Synovial Hemangioma of the Knee Joint: a case report

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Synovial hemangioma is a rare benign tumor, yet an important cause of knee symptoms. We reported a 45-year-old male presented with pain and swelling in the left knee joint. Plain radiography showed a small calcification over the suprapatellar region. Sonography of left knee revealed a heterogeneously hypoechoic lesion with increased blood flow and a calcified spot. Computed tomography demonstrated two nodular lesions with moderate degree of contrast enhancement. MRI study showed two nodular lesions with serpentine structure, showing high signal intensity on T2-weighted images. After arthroscopic examination, arthroscopic surgical excision was performed. The pathologic results proved synovial hemangioma.

Synovial hemangioma is a rare, yet cause many knee symptoms such as localized pain, decreased range of motion and hemarthrosis. This benign vascular tumor was first described by Bouchut in 1856 [1]. Fewer than 200 cases have been published in the literature until 2004 [2]. Synovial hemangioma occurs most frequently in the knee joint but is also found in other joints. The lesion is frequently misdiagnosed, leading to a delay diagnosis. Until recently, there were a few patients diagnosed preoperatively using different imaging modalities including plain-films, ultrasound, arthrography or CT scan. Synovial hemangioma shows characteristic structure and signal intensity on MR imaging [3-4]. We reported a case of synovial hemangioma in the left knee joint which was diagnosed with preoperative imaging studies.

CASE REPORT

A 45-year-old male had a mass over left knee for several years followed by painful swelling for months before visiting our clinics. There was no history of trauma. Physical examination revealed a soft, movable mass about 2 cm in size over lateral suprapatellar region. Laboratory data were unremarkable. Routine radiography showed no bony deformity, however, a small circular calcification was found over suprapatellar region (Fig. 1). Ultrasound (US) examination revealed a heterogeneously hypoechoic nodule with a calcified spot and increased blood flow on color Doppler images (Fig. 2). CT scan demonstrated two nodular lesions in the suprapatellar bursa with moderate degree of contrast enhancement. MR images showed two well-enhancing nodular lesions at suprapatellar pouch of left knee, measured about 1.8 and 1.2 cm in size respectively, with the larger pedunculated lesion at superior lateral portion and the smaller one
embedded at the medial wall of suprapatellar pouch (Fig. 3, 4). MR images revealed serpentine structures within the two nodules on T2-weighted images. A small calcification spot was noted in the larger nodule. Two nodules showed intermediate signal intensity on T1-weight images and high signal intensity on T2-weighted images. Generalized synovitis with synovial thickening and joint effusion were noted. The patient received arthroscopic tumor excision. Two cherry red villonodular nodules measuring 2 x 1 and 1 x 1 cm were excised from the superior lateral portion and the medial wall of suprapatellar pouch, respectively. Histopathology showed soft tissue with proliferation of blood vessels of variable wall thickness, associated with organizing thrombus and calcification, characterized synovial hemangioma (Fig. 5).

**DISCUSSION**

Synovial hemangioms are rare lesions arising...
Figure 3. a. Axial T1-weighted and b. T2-weighted MR images showed the nodule (arrowhead), which was pedunculated at superior lateral portion of suprapatellar pouch of left knee with intermediate signal intensity on T1-WI and high signal intensity on T2-WI. c. The nodule showed well enhancement on post gadolinium MR images (arrowhead).

Figure 4. Sagittal fat-saturated T2-weighted MR image showed a nodule (arrow) of serpentine vascular structures with high signal intensity. A small calcification spot was noted in the larger nodule (arrowhead).

Figure 5. Photomicrograph a. (original magnification, x 200 and b. high magnification, x 400; hematoxylin-eosin stain) showed lobulated proliferation of blood vessels of variable wall thickness (arrow) with organizing thrombus (arrowhead).
from synovium-lined surface and typically occur in young adults. They are usually diagnosed during the first to third decade of life [5-6]. The most typical form of synovial hemangioma is the intraarticular type in which the tumor forms a mass lined by synovial membrane. Sixty percent of cases arise in the knee joint [7]. Most of synovial hemangioma involve the anterior compartment of the knee, either anterolateral or anteromedial region [8-9]. Only 7% cases of synovial hemangiomas of the knee arising from the infrapatellar region in reported cases [7]. Synovial hemangiomas have also been found in the elbow, wrist, ankle [6, 10] and tendon sheath [11]. There is a slight predilection of female to male patients [12].

The symptoms of synovial hemangioma occurring in the knee are non-specific. Devaney et al. [6] reported that symptoms of knee pain and swelling (31%), pain alone (31%), painless mass (31%) and recurrent intra-articular hemorrhage (5%). Because of high incidence of synovial hemangiomas in adolescents or young adults, such patients might be not able for clinicians to accurately evaluate the physical signs and clinical features. Synovial hemangiomas of the knee are rare; very few clinicians have experience of the entity. Therefore, an accurate diagnosis before operation is difficult. In the case of recurrent hemorrhrosis, synovial hemangioma should be considered as a differential diagnosis in the absence of a coagulopathy [13]. However, the majority of patients with synovial hemangioma presented with non-specific symptoms and signs, diagnosis is frequently delayed for several years [6].

Histologically, Stout classified synovial hemangiomas into 4 main categories: cavernous, capillary, mixed cavernous capillary and venous [14]. Synovial hemangioma with simple capillary wall and different degree dilated capillary spaces was classified as cavernous, mixed and capillary hemangioma, respectively. If the vessels have thickening walls and contain smooth muscle cells, the tumor is called venous hemangioma [14-15].

According to the anatomic location, synovial hemangioma can be divided into intraarticular, which is situated inside the joint capsule; juxtaarticular, which is situated outside the joint capsule; and intermediate, which are in an intra-articular as well as extra-articular location [16-17]. In 1939, Benett [18] divided synovial hemangiomas into diffuse and circumscribed types: the diffuse type usually consisted of a cavernous hemangioma with typical intermittent pain and swelling of the joint; circumscribed hemangiomas were a pedunculated synovial tumor of the capillary type.

Plain radiography may be unremarkable in over half the patients. Phleboliths, soft tissue, periosteal thickening, advanced maturation of the epiphysis, and arthritic changes are occasionally present [8]. CT scan aids in demonstrating an intraarticular soft tissue mass but is non-specific for the diagnosis, and demarcation of the tumor is usually not clear [19]. Soft tissue hemangiomas have special serpentine structure on contrast-enhanced CT images and T2-weighted MR images [20]. Synovial hemangiomas, similar to soft tissue hemangiomas, also have serpentine vascular structures best seen on T2-weighted MR images. MRI findings of synovial hemangiomas are frequently pathognomonic: serpentine intraarticular mass with specified signal intensity. The mass usually has intermediate signal intensity on T1-weighted images, and is marked hyperintensity on T2-weighted images reflecting pooling of blood in dilated vascular spaces. Low-signal-intensity linear structures on T2-weighted images are believed to represent fibrous septa or vascular channels [3-4].

In conclusion, synovial hemangioma should be included as a differential diagnosis of knee pain, swelling, mass or recurrent hemorrhrosis in adolescents or young adults without history of trauma or coagulopathy. It has specific imaging characteristics with calcification or phlebolith on plain radiography and high signal serpentine vascular structures on T2-weighted MR images.

**REFERENCE**

膝關節滑膜液血管瘤：病例報告

王明宗1  陳坤煌2,5  葉力仁3,5  陳志程1  曾文盛4  陳怡君6  蔡仁明1

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膝關節滑膜液血管瘤為少見的良性腫瘤，但是常引起膝關節症狀。根據之前文獻報告的滑膜液血管瘤體積都不算太小，大部分都約為4公分大。我們報告一位45歲的男性，因膝蓋疼痛腫脹來做檢查，看見兩個層層卷繞狀的膝關節腫瘤，大小各為1.8及1.2公分，在診斷上更為困難。但是因為這種腫瘤有其影像上特異性，包括在X光上有小的鈣化點還有在磁振造影上呈現出T2高回音和層層卷繞狀特性，所以可以在術前就診斷出來。