

Arthroscopic Excision of Tendinous Giant Cell Tumors Causing Locking in the Knee Joint

Artroskopická extirpace tendinózních obrovskobuněčných nádorů působících kolenní blokády

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ABSTRACT

PURPOSE OF THE STUDY

Non-osseous giant cell tumors are locally aggressive tumors arising around joints. They are commonly located around synovial joints such as wrist and knee and occasionally cause mechanical symptoms.

MATERIAL AND METHODS

This retrospective case series includes 7 patients operated due to intraarticular lesion. The mean age of the patients was 28.7 (range 22–37) years. Mean follow-up period was 12 months.

RESULTS

All patients underwent arthroscopic debridement. They were followed monthly with clinical examination and magnetic resonance imaging (MRI) was obtained at third month for all patients. Patients were contacted through phone call and evaluated with the WOMAC score retrospectively. No recurrence was detected in any patient.

CONCLUSIONS

Arthroscopic debridement is a safe surgical technique that may replace open surgery in the treatment of intraarticular tendinous giant cell tumors.

Key words: tendinous giant cell tumor, arthroscopy, knee locking.

INTRODUCTION

Space occupying lesions of knee joint may cause symptoms such as locking or blocking (13, 16, 20, 23, 24, 25). Physical examination reveals sense of blocking, a popping sound during joint movement; and patients typically can't fully extend their knee. The major causes locking in the knee joint include anterior cruciate ligament (ACL) tear, bucket handle meniscus tear, and intraarticular foreign or loose bodies (3, 4, 15, 18). Rarely, the first symptoms of space occupying lesions of knee may also be blocking or locking. Intraarticular tumors include ganglia, lipoma arborescens, synovial hemangioma, and synovial chondromatosis (7, 9, 11, 22, 24, 26).

Non-osseous giant cell tumors usually originate from periarticular soft tissue (Fig. 1). In 2002, the World Health Organization (WHO) classified giant cell musculoskeletal tumors on the basis of their site of origin. Tumors originated from tendon sheath are termed as localized giant cell tendon tumors, and the ones of synovial origin that usually show diffuse localization are referred to as pigmented villonodular synovitis (8).

In diffuse PVNS, radiotherapy is routinely used for disease remission after arthroscopic debulking. Its cure rate is lower than that of the localized form, which is

rare and can be cured mostly by arthroscopic surgery (5, 17).

In the present study, we aimed to investigate the outcomes of arthroscopic surgery in localized giant cell tumors causing knee joint locking.

MATERIAL AND METHODS

This retrospective study includes 7 patients underwent arthroscopic debridement for intraarticular giant cell tumor of tendinous origin (Figs. 2–4). Five patients



Fig. 1. Morphologic display of a excision material.



Fig. 2. A mass image seen T2 MRI both coronal, sagittal and axial views.

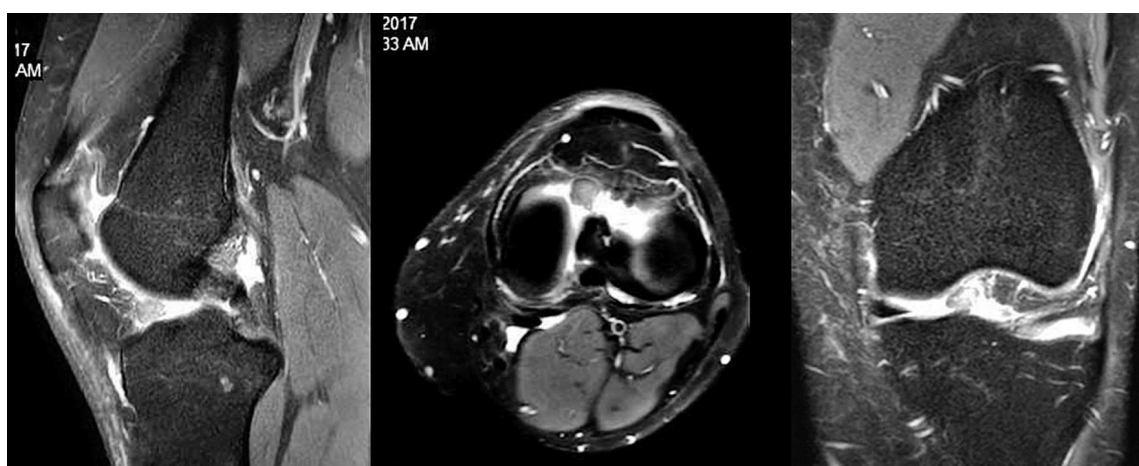


Fig. 3. 2 cm diameter mass located ahead of anterior cruciate ligament.

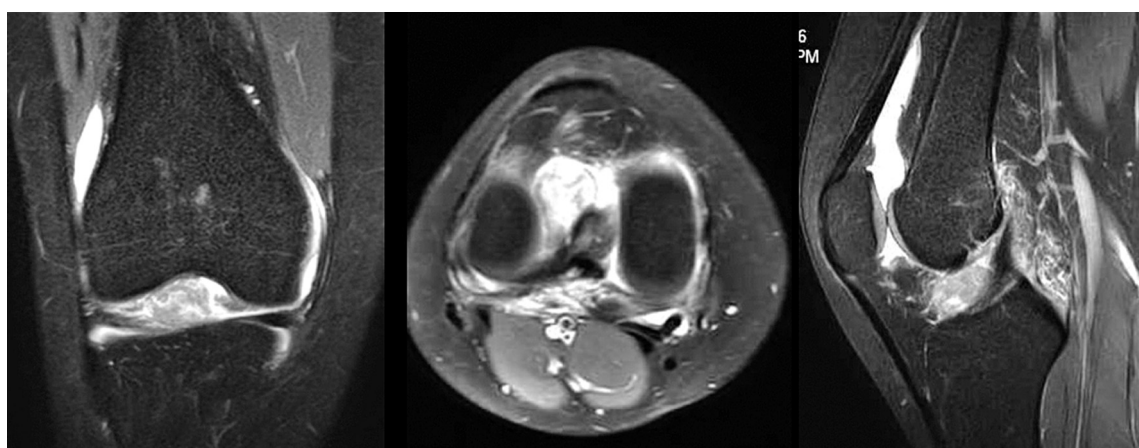


Fig. 4. Another giant cell tumor located behind patella seen all MRI views.

were female and two were male (Table 1). Initially, all patients had sense of blocking or locking in the knee joint. Three patients had accompanying pain, while 4 patients didn't have. The diagnosis of giant cell tumor was confirmed with biopsy before surgery for all patients. (Figs. 5–7). All operations were performed by one senior surgeon (AMB).

Exclusion criteria included: open surgery, patients with missing MRI images before or after the operation, and pathological diagnosis other than a giant cell tendinous tumor. Preoperative data, images, and surgical photos of four patients were retrospectively screened and recorded.

Table 1. General characteristics of the participants

| | Age | Sex | Tumor | Localization size (cm) | Origin from | Follow up time (months) | WOMAC score |
|-----------|------|-----|---------|------------------------|------------------------|-------------------------|-------------|
| Patient 1 | 22 | F | 2.2*3 | Suprapatellar | Quadriceps tendon | 12 | 98.4 |
| Patient 2 | 25 | F | 3*2.4 | Lateral gutter | Lateral retinakulum | 14 | 96.8 |
| Patient 3 | 32 | F | 1*1.3 | Around ACL | Anterior cruciate lig. | 13 | 94.4 |
| Patient 4 | 30 | F | 2*2 | Suprapatellar | Unknown | 12 | 96 |
| Patient 5 | 37 | M | 3.4*3 | Patellar tendon | Patellar tendon | 9 | 91.1 |
| Patient 6 | 31 | F | 2.9*3 | Around ACL | Anterior cruciate lig. | 10 | 96 |
| Patient 7 | 24 | M | 1*1.4 | Around ACL | Anterior cruciate lig. | 11 | 95.2 |
| Mean | 28.7 | | 2.2*2.3 | | | 11.5 | 95.41 |

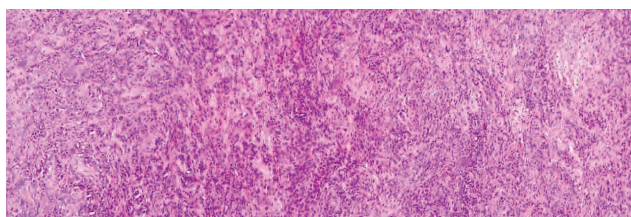


Fig. 5. HEx40 tumor consisting of monotone cells with diffuse growth pattern. Right upper corner shows focal histiocytic response.

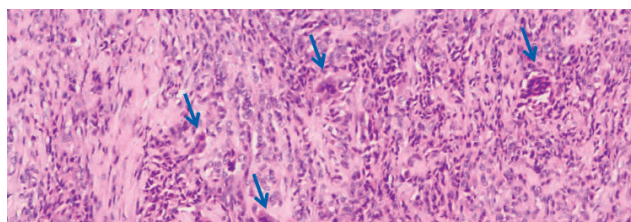


Fig. 6. HEx100. multinucleated giant cells accompanying mononuclear cells.

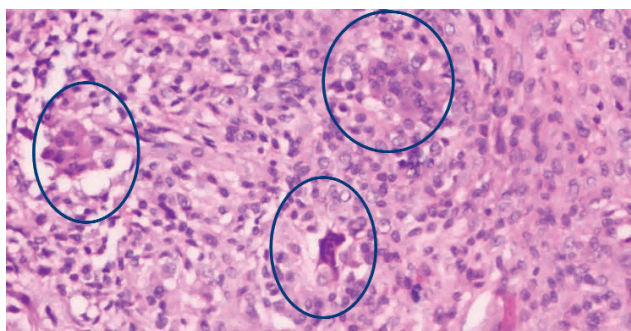


Fig. 7. HEx200. Mononuclear, non atypical cells and accompanying multinucleated giant cells.

RESULTS

The mean age of patients was 28.7 (22–37) years. (Table 1) All patients were prescribed post-operative knee range of motion (ROM) and quadriceps muscle strengthening exercises following elastic bandage wrapping. Six patients were discharged the following day, and one patient was discharged on second day due to pain. Patients were controlled for knee ROM and strength every second day in first two weeks postoperatively. Wound dressing was removed after a mean of 10 days.

All patients having a pathological diagnosis of tendinous giant cell tumor were ordered a follow-up MRI at third month.

Patients without recurrence on MRI examination returned for a repeat visit at six months and one year post-operatively, and follow-up intervals were lengthened thereafter. No abnormality was detected at third, six-month and one year follow-ups in any patient. At short term follow-up

recurrence was detected in any case.

The mean tumor size at presentation was 2.3*2.4 cm². All patients were contacted and evaluated with the WOMAC score. The mean WOMAC score was 95,4 (91.1–98,4). None of the patients had tumor recurrence during follow-up. No patient complained of limitation of joint motion or residual pain at the final examination.

All patients had histologic diagnosis of localized giant cell tumor. Histologic features of this tumor include abundant mononuclear histiocytic cells and in three-dimensional tissue biopsy, hemosiderin within histiocytes. Pathologic evaluation showed osteoclast-like giant cells, foam cells, inflammatory cells and siderophage migration.

DISCUSSION

Giant cell tumors of tendon sheath occur around or sometimes within the joint. Arthroscopic debridement is mostly curative for intraarticular tumors (14). In a retrospective study involving 30 patients, Loriaut et al reported that the most common symptoms were knee discomfort and swelling. The lesions were located in the gutter region in 45% of patients. All patients were arthroscopically treated and none of the patients experienced recurrence during an average follow-up period of 75 months (14).

In a series (n = 26) reported by Dines et al, the mean age of diagnose was 36 years for pigmented villonodular synovitis with intra-articular localization, and the mass most commonly located at suprapatellar region followed by femoral notch. Unlike our series; 12 patients in that study underwent arthroscopic treatment while the remainders were managed with open surgery (6). Recurrence rates of 16–17% have been reported in the literature for giant cell tumors originated from tendon sheath. The majority of recurrences occur in tumors having diameter greater than 2 cm and patients managed with open surgery (2,21).

In the longest follow-up series reported so far, Zhang et al. followed 12 intra-knee tumors for approximately 15 years. They observed no recurrence, and stated that the outcomes were satisfactory for all patients. They reported that a wider tumor resection and the debridement of the whole tunnel through which the tumor passes suffice for surgical management (27).

The most common intraarticular site is the knee joint. Ho et al. reported that intraarticular involvement was seen in 32 of 41 patients, and 18 of these occurred in knee joint. (10)

In a case report, Lee and Wang reported that no recurrence was detected during a 55-month follow-up of a 29-year-old patient after an all-arthroscopic resection using posteromedial and posterolateral portals of a 20*11 mm giant cell tumor originated from ACL (12). Aqarwala et al detected no recurrences six months after arthroscopic resection of a lesion located anterior to the ACL's insertion site in a 27-year-old man (1).

In our study, tumors were also located in the proximity of the ACL. The most common locations were the suprapatellar pouch and femoral notch. Other locations include patellar tendon sheath, posterior cruciate ligament, and medial gutter. All these sites are accessible by arthroscopy (1, 8, 9).

The strength of this study is that it is one of a few studies performed on the arthroscopic management of intraarticular tumors, and that it also evaluated the final functions of patients.

Its limitations include small sample size, retrospective design, and lack of a control group.

CONCLUSIONS

Arthroscopy rapidly replaces open surgery in the management of tenosynovial intra-knee joint giant cell tendon tumors. Considering patient satisfaction and recurrence rates, the outcomes of arthroscopy are satisfactory. It may minimize the likelihood of serious complications of open surgery, including joint stiffness, quadriceps weakness, and superficial or deep infections. Follow up period should be at least 24–48 months to rule out recurrence. In our study, most of tumors were located around ACL and size of tumors were approximately 2 cm.

Abbreviations

WOMAC: The Western Ontario and McMaster Universities Arthritis Index

PVNS: Pigmented Villonodular Synovitis

MRI: Magnetic Resonance Imaging

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