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GLOMUS TUMOUR IN THE FOREARM: A CASE REPORT AND REVIEW OF MRI FINDINGS

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Glomus tumours are uncommon benign neoplasms characterised by the proliferation of modified smooth muscle cells known as glomus cells. Glomus tumours are well described in the extremities, particularly in the sub-ungual region and MRI is well established as the investigation of choice. However, a significant proportion of glomus tumours are extra-digital, but the discussion of MRI findings of extra-digital tumours is limited and restricted to case reports. We present a case of a solitary painful forearm lesion in an 81-year-old man, and review the English literature on extra-digital glomus tumours documenting MR imaging features. Radiologists should be aware of the existence of these lesions, particularly in the setting of chronic pain and focal tenderness.

Key-words: Paraganglioma – Extremities, MR.

Glomus tumours are uncommon benign neoplasms characterised by the proliferation of modified smooth muscle cells known as glomus cells. Glomus cells play a role in thermoregulation. Glomus tumours are well described in the extremities, particularly in the sub-ungual region and MRI is well established as the investigation of choice (1). However, a significant proportion of glomus tumours are extra-digital, but the discussion of MRI findings of extra-digital tumours is limited and restricted to case reports (2-13). We present a case of a solitary painful forearm lesion in an 81-year-old man, and review the English literature on extra-digital glomus tumours documenting MR imaging features. Radiologists should be aware of the existence of these lesions, particularly in the setting of chronic pain and focal tenderness.

Case report

An 81-year-old man presented with a sub-cutaneous nodule in the dorsal forearm that had been slowly growing over 10 years. It was slightly bluish in colour. It had become increasingly painful and was exquisitely tender on palpation.

MRI demonstrated a 6 x 12 x 14 mm ovoid subcutaneous lesion which abutted the superficial muscular fascia on the extensor compartment (Fig. 1). It was hypointense on T1 and hyperintense on T2 and STIR. It was well marginated and no intralesional fat was seen. There was no blooming seen on gradient echo sequence. On ultrasound, the lesion was solid but uniformly hypoechoic.

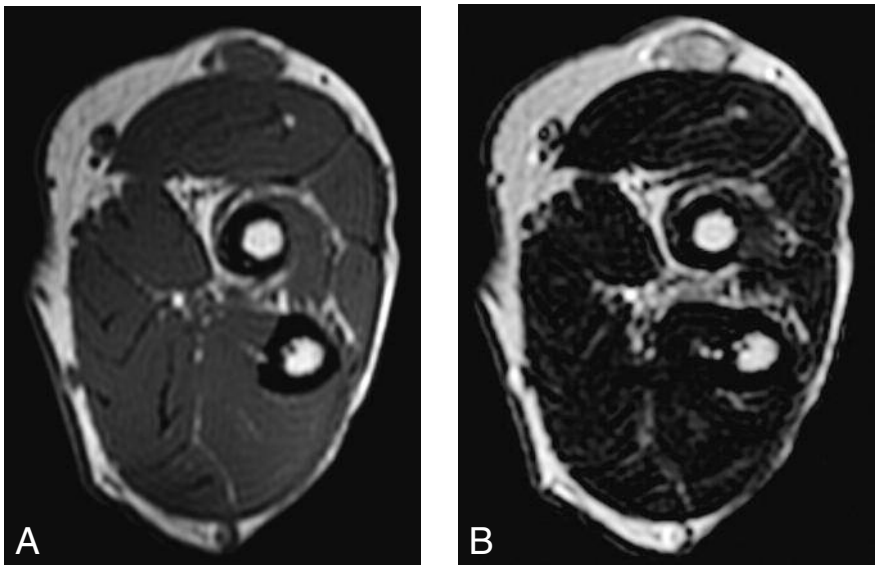

Fig. 1. — MRI left proximal forearm (GE echospeed 1.5T) demonstrating a subcutaneous lesion overlying the extensor compartment (arrow). A: TE 14 TR783, B: TE105 TR3700. The lesion is well defined with a hypointense capsule. It is hypointense on T1 and hyperintense on T2 relative to muscle.

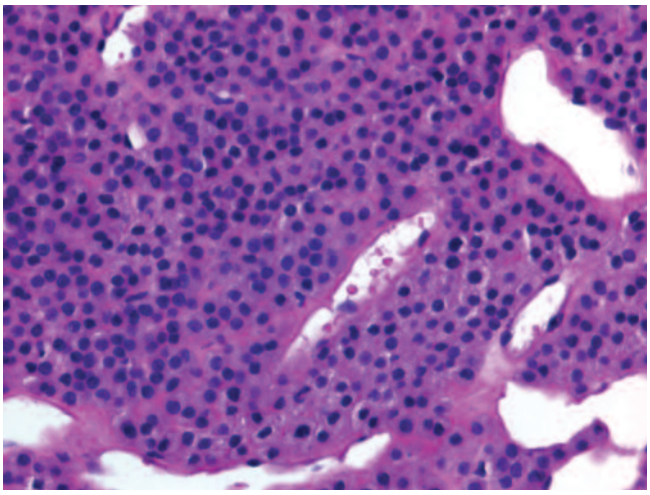

Fig. 2. — High power H&E stain of core biopsy demonstrating nests to sheets of uniform rounded cells with centrally located round nuclei and eosinophilic cytoplasm, set in a richly vascular background of capillary-sized vessels.

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Table I. — Summary table of cases of extra-digital glomus tumours with MRI and/or ultrasound findings.

Author	Age/Sex	Site & Presentation	Presentation	MRI	Ultrasound
Smith	62 F	Radial nerve	Pain	-	25 mm hypoechoic well defined lesion
Mabit	45 M	Patellar tendon	Pain	Ovoid 1 cm. ↑T1 Only T1 weighted sequences performed	Patella tendon enlarged and hypoechoic.
Yoshikawa	35 M	Supraspinatus	Pain	Ovoid 4 x 2 cm ↔T1 ↑T2	
Amillo	38 F	Vastus lateralis	Pain	Ovoid, 3 cm ↓T1 ↑T2 Enhanced, central non-enhancing area	Ovoid hypoechoic mass
Mohler	55 F	Plantar foot	Pain	Ovoid 1 cm ↓T1 ↑T2	
Hardy	65 M	Hoffa fat pad	Pain	Ovoid 10 mm ↓T1 ↑T2 Enhanced	
McDonald	40 M	Buttock – subcutaneous	Pain	Ovoid, 6 mm ↓T1 ↑T2	
Abela	52 M	Scapula region - subcutaneous	Dull ache	Round 10 mm ↔T1 ↑ STIR [images suggest ↓T1]	Hyper-echoic, well defined, prominent vascularity [not shown]
Gonzalez-Llanos	50 M	Periosteal, distal femoral diametaphysis	Pain	Ovoid, 12 mm ↓T1 ↑T2 Enhanced.	Ovoid, hypoechoic
Waseem	73 M	Subcutaneous knee	Pain	Ovoid 50 mm ↓T1 ↑T2	
Senol	21 M	Forearm ?superficial, adjacent to ulnar sensory nerve	Pain, neuralgia	Ovoid 20 x 10 mm ↔T1 ↑T2, ↑TIRM, enhanced.	

Legend:
↑ Increased signal intensity compared to muscle
↓ Decreased signal intensity compared to muscle
↔ Signal intensity similar to muscle.

An ultrasound guided core biopsy was performed, which showed nests of uniformly appearing rounded cells with centrally located round nuclei and eosinophilic cytoplasm, set in a richly vascular background of capillary-sized vessels with varying degree of perivascular hyalinization (Fig. 2). There were no mitotic figures or cytologic atypia present. Tumour cells demonstrated strong H-caldesmon and moderate smooth

muscle actin immunoreactivity and were negative for keratin and S-100. These findings confirm the diagnosis of a benign glomus tumour.

The patient underwent uncomplicated excision of the lesion without any perioperative complications, resulting in resolution of his symptoms. Pathology of the specimen confirmed the diagnosis.

Discussion

Glomus tumours are thought to arise from glomus cells, which form part of glomus bodies. These are arteriovenous shunts typically found in the dermal-sub-dermal junction and involved in thermo-regulation. The majority of these tumours are solitary, and the multiple form, also known as glomangiomatosis, has distinct clinical and pathological characteristics. Glomus tumours are well described in the extremities, particularly in the sub-ungual region. Radiological findings such as chronic pressure erosion on phalangeal tuffs are well described.

Extra-digital glomus tumours, although uncommon, comprise a significant proportion of glomus tumours. Heys et al reported 27 of their 43 cases of glomus tumours occurring outside the hand (2). These lesions tend to present in adults, and are often painful, presumably due to the proximity to the rich neural bed (14). They are small, typically smaller than 2 cm in diameter. Superficial lesions often have a bluish colouration, but deeper lesions are difficult to detect on physical examination (3). Most of the extra-digital glomus tumours are sub-cutaneous, but they can occur at any site including intraosseous, periosteal, intramuscular, intravenous and intraneural locations (4, 14). Radiologists should be aware of this entity, particularly in the setting of pain and tenderness at the affected site.

MRI has a role in diagnosing extra-digital glomus tumours, especially when its small size makes clinical diagnosis difficult. The case reports in English literature on extra-digital glomus tumours find that these lesions are ovoid, well defined and show hypointensity or isointensity on T1 and hyperintensity on T2 weighted sequences on MRI (Table I). The reported cases range from 6 mm to 50 mm in maximal dimension. Takei described a case of a 4 mm lesion adjacent to the superficial radial nerve which MRI did not detect (14). All reported cases which were administrated gadolinium demonstrated at least some contrast enhancement. Gonzalaz, Senol, and Hardy demonstrated homogenous enhancement (4-6). Amillo had a case of a 3 cm lesion within vastus lateralis that had a central non-enhancing area on the presented image; however, this finding was not discussed (7). Yoshikawa performed a non-contrast MR, but the post-contrast CT demonstrated peripheral enhancement of the lesion (8). Yoshikawa also documented multiple small foci of calcifications within the lesion. Our case demonstrated similar imaging characteristics with a well defined lesion showing T1 hypointensity and T2 hyperintensity. We did not administer gadolinium. The MR imaging features are non-specific and the differential diagnosis will include nerve sheath tumours, epidermal cysts, venous malformations, nodular fasciitis, and angioleiomyoma. Cat-scratch disease may also have similar imaging characteristics but the lesions are typically located at nodal stations such as epitrochlear region of the elbow and axilla.

There is some variability of the ultrasound appearance of extradigital glomus tumours. In our case, the lesion was well defined, solid, and uniformly hypoechoic. This is similar to that reported by Smith, Amillo, and Gonzalez (9, 7, 4). Abela showed a case of a subcutaneous lesion in the shoulder region which was hyperechoic (3). Mabit presented a case of a lesion within the patellar tendon which showed expansion of the tendon with hypoechogenicity, but it was not mentioned whether there was a discrete lesion seen on ultrasound (10).

Pathologically, glomus tumours are usually small well-defined lesions. Microscopically, the tumor cells are uniform and round in shape with eosinophilic cytoplasm and centrally located round nuclei. The appearance can vary depending on the relative amount of glomus cells, vascular structures and smooth muscle (15). The current case shows the solid pattern with a predominance of glomus cells arranged in solid nests surrounded by capillary sized vessels. In contrast, lesions showing a predominance of dilated venous vessels and a predominance of smooth muscle cells are referred to as glomangiomas and glomangiomyomas respectively. Immunohistochemically, glomus cells are positive for vimentin, smooth muscle actin and H-caldesmon, and lack the expression for epithelial, melanocytic and vascular markers.

Treatment is surgical excision. Recurrence is rare, and usually related to incomplete excision. Malignant glomus tumours and metastases have been reported but are extremely rare (16, 17). These malignant glomus tumours typically occur in the subfascial or visceral locations, are larger (> 2 cm) in size and demonstrate malignant or atypical histologic features that include marked cytologic atypia and increased mitotic activity with atypical mitotic figures (15).

Although rare, radiologists should be aware of extra-digital glomus tumours. Although the imaging features are non-specific, the clinical notion of pain is an important clue in the characterisation process. Prompt diagnosis and complete excision of the tumour often alleviates patient's pain.

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