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Case Report

Surgery Section

A Rare Case of Cavernous Haemangioma Mimicking Arteriovenous Malformation of the Arm

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ABSTRACT

Cavernous haemangiomas are venous malformations that are commonly localised defects in the vasculature. These haemangiomas are typically asymptomatic but can adversely affect Quality of Life (QoL). Arteriovenous Malformations (AVMs) are also vascular defects with a congenital origin. AVMs are characterised by direct abnormal connections with high blood flow. Cavernous haemangiomas and AVMs can be differentiated using diagnostic modalities such as Magnetic Resonance Imaging (MRI) and computed tomography angiography. This case report aims to document a rare clinical presentation of cavernous venous malformations in a 30-year-old female presenting with swelling of the arm and intermittent pain for the past two years. This case illustrates an atypical presentation of cavernous haemangioma, which initially appeared as an AVM but was gradually confirmed to be a 'cavernous haemangioma'. A 30-year-old female presented with complaints of swelling in her upper arm, which was managed by embolisation followed by surgical resection. The diagnosis was confirmed through histopathology. Histopathological examination played a crucial role in the definitive diagnosis. This case highlights a rare diagnostic challenge where imaging findings initially suggested an AVM, but histopathology confirmed a cavernous haemangioma, emphasising the importance of thorough diagnostic workup in vascular anomalies.

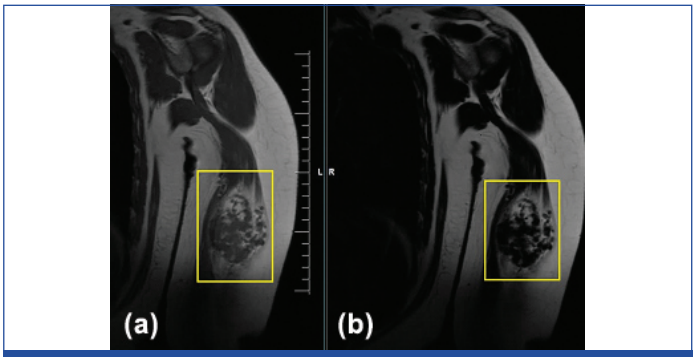
Keywords: Angiography, Embolisation, Histopathology, Vascular malformations

CASE REPORT

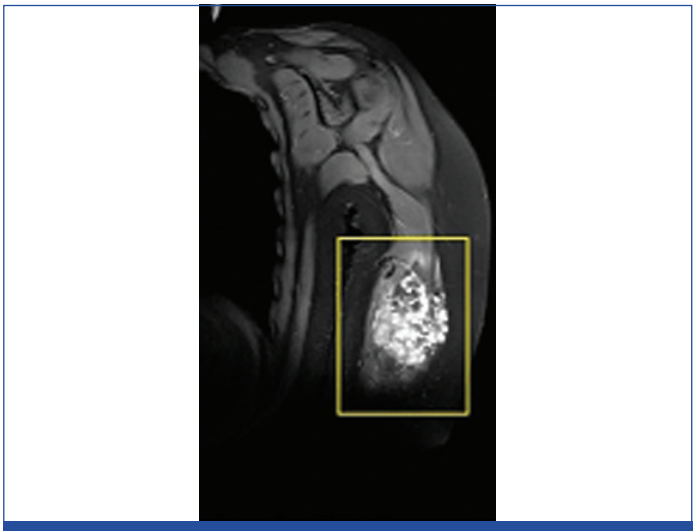
A 30-year-old female presented at a healthcare camp with major complaints of swelling in her left arm, accompanied by intermittent episodes of pain for the past two years. There was no significant medical or family history, and no history of ulceration, fever, nausea, or vomiting; all vital signs were within normal limits.

Physical examination revealed a mass measuring approximately 6.0×5.0 cm over the posterior aspect of the left arm, with normal skin colour and texture. The swelling was mobile, tender, and hard in consistency with a normal local temperature. Radiological screening of the left arm through ultrasound suggested a soft-tissue vascular tumour or intramuscular AVM. Ultrasound imaging showed evidence of a heterogeneously predominant, hypoechoic to isoechoic lesion in the posterior compartment of the left arm, measuring approximately 7.0×5.2 centimeters, with internal vascularity. The lesion was located in the intermuscular plane, revealing arterial and venous flow with vascular channels noted within it. These features were suggestive of a soft-tissue vascular tumour or intramuscular AVM of the left arm. MRI of the same arm showed an altered signal intensity lesion in the intramuscular plane, located in the posterior compartment of the arm, posterior to the neurovascular bundle, with feeders from the brachial artery measuring 7.0×5.3 cm, demonstrating moderate to striped enhancement. This was indicative of a lesion in the posterior compartment of the left arm, suggesting a vascular tumour or AVM. The patient was advised to undergo angiography for a definitive diagnosis [Table/Fig-1-3].

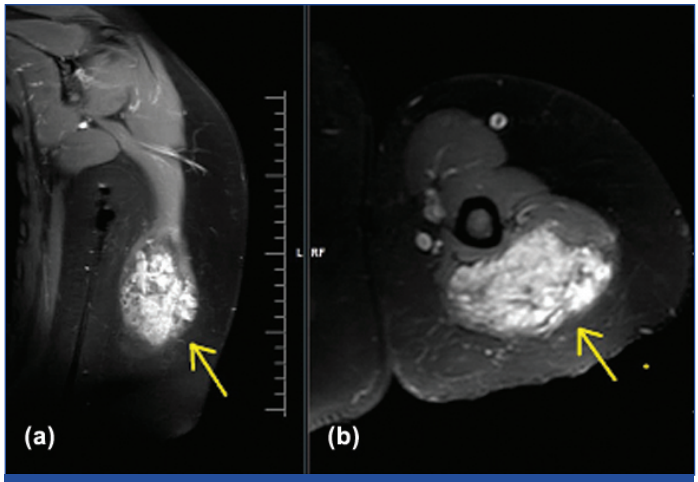
The patient was subjected to left upper limb angiography via right femoral artery access with a 5 French catheter sheath. The findings revealed a highly vascular tumour in the intermuscular plane of the lateral aspect of the left upper arm, with feeder vessels arising from the left brachial artery. The left subclavian artery, left axillary artery, left radial artery, and left ulnar artery appeared normal. These findings suggested a highly vascular tumour in the intramuscular plane of the lateral aspect of the left upper arm. This tumour was managed by left upper limb angioembolisation using right femoral artery access with a 5F femoral sheath, followed by selective cannulation of feeders from the left brachial artery using a Progreat micro catheter, with embolisation of feeding vessels performed with 300-500 micron



[Table/Fig-1]: a) T1 weighted coronal section showing lesion in posterior compartment of left arm; b) T2 weighted coronal section showing lesion in posterior compartment of left arm.



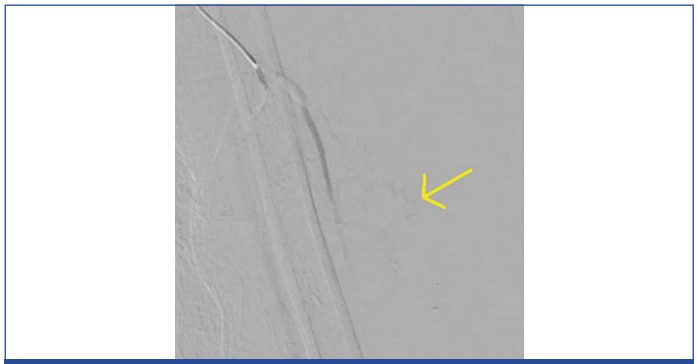
[Table/Fig-2]: Proton density fat-saturated MRI coronal section showing lesion.



[Table/Fig-3]: a) T1 contrast coronal section; b) T1 contrast axial section showing Serpiginous venous and arterial channels.

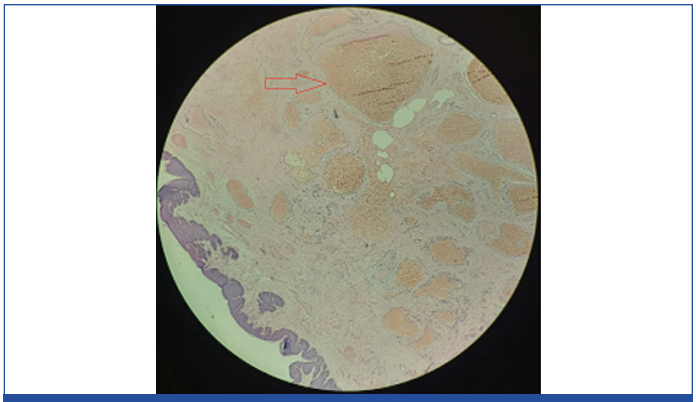
Polyvinyl Alcohol (PVA) particles. The procedure was completed uneventfully, and a completion angiogram revealed complete exclusion of the tumour from the feeding arteries [Table/Fig-4,5].

[Table/Fig-4]: Left upper limb angiography showing highly vascular tumour in intermuscular plane of the lateral aspect of left upper arm with feeder vessels arising from left brachial artery.



[Table/Fig-5]: Post-embolisation, arrow showing no flow through feeding vessels of tumour.

The excised specimen consisted of a single, irregular, grayish-brown tissue measuring 6.5×5×2.5 cm, which was sent for histopathological evaluation. Histopathology showed pigmentation with haemorrhagic large blood vessels. A section from the tumour mass and base demonstrated a circumscribed lesion with multiple dilated vessels lined by a single layer of endothelium, with histopathological features suggestive of cavernous haemangioma [Table/Fig-6]. Other sections (superior, inferior, medial, and lateral margins) showed normal histology. The patient was discharged three days postoperatively. On follow-up after one month, the scar line was found to be healthy, and the patient reported being symptom-free with no new complaints.



[Table/Fig-6]: A 10x view of haematoxylin and eosin stain slide showing a circumscribed lesion with multiple dilated vessels lined by single layer of endothelium; Red arrow indicates dilated vessel.

DISCUSSION

AVMs refer to vascular anomalies characterised by abnormal connections between arteries and veins, bypassing the normal capillary bed [1]. These abnormal connections lead to the direct shunting of blood from arteries to veins, causing pressure disruptions [1,2]. The incidence of AVMs has been reported at 0.3 to 0.5%, with a predominance in children and adolescents [3]. Clinical presentations of AVMs can include asymptomatic lesions, pain, swelling, deformity, and functional impairment, with varying degrees of severity [1,4].

The underlying pathophysiology of AVMs is associated with both genetic and acquired factors. While these lesions commonly occur in the head and neck, upper limb AVMs represent 10% of the total cases. The hands are the most common site for AVMs after the head and neck [1,3,5]. Both cavernous haemangiomas and AVMs arise from aberrations in vascular embryogenesis, sharing a mesodermal origin. AVMs are characterised by persistent arteriovenous connections due to failures in vascular remodelling, whereas cavernous haemangiomas reflect localised errors in venous channel development. Their coexistence or diagnostic mimicry can be attributed to overlapping developmental pathways and angiogenic mechanisms [6].

Common diagnostic modalities include routine imaging techniques such as sonography, Computed Tomography (CT) scans, MRI, and newer modalities like digital subtraction angiography [4,7]. AVMs are usually managed through compression, medical therapy, embolisation, and surgical resection when needed [4,8]. There is a fundamental difference, however, between AVMs, which arise due to embryogenic vascular morphogenesis, and non-proliferative slow-flow vascular malformations seen in cavernous haemangiomas [2,3,9]. Haemangiomas are benign by nature, often observed as abnormal proliferations of blood vessels, with intramuscular lesions making up less than 1% of all haemangiomas [9,10]. Very few cases of intramuscular haemangiomas involving the temporal muscle have been documented. These tumours are categorised into three types: capillary, cavernous, and compound [9].

AVMs and cavernous haemangiomas may coexist, presenting a diagnostic and therapeutic challenge, often in the same anatomical location and with varied clinical presentations. There are few cases reported in the available medical literature [11]. Case reports by Eyesan SU et al., and Patten DK et al., documented similar cases of cavernous haemangiomas in the forearm and elbow of an 18-year-old male and a 15-year-old female, respectively. These presented as slow-growing painful masses, with the diagnosis of intramuscular cavernous haemangioma confirmed by histopathological analysis after surgical excision [12,13]. Due to the diagnostic challenges presented by radiological imaging, MRI has been recommended as a reliable tool for differentiating AVMs and cavernous haemangiomas [14].

Cavernous haemangiomas are typically benign, while high-flow AVMs carry risks of haemorrhage, ischaemia, and cardiac overload

[9,11]. The coexistence of these lesions in the same anatomical region may be linked to potential overlaps in early developmental pathways or genetic predisposition. In some cases, diagnostic modalities such as CT and MRI may fail to preoperatively distinguish between these lesions [11]. Therefore, conventional angiography is critical for accurate differentiation, as it is considered the gold standard for diagnosing AVMs [3]. This patient was managed with preoperative embolisation followed by surgical resection.

CONCLUSION(S)

In conclusion, this rare case highlights the diagnostic complexity in differentiating cavernous haemangiomas from AVMs and the vital role of conventional angiography and histopathology in reaching the correct diagnosis. A multidisciplinary diagnostic and therapeutic strategy is essential for optimal outcomes. Future studies focussing on the genetic and embryologic basis of vascular malformations are warranted to improve diagnostic precision and inform personalised treatment approaches.

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