

**Knee arthroplasty in patient with a giant medial meniscal cyst: case report****I.M. Piven<sup>1</sup>, S.V. Elfimov<sup>1</sup>, M.S. Lykov<sup>1,2</sup>, I.A. Pelevin<sup>1,2</sup>**<sup>1</sup>SBHI SR Centre for Specialized Types of Medical Care Ural Chaklin Research Institute of Traumatology and Orthopaedics, Ekaterinburg, Russia<sup>2</sup>SBEI HPE Ural State Medical University of the RF Ministry of Health, Ekaterinburg, Russia

Giant meniscal cysts are quite rare. Clinical manifestations of the medial meniscal cyst are frequently either asymptomatic or with a mild pain. The most reliable diagnostic method is magnetic resonance imaging (MRI) or computed tomography (CT). Single cases of observation and surgical treatment of giant cysts were reported in the literature. Long course of the disease leads to degenerative changes in the knee and development of osteoarthritis. The article presents an outcome of successful treatment of a patient with grade III knee osteoarthritis and a giant medial meniscal cyst. The formation gradually grew in the knee area for 9 years. The dimension of the cyst was over 11 cm in diameter. The surgical treatment which included the excision of the meniscal cyst followed by knee arthroplasty provided a good clinical result.

Keywords: knee joint, meniscus, cyst, knee osteoarthritis, knee arthroplasty

## INTRODUCTION

Medial meniscus cysts are frequently asymptomatic and are found incidentally by magnetic resonance imaging (MRI) or computed tomography (CT) examination performed for other types of articular pathology. Their incidence ranges between 4 and 5 % [1]. In 66 % of cases, they are located in the medial compartment. The average diameter of the formations varies from 0.3 to 9 mm [2]. Giant cysts are very rare. In the literature, only several cases were described with the maximum diameter size of the cysts of 5 cm to 10 cm [1]. Patients find the cysts themselves in the lateral part of the knee joint because of the smaller soft tissues thickness as compared with the medial compartment. Therefore, the medial cysts are generally larger in size [3].

In 98 % of cases, medial cysts are associated

with a horizontal rupture of the meniscus. The lesion passes to the capsule of the joint. It results in the passage of the synovial fluid between the medial collateral ligament and the tendon of the semimembranous muscle. After the fluid is out of the joint, the valve mechanism is triggered and leads to its accumulation outside the joint and gradual growth of the cyst [4]. Massive osteophytes of the medial department can mask the cyst if knee osteoarthritis is pronounced [3].

Single cases of surgical giant cyst treatment were described in the literature. In one case, a giant meniscal cyst (10 cm in diameter) was accompanied by gonarthrosis. In this case, the excision of the cyst was carried out along with total knee arthroplasty at one stage [2].

## MATERIAL AND METHODS

We present a one-stage management of a medial meniscus giant cyst resection followed by knee arthroplasty.

Patient I., born in 1969, was admitted for treatment to orthopedic department No. 1 of the *Chaklin Research Institute of Traumatology and Orthopaedics* on 11.03.2015 with the diagnosis: bilateral gonarthrosis of grade III on the right side and grad II on the left one, varus deformity at the

level of the right knee joint, and giant cyst of the medial right knee meniscus. Upon admission, the patient complained of lameness, pain in the right knee joint which increased after the load, and also on a large size formation along the medial surface of the right knee joint. About 25 years ago, the patient received a blow to the medial surface of the right knee while playing football after which pain and swelling appeared in this place. Con-

servative treatment of the medial meniscus injury was undertaken. Since 2006, the patient noted the growth of a tumor-like formation along the medial surface of the knee joint. The patient was examined at his residence hospital and diagnosed with gonarthrosis of grade 2-3 on the right side.

In 2008, arthroscopy of the right knee joint was performed at the Kurgan centre for traumatology and orthopedics. The size of the tumor-like formation was small at that time. A moderate growth of the cyst was observed in the period from 2008 to 2011. In 2011, the patient returned to the *Chaklin Research Institute of Traumatology and Orthopaedics* with complaints of pain that aggravated after prolonged exercise and deformity at the level of the right knee joint. The right knee joint was examined and a painless, immobile formation, dense to the touch, measuring 120x100 mm with unchanged skin over the formation was detected.

Diagnosis was established with clinical and radiographic findings: bilateral gonarthrosis (right side of grade III and left side of grade II) and varus deformity at the level of the right knee joint. According to the MRI, there were cicatricial changes in the medial collateral ligament. Medial meniscus was damaged and prolapsed under the medial part of the thickened collateral ligament. The formation on the right anterior part of the right knee joint was large. According to the patient, a significant increase in its size occurred in the last 2 years. Varus deformity at the level of the

right knee joint was 10°. On the medial surface of the right knee joint, a round tumor-like formation with a diameter of about 120 mm was detected that passed to the anterior surface. The skin over the formation was not changed. The symptom of fluctuation was determined. The patella was laterally displaced and little active (**Fig. 1**).

There was pain and crepitation in the joint when patient ambulated. Range of the right knee motion was 100° flexion and 0° extension.

X-rays were taken (**Fig. 2**); ultrasound (US) and CT of the right knee joint were performed (**Fig. 3**).

The giant cyst of the medial meniscus measured 110 × 60 × 100 mm, the joint gap was narrow up to contact. There was sclerosis of the adjacent articular surfaces, marginal osteophytes, and chondromatosis.

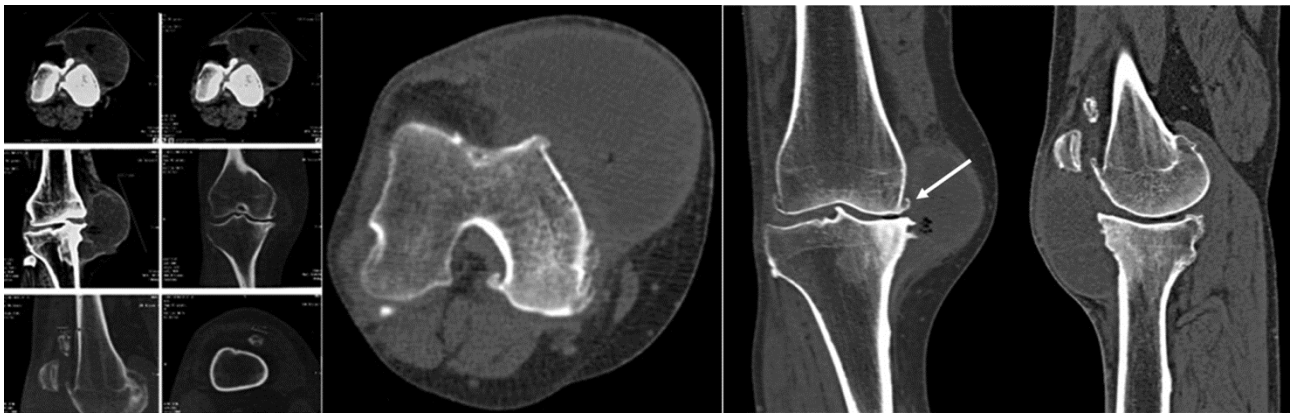
Taking into account all clinical manifestations and radiographic findings, the patient underwent simultaneous removal of the cyst and right knee arthroplasty with the cemented implant *Mathys BalanSys* on 11.03.2015. Macroscopically, the formation was a round, dense elastic tissue along the medial surface of the knee joint measuring 110 × 100 mm. It was excised along with a dense capsule. Its incised cross-section was filled with gelatinous yellow contents. The mouth through which the cyst communicated with the damaged meniscus and the cavity of the knee joint was clearly seen (**Fig. 4**).



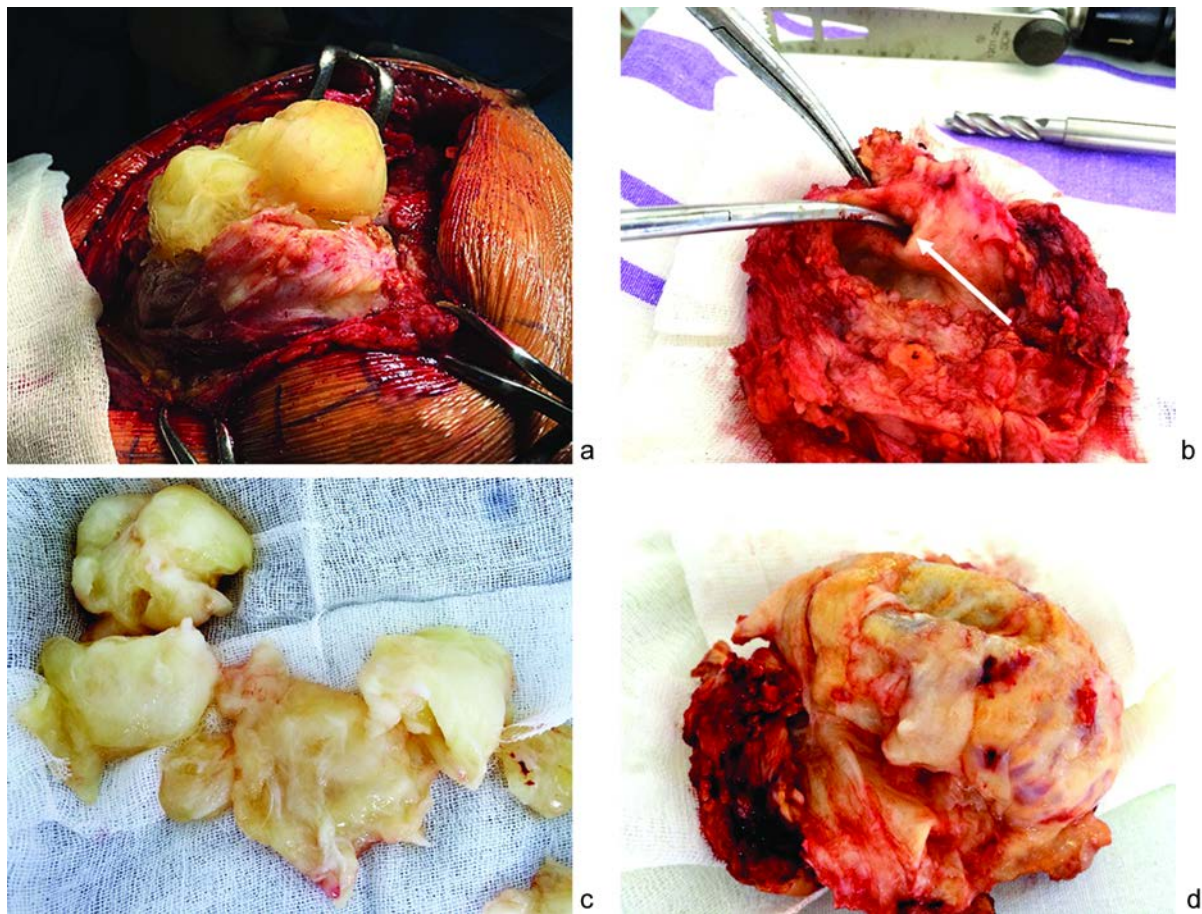
**Fig. 1** Appearance of the patient at admission: a) standing on both legs, b) front view of the right knee joint



**Fig. 2** Preoperative radiographs of the right knee joint: a) AP view; b) lateral view; c) axial radiograph of the lower limbs (full leg – full spine)



**Fig. 3** Preoperative CT of the right knee joint. A giant meniscus cyst (indicated by an arrow) communicates with the joint cavity



**Fig. 4** Appearance of the giant cyst with its contents: a) contents of the cyst; b) the mouth of the cyst is indicated by an arrow; c) contents of the cyst, d) crosssection cyst view

Histological study revealed that the capsule of the formation was a fibrous connective tissue with foci of basophilia, lymphoid infiltrates with an adjacent mucous component without an

epithelial lining among which there were cell areas with a foamy cytoplasm, a hyperchromic large nucleus, macrophages, productive vasculitis, sclerosis.

#### RESULTS AND DISCUSSION

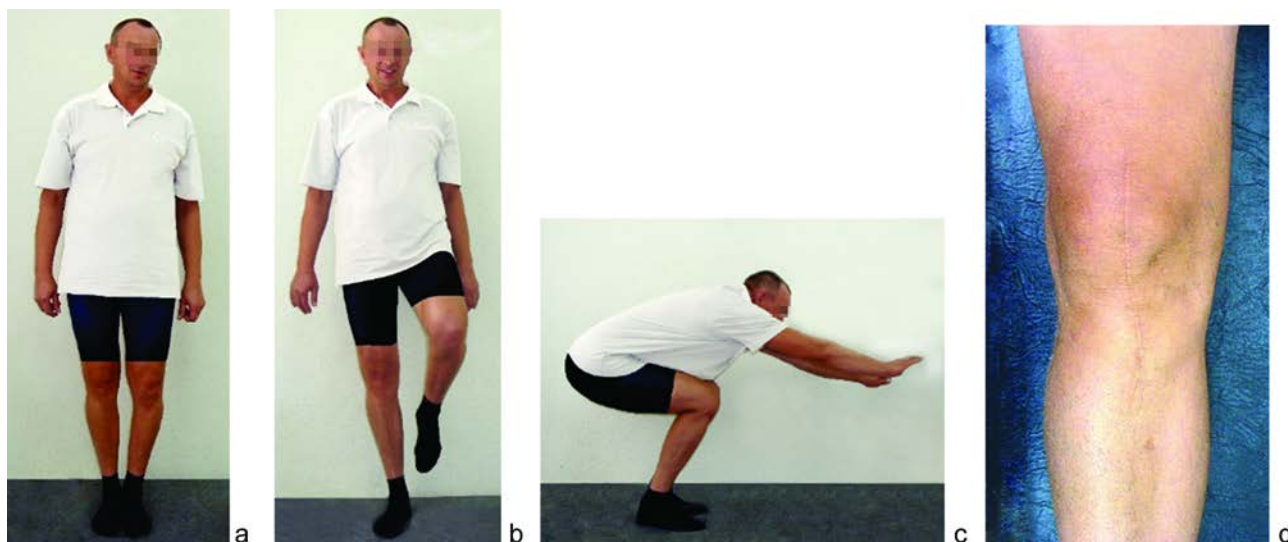
Postoperative management of the patient was carried out in accordance with the standard protocol for the rehabilitation of patients after knee arthroplasty.

From the first day after the operation, walking and continuous passive motion (CPM) was allowed. In the early postoperative period, synovitis was ob-



served and for which the knee joint punctures were performed. Anti-inflammatory therapy had a positive effect. Healing occurred by first intention. The range of motion at discharge was 100° flexion and 0° extension. A follow-up was checked 6 months after the operation (**Fig. 5**).

The patient does not present any complaints, moves without additional support, and works on his specialty. Right knee joint flexion is 110°, extension is 0°. Follow-up radiographs show a restored biomechanical axis of the right lower limb (**Fig. 6**). KSS score was assessed as good (84 points).



**Fig. 5** Functional result after 6 months: a) patient bearing weight on both legs; b) on the right leg; c) squatting; d) frontal view of the right knee joint



**Fig. 6** Radiographs after right knee joint arthroplasty: a) AP view; b) lateral view; c) axial radiograph of the lower limbs (full leg – full spine)

## CONCLUSIONS

Giant cysts of the meniscus is a rare disease, frequently accompanied by meniscus damage. Its development is facilitated by the rupture of the joint capsule, leading to the communication of the joint cavity with the pararticular space. To date, the most reliable methods of diagnosis are MRI and CT that inform on the cyst size and location, as well as on concomitant intra-articular pathology

[5]. All this against a background of meniscus damage causes degenerative changes in bone tissue and leads to the development of deforming arthrosis. This clinical case is its confirmation and demonstrates the need for diagnosis at an early stage in the outpatient setting. The optimal surgical tactics in this case is a one-stage excision of the cyst and knee joint arthroplasty.

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