

---

Case Report

---

Magnetic resonance imaging and pathologic correlation  
in a case of angioleiomyoma of the lower extremity  
MRI 所見と病理対比を行った下肢血管平滑筋腫の 1 例

Yasuo OHKUBO<sup>1)</sup>, Fumio KOTAKE<sup>2)</sup>, Yoshikatsu INOUE<sup>3)</sup>  
大久保 裕 雄<sup>1)</sup>      小 竹 文 雄<sup>2)</sup>      井 上 宣 克<sup>3)</sup>

<sup>1)</sup>Department of Radiology, Warabi Municipal Hospital

<sup>2)</sup>Department of Radiology, Tokyo Medical University, Kasumigaura Hospital

<sup>3)</sup>Department of Orthopedic Surgery, Warabi Municipal Hospital

<sup>1)</sup>蕨市立病院放射線科

<sup>2)</sup>東京医科大学霞ヶ浦病院放射線科

<sup>3)</sup>蕨市立病院整形外科

---

**Abstract**

A 49-year-old woman with a tumor within the left lower leg from about 10 years previously experienced occasional bouts of spontaneous pain and tenderness, and pain was severe from December ■, 2006. Laboratory tests were generally normal. On MRI, the T1-weighted image showed a comparatively uniform isointensity in the subcutaneous tissue. The T2-weighted image showed isointensity overall, a patchy low signal intensity, and high signal intensity in only a few parts of the tumor. A few vessels in the tumor were observed as petechial low signal intensity. Resection of the tumor was performed, and we established a diagnosis of angioleiomyoma. Angioleiomyoma is a painful, small tumor mass in the subcutaneous tissues of the lower extremity in middle-aged women, and it appears as a capsule or signal void in the mass, even when the whole tumor mass showed nearly complete isointensity on T2-weighted image. On MRI and pathology correlation, the signal intensity of T2-weighted image of angioleiomyoma is considered to be decided by the ratio of the amounts of the smooth muscle, sinusoidal and dilated vascular spaces, and collagenic fiber in the tumor.

---

**Introduction**

Angioleiomyoma observed in the field of dermatology is a rare tumor and a painful small tumor seen in the subcutaneous tissues of the lower extremities in middle-aged women<sup>1)</sup>. Angioleiomyoma showed isointensity on T1-weighted image and positive enhancement on

T1-weighted image with contrast media<sup>2)</sup>. High signal intensity and isointensity are often observed on T2-weighted image<sup>2)</sup>. Previous reports have shown that various low signal intensity and isointensity are present in the tumor on T2-weighted image<sup>2)3)</sup>. In addition, petechial low signal intensity in the tumor is considered to indicate signal void or calcification<sup>3)</sup>. The fibrous

---

Received March 12, 2008, Accepted May 22, 2008

**Key words** : Angioleiomyoma, Magnetic resonance imaging, Lower extremity

**Corresponding author** : Yasuo OHKUBO, Department of Radiology, Warabi Municipal Hospital, 2-12-8 Kitamachi, Warabi shi, Saitama 335-0001, Japan

Tel : 048-432-2277 (ext. 181) Fax : 048-431-6002 E-mail : ookuboyasuo@hotmail.com

capsule of angioleiomyoma shows low signal intensity band on T2-weighted image<sup>4)</sup>.

**Case Report**

A 49-year-old woman noted a tumor with a diameter of about 10 mm on the inner side of the left lower extremity 10 years ago. She experienced occasional

bouts of spontaneous pain and tenderness, and pain was severe from December ■, 2006, when she visited the department of orthopedics in our hospital.

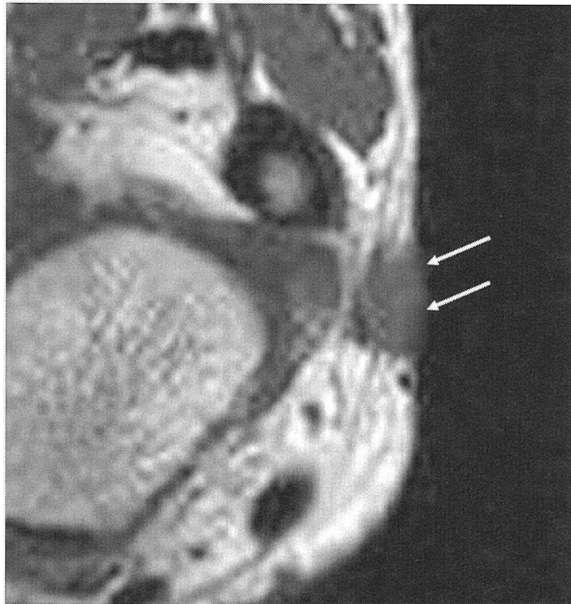
Palpation revealed a smooth-surfaced, mobile, and tender mass in the subcutaneous tissue of the inner left lower leg. Since no fluid was collected by tumor puncture, the diagnosis of ganglion was uncertain. Her laboratory data were: WBC count, 4,200/ $\mu$ l; RBC counts,  $460 \times 10^3$ / $\mu$ l; Hb, 9.5 g/dl; platelet count,  $19.7 \times 10^4$ / $\mu$ l; and CRP,  $\leq 0.1$  mg/dl and no abnormal values were observed in other biochemical data.

**MR imaging**

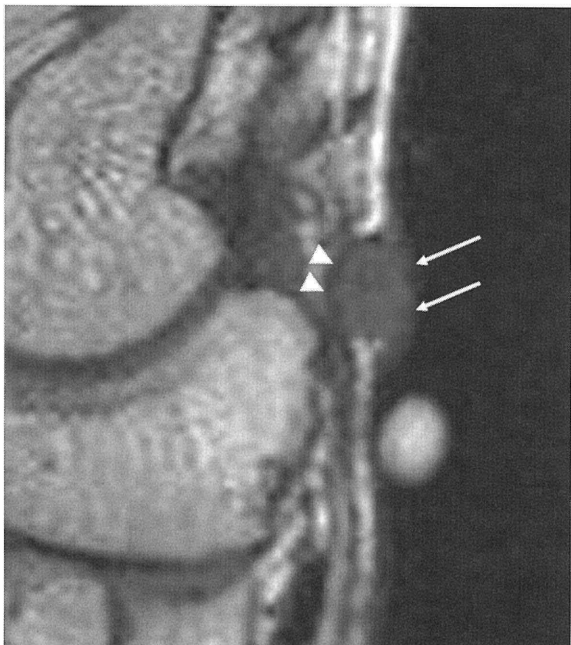
The tumor was present in the subcutaneous tissues apart from the talus, the flexor digitorum longus tendon, and the posterior tibial muscle tendon. T1-weighted image showed a comparatively uniform isointensity in the subcutaneous tissues (Fig. 1a, b). T2WI showed a nearly isointense, petechial low signal intensity, and patchy high signal intensity in the tumor (Fig. 2a, b). Capsular-like structure with a low signal intensity band was observed on the inner side of the tumor. The size of the tumor was about  $8.8 \times 8.0 \times 5.8$  mm.

**Clinical course**

The patient underwent resection of tumor on February 1, 2007. The tumor findings were as follows: the tumor observed in the subcutaneous tissue had a smooth surface and did not adhere to the surrounding tissues

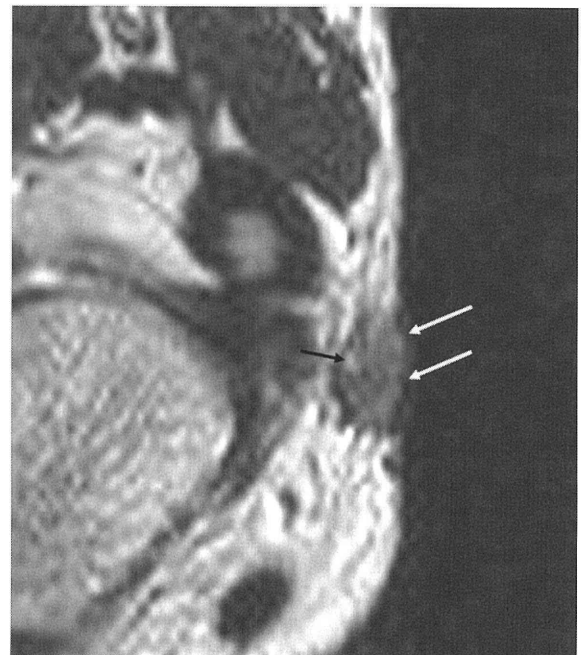


a

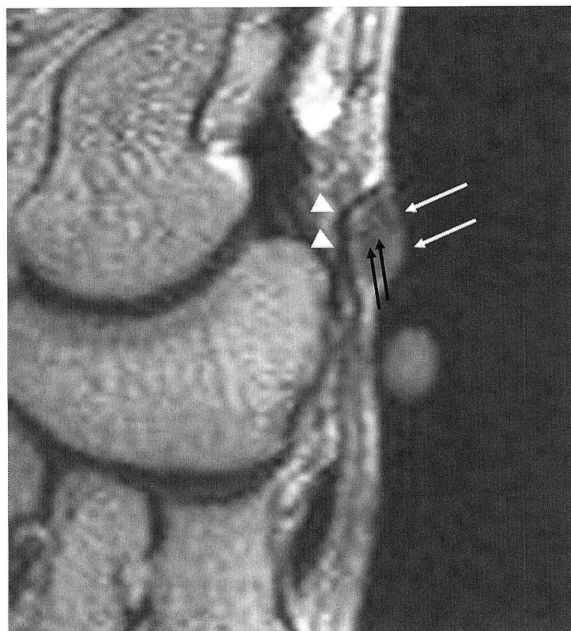


b

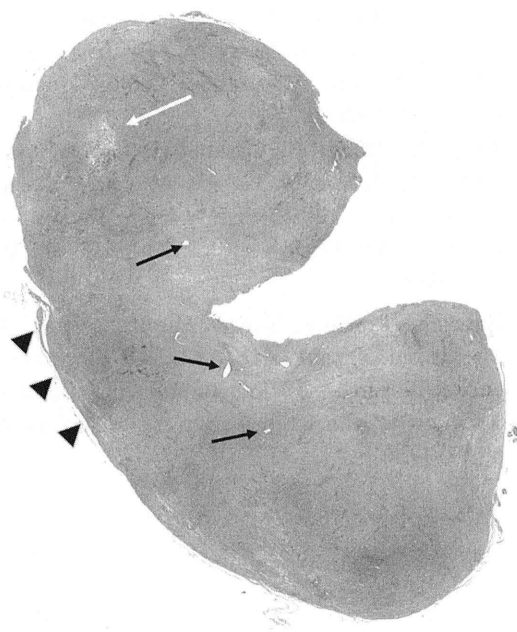
**Fig. 1a, b** Transaxial image and coronal image of T1-weighted image. The subcutaneous tumor showed uniform isointensity (white arrows). A capsular-like structure with a low signal intensity band was observed on the inner side of the tumor (white arrowheads).



**Fig. 2a** Transaxial image of T2-weighted image. The subcutaneous tumor showed isointensity overall (white arrows). A patchy high signal intensity area in the tumor was noted (black arrow).



**Fig. 2b** Coronal image of T2-weighted image. The subcutaneous tumor showed isointensity (white arrows). A few areas of small low signal intensity in the tumor indicated signal void (black arrows). A capsular-like structure with a low signal intensity band was observed on the inner side of the tumor (white arrowheads).



**Fig. 3** H-E stain.  $\times 4$  The mass showed proliferation of blood vessels lined by vascular endothelial cells (black arrows), myxomatous change (white arrow) and perivascular proliferation of smooth muscle cells and collagen fibers. The mass was observed to be surrounded by a capsule (black arrowheads).

and had a size of about  $10 \times 10 \times 8$  mm. Therefore, the removal of the tumor was easy. The tumor surface was light yellow and the cut surface was almost uniformly light yellow.

**Pathological findings**

A well-defined mass surrounded by a capsule was observed in the subcutaneous tissues. Microscopically, the mass showed proliferation of blood vessels lined by vascular endothelial cells, myxomatous change and almost perivascular proliferation of smooth muscle cells and collagen fibers. Therefore, the tumor was diagnosed as a capillary-type angioleiomyoma (Fig. 3). There was no definite calcification within the tumor.

**Discussion**

Angioleiomyoma is a small tumor arising from the vascular smooth muscles and is observed most often in women between the age of 30 and 60 years. The tumor can occur anywhere in the body, but is observed most frequently in the lower legs<sup>1</sup>.

Characteristically, most of the patients develop painful intracutaneous or subcutaneous nodes. In the field of dermatology, painful tumors are classified into **ANGEL**<sup>5</sup> (**A**ngiolipoma, **A**ngioleiomyoma, **N**euroma, **G**lomus tumor, **E**ccrine spiradenoma, and **L**eiomyoma), and they are rare tumors. Based on histological findings, angioleiomyoma are classified into capillary (66%), venous (23%), and cavernous (11%) types<sup>6</sup>. The incidence rates by tissue classification of painful tumors are 70% for capillary type, 37% for venous type, and 30% for cavernous type. The following three explanations have been given as the causes of pain : 1. pain due to mechanical pressure of the proliferated smooth muscle cells ; 2. pressure of the nerve cells due to vasodilation resulting from the increased venous pressure ; and 3. pain due to the contraction of the vascular smooth muscle by the sympathetic nerve and the ischemic state. However, these explanations are based on speculation and need to be verified<sup>7-9</sup>.

In recent years, MRI findings of angioleiomyoma have been reported as this modality has become popular<sup>2,3</sup>. The MRI of the angioleiomyoma showed isointensity on T1-weighted image and positive enhancement on T1-weighted image with contrast media<sup>2</sup>. High signal intensity and isointensity are often observed on T2-weighted image<sup>2</sup>. Previous reports have shown that areas of low signal intensity and isointensity are present in the tumor on T2-weighted image<sup>2,3</sup>. In addition, petechial low signal intensity in the tumor is considered to due to be signal void and calcification<sup>3</sup>. The fibrous capsule shows low signal intensity on T2-weighted image<sup>4</sup>.

The findings of T2-weighted image and pathology

correlation of angioleiomyoma in the past report, the proliferation of smooth muscle with sinusoidal and dilated vascular spaces around the area shows high signal intensity, thrombus and tough fibrous tissues show isointensity, and hemosiderin deposition and fibrous capsule show low signal intensity on T2-weighted image<sup>9)</sup>. However, it is well known that the striated and smooth muscles and uterine myoma (leiomyoma) of gynecologic pelvic lesion show low signal intensity on T2-weighted image, and tumor mass is considered to show low signal intensity in proliferation of the smooth muscle only.

In our patient, the reason why the intensity of tumor itself showed isointensity on T2-weighted image was considered to be as follows: most of the tumor consisted mostly of smooth muscle, and sinusoidal and dilated vascular spaces and collagenic fibers were considered to be observed sporadically. The signal intensity of angioleiomyoma was decided by the ratio of the amounts of the smooth muscle, the sinusoidal and dilated vascular spaces and collagenic fiber on T2-weighted image. A capsular-like structure with a low signal band was seen at the inner side of tumor, but pathologically, definite thickened fibrous capsule of angioleiomyoma was not noted. The capsular-like structure with a thick low signal band may be the thin capsule of the tumor and chemical shift artifacts. Small areas of high signal intensity were suspected to be myxomatous change in the tumor.

### Conclusion

A painful small tumor in the subcutaneous tissues of the lower extremity in a middle-aged woman was diagnosed as an angioleiomyoma, and it showed a few vessels in the tumor on MRI, showing signal void, even when the whole tumor mass showed isointensity and a petechial low signal intensity on T2-weighted image. Therefore, the signal intensity on T2-weighted image of angioleiomyoma is considered to be decided by the ratio of the amounts of the smooth muscle, sinusoidal and dilated vascular spaces, and collagenic fiber in the tumor.

The capsular-like structure with a thick low signal band may be the thin capsule of the tumor and chemical shift artifacts.

### References

- 1) Hachisuga T, Hashimoto H, Enjoji M: Angioleiomyoma; clinicopathologic reappraisal of 562 cases. *Cancer* **51**: 126-130, 1984
- 2) Hwang JW, Ahn JM, Kang HS, Suh JS, Kim SM, Seo JW: Vascular Leiomyomas of an Extremity: MR Imaging-Pathology Correlation. *AJR* **171**: 981-985, 1998
- 3) Ueda N, Abe M, Shirai H, Watanabe C, Ohtsuka H: Vascular Leiomyomas of the Hand. (In Japanese with English abstract) *J Jpn Surg Hand* **22**: 140-143, 2005
- 4) Yoshioka Y, Nakashima H, Shido Y, Urakawa H: Angioleiomyoma of the Hand. Report of Three Cases. (In Japanese with English abstract) *JCLS* **41**: 159-162, 2006
- 5) Sakamoto F: Painful tumors of the skin. (In Japanese with English abstract) *MB derma* **121**: 53-60, 2006
- 6) Morimoto N: Angioleiomyoma [Vascular Leiomyoma]—A Clinicopathologic Study—. (In Japanese with English abstract) *Med J Kagoshima Univ* **24**: 663-666, 1974
- 7) Koizumi Y, Seki A, Mori T, Juji T, Marutani R, Masuda K, Koshituka H, Hirose T, Itoh Y, Matsumoto T, Fujimura S: Angioleiomyoma of lower extremity—Two Case Report—. (In Japanese with English abstract) *J Kanagawa Orthop Traumatol* **18**: 73-75, 2005
- 8) Tsujii M, Hirata H, Ohsumi H, Kawamoto M, Nishimura J, Seto M, Uchida A: Large Vascular Leiomyoma of the Plam. Case Report. (In Japanese with English abstract) *JCLS* **40**: 713-716, 2005
- 9) Hasegawa T, Seki K, Yang P, Hirose T, Hizawa K: Mechanism of pain and cytoskeletal properties in angioleiomyoma: An immunohistochemical study. (In Japanese with English abstract) *Pathol Int* **44**: 66-72, 1994