ganglia have typically described pain and loss of joint range of motion^(15,16,17) as predominant clinical features. In a study of 6,500 arthroscopic examinations in which 38 intra-articular ganglia were identified, the nature of the participant's pain was often described as an indistinguishable diffuse aching sensation, 15 patients had pain in the medial joint line and only one in the lateral joint line⁽¹⁸⁾. A palpable mass, pain on terminal knee extension or flexion, clicking and locking may also be present denoting the mechanical internal derangement caused by intra-articular ganglia^(5,14,19).

MR imaging is considered as the gold standard modality for detecting ganglion cysts in the knee as it is non-invasive, effective and confers particular ability in evaluating the presence of associated intra-articular disease⁽²⁰⁾. MR imaging of ganglion cysts illustrate the gelatinous fluid characteristic of the lesion as homogeneously low signal intensity relative to muscle on T1 - weighted images and high signal intensity on T2 - weighted images⁽⁷⁾. Ganglion cyst appearance on MR imaging is variable, ranging from round or fusiform in shape, uni- or multi-lobulated in structure that may contain well-defined internal septations^(13,21,22).

In our case, the IPFP ganglion was misinterpreted as a parameniscal cyst on diagnostic MR imaging. In one highly cited study by Burk et al⁽⁶⁾, MR features of meniscal and ganglion cysts were reviewed to differentiate these lesions based on their appearances. Sixteen cystic lesions of the knee were evaluated that included 11 meniscal cysts and 5 ganglion cysts. Burk et al concluded that MR can distinguish between these cystic lesions, as meniscal cysts are located in the medial or lateral joint line and have the associated presence of a meniscal tear. The authors described that ganglion cysts may or may not be continuous with the joint

capsule and are not associated with meniscal tears.

However, our surgically and pathologically confirmed case of an IPFP ganglion cyst, was in contrast, associated with a meniscal tear but intimately related to the infrapatellar fat pad. Although standard MR is the imaging modality of choice in evaluating cystic masses in the knee because of its soft tissue contrast capability, we agree with Kim et al⁽²¹⁾ who advocate fat suppressed contrast-enhanced MR could be a more valuable alternative in diagnosing intra-articular ganglion cysts in the IPFP.

CONCLUSION

In conclusion, intra-articular ganglia are uncommon and tend more often to manifest within cruciate ligaments and menisci. Clinical features of ganglion cysts correlate with size and location of the lesions. Patients with these IPFP ganglionic cystic may describe indistinguishable pain, clicking and locking. A palpable mass and limitation of movement may be found on examination. MR imaging is the current preferred modality in evaluating these lesions, however, caution is advised to radiologists interpreting intra-articular ganglia found with associated meniscal tears as parameniscal cysts. Fat suppressed contrast-enhanced MR may be more useful in identifying infrapatellar fat pad ganglia, avoiding misinterpretation and potential unnecessary surgery.

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