CASE REPORT

Ultrasound-guided aspiration and steroid injection of a posterior cruciate ligament ganglion cyst: report of a case

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Abstract Ganglion cysts are benign masses that originate from mucinous degeneration of the connective tissues and are quite rare when arising from the knee joint. Symptoms are often represented by pain, joint tenderness, effusion and occasional swelling with a palpable mass in the popliteal region of the knee. Percutaneous aspiration followed by a corticosteroid injection of a ganglion cyst has either a diagnostic or therapeutic meaning and its guidance through ultrasound allows the operator to make more accurate the procedure, ensuring the correct placement of the needle inside the lesion. We report our experience in the treatment of a voluminous ganglion cyst of the posterior cruciate ligament performed through the ultrasound guidance in a symptomatic young patient.

Keywords Ultrasound guidance · Ganglion cyst · Posterior cruciate ligament · Steroid injection · Knee pain

Abstract Le cisti gangliari sono formazioni benigne che derivano dalla degenerazione mucinosa del tessuto connettivo ed il loro sviluppo all'interno della cavità articolare del ginocchio è relativamente rara. Esse si manifestano con dolore, versamento articolare, nonché occasionalmente con gonfiore e sottoforma di una massa palpabile a livello della regione poplitea. La loro aspirazione percutanea,

eventualmente seguita da un'iniezione di corticosteroide, ha una valenza sia diagnostica che terapeutica e l'ausilio della guida ecografica permette all'operatore di rendere la procedura la più accurata possibile, assicurando il corretto posizionamento dell'ago all'interno della lesione. Vogliamo riportare la nostra esperienza nel trattamento percutaneo tramite guida ecografica di una voluminosa cisti gangliare del legamento crociato posteriore in una giovane paziente sintomatica.

Introduction

Ganglion cysts are benign common “tumor-like” fluid lesions growing out from mucinous involution of collagenous structures [1, 2]; they could arise from different locations, such as joint capsules, muscles, tendons and tendon sheaths [1].

They often originate from articular joints of the wrist, whereas they are relatively rare within the knee joint [3]. When symptomatic, ganglion cyst of the knee revealed themselves with pain, effusion, joint tenderness and limited knee flexion and extension [2].

Magnetic resonance imaging (MRI) is up to now considered the main technique in detecting and localizing the ganglion cyst before therapeutic approach [1], still represented by open surgery or arthroscopic excision [3].

Recently, ultrasound examination revealed its usefulness in identifying these lesions around the knee [1, 4] showing above all the great advantage in providing an alternative non-operative method of treating these lesions [5], consisting its application through a real-time guidance for percutaneous needle aspiration, eventually followed by a corticosteroid injection to prevent further inflammation [1, 6].

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Fig. 1 Sagittal STIR—(a) and T1-weighted (b) images showing a large cystic structure arising from the posterior aspect of an intact posterior cruciate ligament's sheath

Fig. 2 Axial T2—(a) and proton density-weighted (b) images demonstrate the cyst inside the intercondylar notch, mildly compressing the posterior capsular structures and muscles of the knee. An isointense signal on the proton density (PD)-weighted images is typically according to a ganglion cyst

We present a case of a voluminous ganglion cyst of the posterior cruciate ligament successfully treated by aspiration and corticosteroid injection with a real-time ultrasound guidance.

Case report

A 33-year-old woman came to our department referring an intense pain in the posterior aspect of the knee, which arose several months before, increased with physical activity and combined with swelling of the popliteal region; an occasional locking was also described; no history of recent or previous trauma was reported in anamnesis.

High tenderness on palpation of the popliteal region was revealed at the physical examination.

A knee MRI was then performed on the suspect of a possible intra-articular ganglion cyst: Multi-planar images (axial, sagittal, coronal) with the proton density (PD)-weighted, T2-weighted, T1-weighted and STIR sequences with a low-field dedicated extremity scanner (Esaote[®],

Italy) were obtained, showing a large, oval-shape 33×20 mm cystic structure arising from the posterior aspect of the posterior cruciate ligament sheath, toward the intercondylar notch (Fig. 1). It showed an intermediate signal on PD sequences and homogeneous hypersignal on T2w and STIR images, with a fine and incomplete inner septation, according to a ganglion cystic lesion (Fig. 2).

Neither intra-articular free synovial effusion nor any other capsular or ligamentous disorder was detected.

A written consent from the patient was obtained and an ultrasound-guided aspiration followed by corticosteroid injection of the cyst was finally planned: Preliminary local anesthesia with 1.5 ml of mepivacaine in a sterile technique, with the patient in prone position, was performed; a 20 G spinal needle was then inserted directly into the cyst through a real-time ultrasound guidance (Figs. 3, 4).

Ganglion cyst was hence aspirated, revealing 4 ml of a mucinous dense fluid; a 1.5-ml prefilled corticosteroid syringe was then injected into the cyst with the needle still inside the collapsed cystic walls.

Fig. 3 Long-axis gray scale scan of popliteal region of the knee shows a well-defined, hypoechoic, moderate expansile lesion (*asterisks*) inside the intercondylar notch

Fig. 4 Long-axis scan showing the right placement of a 20 G spinal needle (*arrows*) inside the cyst (*asterisks*) through the real-time ultrasound guidance and with the application of the color-Doppler

The patient immediately experienced a complete pain relief at the end of the procedure, without any worsening after a 6-month follow-up period.

Discussion

Intra-articular ganglion cysts of the knee joint are rare and they can be recognized with MRI in about 1.3 % of the patients and approximately in 0.6 % during a knee arthroscopy [3, 7].

They are supposed to grow as a benign “tumor-like” masses developed by mucinous degeneration of the connective tissue [3, 8] and their symptoms are represented by knee pain that might increase with physical activity, especially during the downhill walking [1], mechanical locking and occasional swelling in popliteal region with a palpable mass [7].

Homogeneous hyperintense signal on T2w and STIR sequences at MRI clearly show their fluid content and, when associated with ACL, allow to make a differential diagnosis with partial tears of the ligament [9].

Arthroscopic resection is still considered the mainstay of ganglion cysts treatment [3, 10], even if it is an expensive procedure that required patient’s hospitalization and that might seldom lead to severe complications, also including popliteal artery or ligamentous injuries [3, 11].

Ultrasound-guided percutaneous aspiration of the cyst is a recent, new technique that offers the great advantage to yield an easily, quicker and non-operative approach in treating these kinds of lesions [5], because it ensures the radiologist that the ganglion cyst will be definitely treated, when the needle is accurately placed inside the cyst through the real-time ultrasound guidance.

New high-frequency probes and the power-Doppler real-time application during the procedure are able to detect even small vascular and nervous structures that can thus be avoided by the needle during its course toward the cyst and its further decompression [3, 5].

We employed a 20 G spinal needle considering the size and high viscosity of its content, which otherwise make aspiration difficult, but other authors performed the same procedure also with a larger caliber of the needle [3].

In addition, a successive corticosteroid injection inside the cyst can definitely lead to pain relief and an improvement of symptoms for the anti-inflammatory property of steroids, finally decreasing the probabilities of its recurrence: Once again, the role of ultrasound guidance to guarantee the intra-lesion injection of the drug is therefore essential, to also prevent any kind of complication that might be related with soft tissues infiltration [3, 6].

In conclusion, we successfully demonstrated that percutaneous aspiration followed by a corticosteroid injection is an easy, quick and low-risk procedure that could totally replace surgery in the treatment of a knee ganglion cyst, when performed through ultrasound real-time guidance as a mandatory application to avoid any nearby neurovascular structures throughout the needle’s trajectory, ensuring instead its correct placement inside the lesion.

Conflict of interest Giuseppe Maria Vilella, Pietro Guerrisi, Giulia Lucignani, Gaia Pasquali, Francesco Maria Drudi declare that they have no conflict of interest.

Human and animal studies The study was conducted in accordance with all institutional and national guidelines for the care and use of laboratory animals.

Informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). All patients provided written informed consent to enrollment in the study and to the inclusion in this article of information that could potentially lead to their identification.

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