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Ways to improve the results of surgical treatment of Baker's cysts

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Abstract: The cyst in the popliteal bursa, also known as Baker's cyst or popliteal cyst, is a common circumstance during adolescent life period. It might be asymptomatic, as long as symptoms appear those may involve swelling, pain or discomfort, knee stiffness as well. Modern approach with the help of arthroscope gives decent results than open surgery (recurrences, contractures, late wound healing). This case report is a description of the arthroscopic treatment of Baker's cysts and will be an actual blueprint to perform productive way of treatment of popliteal cysts.

Keywords: hiperproduction-excessive or extreme **patellofemoral -** related to knee and thigh **intra articular-** into a joint **synovectomy -** removal of the synovium **nosology -** classification of diseases

Introduction

In 1877 Baker described a cyst located in the popliteal fossa. This is a soft dense elastic tumor-like formation, which is located on the back surface of the knee joint, i.e. in the popliteal fossa.

The reasons for the formation of Baker's cyst are associated with inflammation of the capsule of the knee joint, which causes hyperproduction of synovial fluid. It is accumulated mainly in the volvulus of the capsule of the knee joint, which is located at the back; this location of the Baker cyst is due to the structural features of the knee capsule and its biomechanics. When bending the knee joint, the fluid moves posteriorly by the means of its mechanical "squeezing", it is often difficult to determine the real cause of the cyst based on the patient's survey. The patient simply does not indicate any injury or anything else. The cyst develops as a result of inflammation of the joint capsule. Inflammation is accompanied by increased production of synovial fluid which prevails over its absorption.Stretching of the inflamed capsule of the knee joint is the cause of the pain. The main factors in the formation of a cyst are the presence of an anastomosis between the joint cavity and the sack of the popliteal area, synovial folds that determine the unidirectional flow of synovial fluid from the joint cavity into the sack of the popliteal fossa, high pressure of the articular fluid in the joint cavity. (9) (Surgery in Uzbekistan No. 4, 2018).

Until today, the question remains open regarding tactics and methods of treatment (7).Conservative puncture techniques, with all their advantages over surgical intervention, unfortunately, often lead to a relapse of the disease. This type of therapy is used for therapeutic purposes in cases where it is not possible to perform an operation, and for differential diagnosis (taking the contents for research).After conservative treatment, relapses occur in 30-51.5% of cases [3, 8]. This method is not always effective, supplemented by the subsequent administration of cyclophosphamide or glucocorticoid medications.

N.B. Filatova reports that relapses of the disease after a puncture medication method occur in 7.6% of cases. [5].

The first reports of open extirpation of Baker's cyst appeared in the second half of the 20th century. [6, 10]. But the technique was not widely used, since the thin membranes of the cyst, the presence of adhesions with the surrounding tissues and the proximity of a large neurovascular bundle made it difficult to completely isolate the formation. In a series of studies [12], a recurrent cyst was found in 63% of 40 patients operated on in this way.

The authors explained this, first of all, by the difficulties of forming an adequate suture of the capsule opening in the area of the anastomosis. Lack of complete tightness allows excess intra-articular fluid to re-stimulate cyst formation.

The use of arthroscopic instrumentation has expanded the indications for closed endoscopic methods of interventions on the knee joint. In later works [11], the surgical treatment of Baker's cyst was described, including not only arthroscopic diagnosis and manipulation of damaged intra-articular structures, but also treatment of the cyst cavity using the posterior medial approach to the anastomosis. The authors did not perform extirpation of the cyst and closure of the capsule defect in the posterior part of the knee joint, considering this stage optional. Modern minimally invasive methods of popliteal cyst surgery require high quality debridement. It is believed that it eliminates the cause of chronic exudative inflammation, which in turn leads to an increase in intra-articular pressure and the formation of a protrusion of the synovium into the posterior part of the knee joint through a complete rupture of the posterior horn of the medial meniscus [13].

MRI is the most reliable method in the diagnosis of Baker's cyst. MRI not only determines the presence of a Baker cyst, but also determines the size of its wall, consistency, destructive changes and pathology of the knee joint.

Material and methods

The present study is based on the results of endoscopic treatment of 96 patients with Baker's cyst in the sports injury department of the Republican Specialized Scientific and Practical Medical Center of Traumatology and Orthopedics 2005-2018.The age of the patients ranged from 23 to 67 years. 59 of them are female patients, 37 are male patients. All patients underwent arthroscopy. These patients were distributed by etiology as follows: inflammatory process - 55 (60.4%) patients, trauma - 24 (25%), idiopathic - 17 (17.7%). In 46 patients (26 males and 20 females), a rupture of the posterior horn of the medial meniscus was determined. In 50 patients (20 males and 30 females), degenerative changes in the menisci and meniscosis, together with Baker's cysts of the knee joint, were determined.

In this work, the following research methods were used: clinical, ultrasound and MRI of the knee joint, artoscopic. All patients underwent arthroscopic diagnostics and debridement of the knee joint and Baker's cyst.

Surgical techniques

Under spinal or general anesthesia, the patient in the supine position through the anterolateral arthroscopic access of the knee joint is introduced an arthroscope, while the anteromedial access is used to introduce arthroscopic instrumentation into the joint (probe, various nippers, arthroscopic scissors, shavers, and coagulator).

Using special instruments, the posterior horn of the medial meniscus is obliquely resected from 1/3 of the body to the root of the posterior horn.

A synovectomy is performed between the tendons of the inner head of the gastrocnemius and semimembranous muscles. Often, during synovectomy, the cyst capsule is perforated, and the contents enter the joint cavity through the hole formed, the arthroscope is inserted into the cyst cavity.

Then a shaver is inserted through the posteromedial access into the cyst cavity. Synovectomy of the cyst is performed under control through an arthroscope. Additionally, lavage of the knee joint is performed. An arthroscope is inserted through the anterolateral approach of the knee joint, while the anteromedial approach is used to introduce arthroscopic instrumentation into the joint. Everything is controlled by a video monitor with constant video recording of the operation progress.

In most cases, it is impossible to identify the communication between the cavities without partial synovectomy.

Example 1. Patient V. A., born in 1986. Complaints upon admission: pain and deformity in the right knee joint, edema, lameness, sudden onset of pain in the knee joint. From the anamnesis: according to the patient, the right knee joint has been bothering her for 3 years, she received a knee joint injury several times. She was treated conservatively, but unsuccessfully. She was last treated 3 weeks before admission. Hospitalized in the department for surgical treatment. MPT signs of osteoarthritis (grade 2) of the right knee joint. Degeneration of the body and posterior horn of the medial meniscus (grade II according to Stoller). Synovitis. Suprapatellar bursitis. Popliteal fossa cyst (Baker's cyst). Patellofemoral arthrosis (Fig. 1).

Surgical technique. Under spinal anesthesia in the supine position of the patient, the right lower limb was repeatedly treated with an antiseptic. An arthroscope was introduced by anteromedial and anterolateral ports. The joint is filled with 0.9% saline.

A radial rupture was noted in the region of the root of the posterior horn of the medial meniscus. With the help of arthroscopic instruments, Hoff's body was partially removed. The joint was decompressed by synovectomy of hypertrophied synovial membranes. The damaged part of the meniscus was partially resected.

The inner leaf of Baker's cyst was decompressed by perforation; the contents of the cyst were evacuated into the joint cavity (Fig. 2).

Example 2. Patient D. A., born in 1963. Complaints upon admission: pain in the left knee joint and popliteal area; lesion in popliteal area, limitation of movement.

MRI findings (October 21, 2016): signs of moderate osteoarthritis of the left knee joint with degenerative changes in both menisci. Popliteal fossa cyst (Fig. 3).

Surgical technique. Under spinal anesthesia in the supine position of the patient, the left lower limb was repeatedly treated with iodine and alcohol. An arthroscope was introduced by anteromedial and anterolateral ports. The joint was filled with 0.9% saline. Diagnostic arthroscopy of the left knee joint was performed, partial meniscectomy of the medial meniscus and joint removal were performed.

Then Baker's cyst was decompressed, subchondral tunnelization of the inner femoral condyle was performed (Fig. 4). The joint is flushed multiple times with saline. Iodine, alcohol, aseptic bandage.

On the first day, patients underwent puncture of the knee joint with intra-articular injection of 25 mg of hydrocortisone. On the 3rd day after the operation, the patients were discharged for outpatient treatment.

The immediate results of treatment were studied within 3 to 6 months. Resorption of Baker's cyst, pain relief, and moderate synovitis has been attributed to a positive clinical result.

Results and its discussion

Arthroscopic removal of Baker's cyst is considered a minimally invasive method of treatment for this pathology of the knee joint. Arthroscopy of Baker's cyst allows revealing intra-articular lesions of cartilage, menisci, synovium, and damage to the ligamentous apparatus. To determine the communication between the cyst and the joint cavity, the posteromedial or posterolateral volvulus is examined. Before arthroscopy, the outline of the cyst on the skin should be noted. The release of a jelly-like mass into the joint cavity indicates its communication with the cyst cavity. Folds of the posteromedial volvulus may mask the orifice of the cyst.

To facilitate visualization of this area, a needle can be inserted into the posteromedial volvulus. In patients in whom the clinical manifestations of pain were expressed, significant hypertrophy of the synovial membrane of the knee joint was noted. According to nosology, the patients were divided as follows: in 65 patients, Baker's cyst was diagnosed in combination with damage to the menisci, in 8 with hypertrophy of the Hoff's fat body, in 23 with synovitis of the knee joint.

The leading place in the complex of functional therapy after arthroscopy of the knee joint is given to remedial gymnastics. The goal of exercise therapy is to protect the knee joint from overstrain, accelerate the healing of soft tissues, restore the range of motion in the joint and restore full muscle strength.

The average time for patients to return to their previous activities after surgery was, on average, 2 months, taking into account the period of rehabilitation, which included intra-articular injections of anti-inflammatory medications.

The effectiveness of arthroscopic treatment was evaluated clinically from 8 weeks to 6 months after surgery. Positive clinical outcome included no complaints, negative symptoms, and return to daily life.

Findings

To diagnose Baker's cyst of the knee, a clinical examination with MRI diagnostics is necessary.

The minimally invasive method of treating patients with a popliteal cyst is low-traumatic and highly effective.

Arthroscopic treatment of patients with Baker's cyst of the knee joint allows to restore the function of the affected joint in the optimal time, return patients to their usual activities and improve the quality of life when compared with traditional surgical treatment.

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