



Synovial hemangioma and osteoarthritis of the knee: a case report

Marco DE GORI, Olimpio GALASSO, Giorgio GASPARINI

Department of Orthopedic and Trauma Surgery, School of Medicine, "Magna Græcia" University,
"Mater Domini" University Hospital, Catanzaro, Italy

This report presents an adult patient suffering from knee osteoarthritis and gross hypertrophy of the synovium, preoperatively interpreted as a nonspecific synovial reaction. The patient underwent a total knee replacement and a complete synovectomy was performed. Histological examination disclosed a synovial hemangioma, which is a rare intra-articular, benign tumor of youth.

Key words: Osteoarthritis; synovial hemangioma; tumor.

A synovial hemangioma is a rare intra-articular, benign tumor consisting of a proliferation of blood vessels arising in a mass contoured by a synovium-lined surface.^[1] Since this condition's first description,^[2] the current estimate is that there have been approximately 200 published cases.^[3] A synovial hemangioma nearly invariably involves the knee joint in children and young adults,^[4] and differential diagnosis is frequently difficult and delayed for several years.^[5]

We report a case of a synovial hemangioma diagnosed in a 67-year-old patient undergoing a total knee replacement for osteoarthritis.

Case report

A 67-year-old Caucasian man was admitted to our institution with a complaint of worsening pain, claudication and recurrent swelling of the right knee for 15 years, resulting in both a reduction in joint functionality and a disturbance of activities of daily living. The patient's medical, developmental and family histories were unremarkable.

Physical examination of the knee showed a neutral alignment, a general passive crepitus, tibiofemoral and patellofemoral tenderness and a 0° to 90° active and passive range of motion. A laboratory examination, including a complete blood cell count, serum chemistries, erythrocyte sedimentation rate testing, C-reactive protein testing, a coagulation profile and a complete assessment for rheumatic diseases showed values within normal ranges. Plain radiographs of the chest and the left knee were normal. Weight-bearing anteroposterior and lateral radiographs of the right knee showed a definite narrowing of both the medial tibiofemoral and the patellofemoral joint space, multiple osteophytes and medial subchondral geodes: that is, Grade 1 knee osteoarthritis according to the Ahlbäck scale (Fig. 1).^[6] Magnetic resonance imaging (MRI) scans, which the patient underwent of his own initiative, showed a generalized hypertrophy of the synovium, defined by the presence of a low-to-intermediate signal intensity on T1-weighted scans and a high signal intensity on T2-weighted and fat-suppressed scans

Correspondence: Olimpio Galasso, MD. Department of Orthopedic and Trauma Surgery, School of Medicine, "Magna Græcia" University, "Mater Domini" University Hospital, Viale Salvatore Venuta, 88100 Catanzaro, Italy.

Tel: +39-961 – 364 7662 e-mail: galasso@unicz.it

Submitted: January 17, 2014 **Accepted:** May 28, 2014

©2014 Turkish Association of Orthopaedics and Traumatology

Available online at

www.aott.org.tr

doi: 10.3944/AOTT.2014.14.0036

QR (Quick Response) Code





Fig. 1. Preoperative (a) anteroposterior and (b) lateral radiographs of the right knee.

(Fig. 2). This finding was interpreted as a synovial reaction to osteoarthritis.

The patient was treated with a total knee replacement. Intraoperatively, after capsule incision, a voluminous synovial pannus occupying the entire subpatellar recess was observed (Fig. 3). A complete synovectomy was performed, resulting in the removal of 27 grams of hypertrophic synovial tissue. A standard, posterior-stabilized total knee prosthesis was implanted, as planned, and no intraoperative complications were noted. On the 2nd postoperative day, the patient began a standard rehabilitation program, including both passive and active range of motion improvement and muscle strengthening. The patient was discharged uneventfully after 7 days.

Microbiological examination of the synovial samples showed no growth of microorganisms. Histopathology showed multiple dilated vascular channels located un-

derneath the synovium and surrounded by fibromyxoid stroma (Fig. 4). The pathologist ultimately diagnosed a synovial hemangioma. At the latest available examination 2 years postoperatively, the patient had a painless, stable knee with a 0° to 120° active and passive range of motion and without any clinical evidence of recurrence.

Discussion

Two distinctive characteristics of the present case are worth addressing. First, the age of diagnosis of a synovial hemangioma is noteworthy. The average age of onset of a synovial hemangioma is 10.9 years in females and 12.5 years in males, and approximately 75% of patients are symptomatic prior to 16 years of age.^[7] In our patient, the symptoms of knee pain and effusion occurred after the age of 50 years. The late onset of symptoms, together with the small number of diagnosed cases, may explain the delayed diagnosis. Furthermore, most patients suffering from a synovial hemangioma complain of nonspecific symptoms and various more common intra-articular lesions exhibit similar features.^[3] Notably, it has been previously observed that only 22% of cases are preoperatively recognized.^[7] Intensified efforts have been made to facilitate the identification of a synovial hemangioma on standard and gadolinium-enhanced MRI scans.^[3,8,9] However, the differential diagnosis is still critical. A lack of identification can lead to a possible delay in diagnosis for 20 to 40 years.^[10] To the best of our knowledge, only a study by Sasho et al. described a case of a synovial hemangioma diagnosed in a 60-year-old man suffering from recurrent knee hemarthrosis without any arthroscopic sign of chondral lesions or osteoarthritis.^[3]

In the current case, the synovial hypertrophy and hyperplasia detected with the MRI was interpreted as a

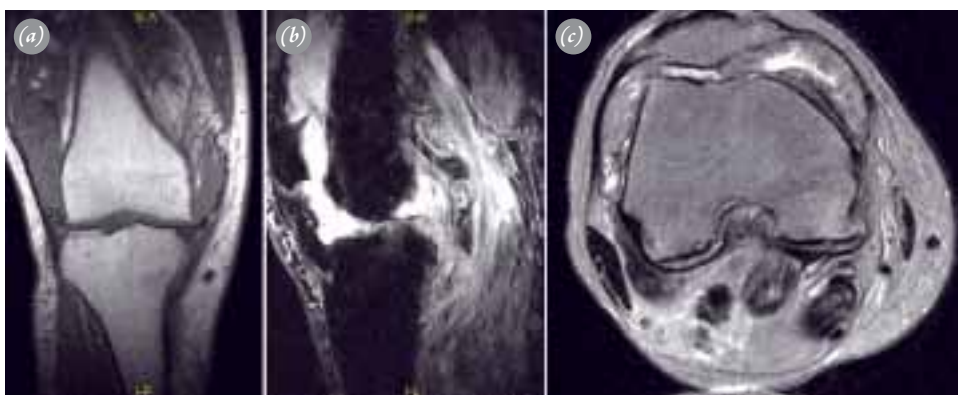


Fig. 2. Magnetic resonance imaging scans of the right knee. (a) Coronal T1 spin-echo, (b) sagittal T2 water-fat separation and (c) axial T2-weighted sequences showing synovial membrane inflammation and hypertrophy. Nodular thickening of the synovium, with a low signal intensity occupying the suprapatellar pouch, can be observed in the T2 images. The areas of very high signal intensity on the T2 sequences correspond to joint fluid.



Fig. 3. Intraoperative view of the hypertrophic synovial membrane. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

synovial reaction to osteoarthritis rather than a synovial hemangioma. The differential diagnosis included other non-inflammatory synovial lesions such as synovial chondromatosis and pigmented villonodular synovitis. Indeed, the mono-articular localization, the involvement of large joints, primarily the knee, the male sex and the paucity of symptoms are common features of synovial hemangioma and synovial chondromatosis. However, lesion imaging is fairly diagnostic in the latter due to the calcification and ossification of the cartilage.^[11] The absence of calcification has been rarely reported even in the early stages of chondromatosis. Therefore, in the case here described, the lack of multiple calcified intra-articular loose bodies on plain radiographs and MRI excluded the diagnosis of synovial chondromatosis. A second lesion that may resemble synovial hemangioma is articular pigmented

villonodular synovitis. It mainly affects the knee joint and although the lesion may occur at any age, the highest incidence is from 20 to 50 years of age. In addition, the growth of articular pigmented villonodular synovitis is indolent and the symptoms are of long duration with chronic joint swelling and synovial thickening. In clinical practice, the distinction between pigmented villonodular synovitis and synovial hemangioma is usually made with MRI. Indeed, proliferating synovium in pigmented villonodular synovitis is typically a heterogeneous mass with areas of low signal on both T1- and T2-weighted images due to large deposits of hemosiderin.^[12] The ultimate diagnosis relies on histology and the recognition of anomalous vessels with vascular caverns and pseudo veins underlying the hyperplastic and hemosiderin-laden synovium allows the diagnosis of synovial hemangioma.

Lipoma arborescens may mimic a synovial hemangioma and is characterized by diffuse replacement of the subsynovial tissue by mature fat cells, producing prominent villous transformation of the synovium. Macroscopically, it appears as a synovial mass with a frond-like architecture, numerous broad-based polypoid or thin papillary villi composed of fatty yellow tissue. Similarly to the case here reported, patients with lipoma arborescens have a slowly progressive swelling of the involved joint, which may be associated with joint effusion and pain. Moreover, a soft, painful swelling in the suprapatellar pouch can be noted and laboratory tests are usually normal. However, MRI is able to detect the fat-signal intensity on all pulse sequences that characterizes the lipoma arborescens,^[13] and histology narrows down the possible diagnoses. Indeed, histologically, villi of the lipoma arborescens are mainly filled with mature adipose cells. The synovial sarcoma and other inflammatory and hemophilic arthropathies should be also considered for

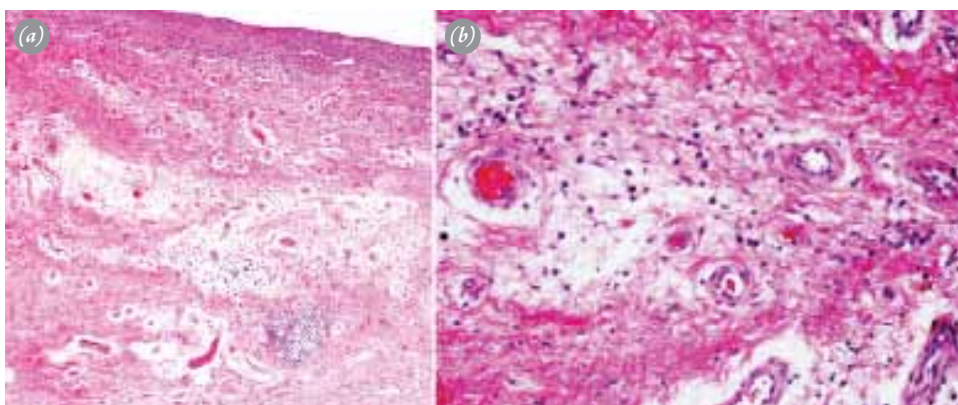


Fig. 4. Photomicrographs (hematoxylin and eosin stain) of the synovial hemangioma under (a) x40 and (b) x400 magnification. Hypertrophic and hyperplastic synovial proliferation is observable. In the subsynovial layer, several congested arterioles can be recognized in the context of patchy fibromyxoid stroma. [Color figures can be viewed in the online issue, which is available at www.aott.org.tr]

the differential diagnosis of synovial hemangioma.^[14]

The second major issue in this case was the concomitant diagnosis of a synovial hemangioma and knee osteoarthritis; whether these two diagnoses are coincidental or consequential is debatable. Notably, Akgün et al.^[4] previously reported Grade 3-4 chondral lesions in a 19-year-old woman suffering from a synovial hemangioma of the knee. The authors justified the presence of an arthropathy as the probable result of both recurrent episodes of intra-articular bleeding and mechanical irritation. Accordingly, it has been previously reported that due to lysosomal mediators from mononuclear cells, recurrent hemarthrosis leads to osteoarthritic changes.^[15] Hence, progressive articular damage due to a synovial hemangioma must be considered. Mainly due to the diagnostic delay, a synovial hemangioma can progressively increase in size and infiltrate the surrounding tissues, resulting in the invasion of adjacent bone.^[16] Holzapfel et al.^[14] presented a case of a synovial hemangioma of the knee associated with cystic invasion of the femur. The authors noted the possibility that the aggressive growth of a tumor can result in the destruction of juxta-articular structures.

It is tempting to hypothesize that our patient suffered from secondary knee osteoarthritis due to both the intra-articular widespread nature and the local aggressiveness of the synovial hemangioma. This speculation is supported by the fact that the left knee and other joints showed no signs of osteoarthritis and no symptoms were observed. Furthermore, no additional risk factors for osteoarthritis could be found in the patient's history.

In conclusion, this case report noted the possible pathogenic role of a synovial hemangioma of the knee in both the pathogenesis and the progression of osteoarthritis. Taking into account this pathology, MRI may allow an earlier diagnosis and provide valuable information about the intra- and juxta-articular spreading of the lesion, if correctly interpreted.

Conflicts of Interest: No conflicts declared.

References

1. Calonje E. Haemangiomas. In: Fletcher CD, Unni KK, Mertens F, editors. World Health Organization Classification of Tumours. Pathology and genetics of tumours of soft tissue and bone. Lyon, France: IARC Press; 2002. p. 156-8.
2. Bouchut E. Erectile tumor of the knee joint. [Article in French] *Gaz Hop* 1856;29:379-81.
3. Sasho T, Nakagawa K, Matsuki K, Hoshi H, Saito M, Ikegawa N, et al. Two cases of synovial haemangioma of the knee joint: Gd-enhanced image features on MRI and arthroscopic excision. *Knee* 2011;18:509-11. [CrossRef](#)
4. Akgün I, Kesmezacar H, Oğüt T, Dervişoğlu S. Intra-articular hemangioma of the knee. *Arthroscopy* 2003;19:E17.
5. Devaney K, Vinh TN, Sweet DE. Synovial hemangioma: a report of 20 cases with differential diagnostic considerations. *Hum Pathol* 1993;24:737-45. [CrossRef](#)
6. Ahlbäck S. Osteoarthrosis of the knee. A radiographic investigation. *Acta Radiol Diagn (Stockh)* 1968;Suppl 277:7-72.
7. Moon NF. Synovial hemangioma of the knee joint. A review of previously reported cases and inclusion of two new cases. *Clin Orthop Relat Res* 1973;90:183-90.
8. Llauger J, Monill JM, Palmer J, Clotet M. Synovial hemangioma of the knee: MRI findings in two cases. *Skeletal Radiol* 1995;24:579-81. [CrossRef](#)
9. Silit E, Mutlu H, Pekkafali Z, Kizilkaya E, Basekim CC. Synovial hemangioma of the knee invading the femur. *Skeletal Radiol* 2002;31:612-4. [CrossRef](#)
10. Suh JT, Cheon SJ, Choi SJ. Synovial hemangioma of the knee. *Arthroscopy* 2003;19:27-30. [CrossRef](#)
11. Adelani MA, Wupperman RM, Holt GE. Benign synovial disorders. *J Am Acad Orthop Surg* 2008;16:268-75.
12. Masih S, Antebi A. Imaging of pigmented villonodular synovitis. *Semin Musculoskelet Radiol* 2003;7:205-16. [CrossRef](#)
13. Kloen P, Keel SB, Chandler HP, Geiger RH, Zarins B, Rosenberg AE. Lipoma arborescens of the knee. *J Bone Joint Surg Br* 1998;80:298-301. [CrossRef](#)
14. Holzapfel BM, Geitner U, Diebold J, Glaser C, Jansson V, Dürr HR. Synovial hemangioma of the knee joint with cystic invasion of the femur: a case report and review of the literature. *Arch Orthop Trauma Surg* 2009;129:143-8.
15. Niibayashi H, Shimizu K, Suzuki K, Yamamoto S, Yasuda T, Yamamuro T. Proteoglycan degradation in hemarthrosis. Intraarticular, autologous blood injection in rat knees. *Acta Orthop Scand* 1995;66:73-9. [CrossRef](#)
16. Sheldon PJ, Forrester DM, Leach TJ. Imaging of intra-articular masses. *Radiographics* 2005;25:105-19. [CrossRef](#)