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Multiple glomus tumor on the anteromedial side of leg

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To the editor,

Multiple glomus tumor is a rare benign neoplasm that arises from the glomus body in the stratum reticularis of the dermis, the highly specialized arteriovenous anastomosis for thermoregulation.[1−4] Although several cases of multiple glomus tumor involving the anterior thigh,[5] submandibular and parotid regions,[6] the torso,[7] have been reported, radiological characteristics on MRI images for multiple glomus tumor have not been described. We reported here both pre-operative and post-operative MR images from a case of 16 years old girl with multiple glomus tumor that partially coalesced on the anterior side of the leg.

A 16-year-old patient was referred to our radiological department from the local clinic. The patient complained of the enlarging multiple masses on the anteromedial side of the leg that was found inadvertently 6 years ago. The pain was exacerbated during exercise. Clinical examination revealed 2 masses (3 cm × 3 cm, 1.5 cm × 1.5 cm) on the anteromedial side of the leg with mild tenderness and no ulceration. Routine laboratory tests showed normal results and no past medical or family history were informative. The patient underwent a 1.5T MR scan preoperatively and exhibited two well-defined lesions that partially coalesced (2.27 cm × 0.90 cm and 2.23 cm × 1.04 cm) on the anteromedial side of leg with an intermediate to low signal on T1 weighted spin-echo images, high signal intensity on T2 weighted spin-echo images, and homogeneously avid enhancement after administration of the contrast agent (Gadolinium) (Fig. 1). Initially, a radiological diagnosis of venous malformation was made. The patient was referred to the cosmetic surgery department for an operation. The histological examination showed tumor cells that were uniform with a round nucleus surrounding an irregularly-shaped vascular space (Fig. 2). The immunohistochemistry results showed HCK(−), P63(−), P40(−), Ki-67 (partially +), CD44 (partially +), CK5/6(−), SMA(+/−), S-100(−), Calponin (partially+), Des (−), CD34 (−), Vim (++), EMA (−), and CD117 (−). A diagnosis of a glomus tumor was made. According to the proportion of the glomus tumor, the vasculature structure, and the smooth muscle tissue, the glomus tumor can be designated as a glomangioma. Three months and six months after surgery, the patients underwent 1.5T MRI scan as postoperative follow-up and showed no signs of recurrence (Fig. 3).

Multiple glomus tumors account for 10−20% of all glomus tumors, and are a rare benign neoplasm that arises from the glomus body in the stratum reticularis of the dermis, the highly specialized arteriovenous anastomosis for thermoregulation.[1−4] In comparison with solitary glomus tumor, with a predilection for occurring in adult women around the 3rd to 5th decades of life,[4] multiple glomus tumor has a male predominance around 4:1, with early onset in childhood.[8] Clinically, glomangiomas appears as red to blue compressible

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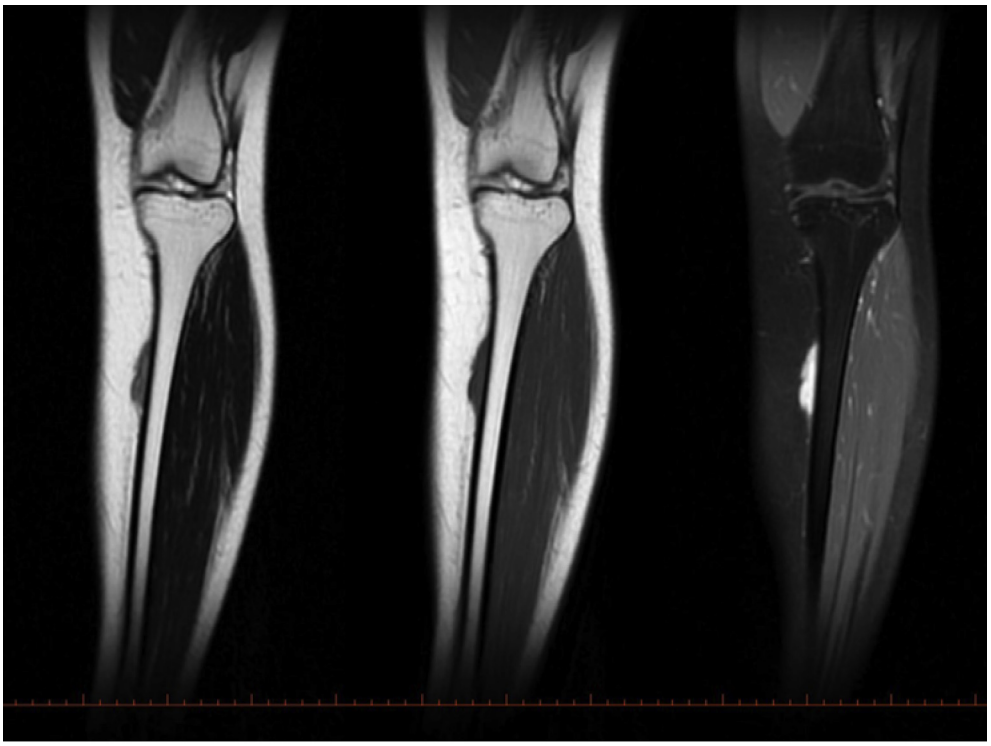
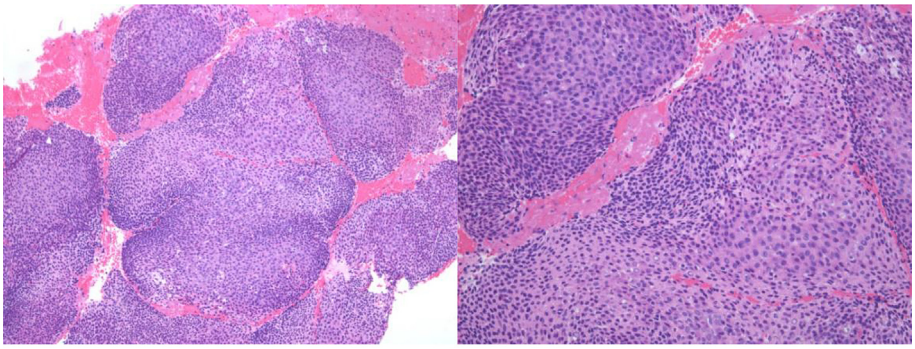


a b c

Fig. 1. Two well-defined lesions partially coalesce (2.27 cm × 0.90 cm, 2.23 cm × 1.04 cm) on the anteromedial side of leg with an intermediate to low signal on T1 weighted spin-echo images (a), high signal intensity on T2 weighted spin-echo images (b), and homogeneously avid enhancement after administration of Gadolinium (c).



a b

Fig. 2. (a and b) Tumor cells are uniform with a round nucleus surrounding an irregularly-shaped vascular space. No nucleus atypia or mitotic phase are shown. (a: HE, original magnification ×100, b: HE, original magnification ×400).

papulonodules. The classic triad of symptoms of solitary glomus tumor, consisting of paroxysmal severe pain, point tenderness and cold hypersensitivity, is often absent from multiple glomus tumors. A glomus tumor is usually located in the subungal area because the glomus body is highly concentrated at the tips of digits, especially under the nails.[1] As an extra-digital glomus tumor is very rare and clinical symptoms are less specific or even absent, a diagnosis is often delayed or even mistaken.

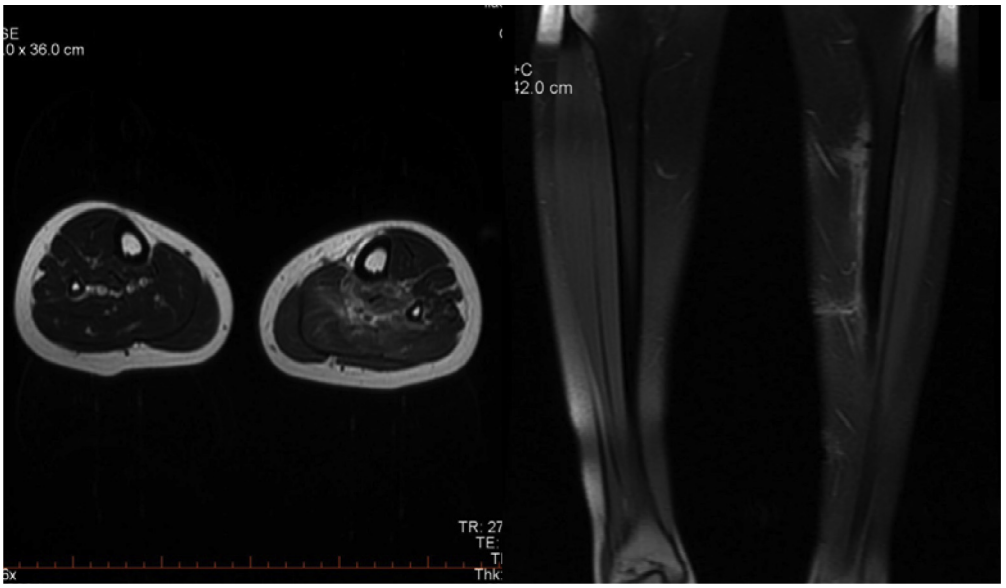


Fig. 3. Transverse T2 weighted spin-echo image (a) and the sagittal post contrast T1-weighted spin-echo image (b) depict the scar tissue with a high signal and no enhancement 6 months after surgery.

Histologically, there are three main variants according to the proportion of glomus cells, the vasculature structure, and smooth muscle cells.[9]

1. Solitary glomus tumor: mainly consisting of layers of glomus cells surrounding the vascular lumina and small vascular spaces.[2]
2. Glomangioma: having larger and more irregular vascular spaces coated by a few layers of glomus cells and being less well circumscribed. This type is usually seen in multiple glomus tumors.[10]
3. Glomangiomyoma: also containing multiple smooth muscle cells.[9]

Other variants, such as plaque type and patch type have been described as well.[11]

In the present case, multiple glomus tumor can be designated as glomangioma according to the histology and immunohistochemical results. Glomangioma (also called glomuvenous malformations) may either be acquired or congenital. The heterozygous germline mutations in the glomulin gene (GLMN), which is localized to chromosome 1p21-22, have been reported in these patients.[12−15] Brems et al.[14] also suggested a genetic association between glomus tumors and type I neurofibromatosis. They showed that glomus tumors that arise in patients with type I neurofibromatosis are due to biallelic inactivation of the NF1 gene, or a "second hit" that occurs specifically within the α-smooth muscle actin-positive cells of the glomus body.[15]

MR images of multiple glomus tumors show the lesions have an intermediate-low signal on T1 weighted spin-echo images, high signal intensity on T2 weighted spin-echo images, and homogeneously avid enhancement after administration of the contrast agent (Gadolinium). Initially in our case, a diagnosis of venous malformation was made because venous malformation demonstrates a similar signal on MR images as does glomus tumors. But phleboliths as the round signal void on both T1 and T2 weighted images are frequently seen in venous malformation. In addition, venous malformation can be emptied by and is less painful on compression.[16−18] According to the clinical and radiological evidence, a diagnosis of venous malformation could be ruled out. Radiologically, a glomus tumor should also be differentiated from enchondromas, epidermal inclusion cysts, metastasis, aneurismal bone cysts, sarcoidosis eccrine spiradenomas, leiomyomas, neuromatosis hyperplasias, and multiple hemangiomas.[10] An MR scan can also aid in the evaluation of recurrent glomus tumor.[3] Nicolas et al.[4] reported that in all 24 patients with recurrent pain after previous excision of a glomus tumor of the fingertip, MR imaging revealed a nodule consistent with the diagnosis of a recurrent glomus tumor. In 13 (54%) of 24 patients, the nodule had typical features of a glomus tumor. In eight (33%) of 24

patients, the tumors had low signal intensity or isointensity compared with the nail bed on T2-weighted images. In six (25%) of 24 patients, the tumors had faint enhancement after intravenous gadolinium chelate administration. In our case, MR images at 3 months follow-up showed scar tissue and no signs of recurrence.

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