CHAPTER **20**

ARTERIOVENOUS HEMANGIOMA OF THE ANKLE: A Case Study

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INTRODUCTION

Soft tissue masses are a common finding among primary and specialist physicians. In the foot and ankle, ganglion cysts are the most common culprit (1). Arterio-venous hemangiomas (AVHs) are a rare finding in the foot and ankle (2). This article is a presentation of a case study that was initially diagnosed via magnetic resonance imaging (MRI) as a ganglion cyst; later histologic studies proved the mass to be an AVH. Dermatologic manifestations may sometimes arise with extremity AVHs and will further complicate the diagnosis (3). Differentiation between malignant versus benign soft tissue masses is paramount to the treatment and prognosis of the patient.

CASE PRESENTATION

A 30-year-old male presented with a soft tissue mass on the dorsal-medial aspect of his left ankle (Figures 1, 2). The mass first appeared when the patient was approximately 16-years-old. The patient suspects it developed several weeks following an ankle sprain. The mass has been gradually growing in size since the onset and sometimes varies in size depending on activity. The patient reports that it is larger after sports activities. Currently, the mass is moderately painful after he plays basketball but is generally nonpainful. The patient also reports some shoe gear restrictions due to the size of the mass. Upon examination, the skin over the mass did not exhibit any abnormal dermatological manifestations. The dorsalis pedis and posterior tibial arteries were palpable. The mass was fairly firm, not freely movable, and pain was not elicited upon palpation.

Plain radiographs were obtained and revealed a large radiolucent soft tissue mass on the dorsal-medial aspect of the left ankle; no cortical erosion was noted to the tibia or surrounding osseous structures (Figures 3, 4). An ultrasound was not obtained. MRI revealed a "Large cystic appearing mass with multiple septations at the antero-medial ankle and likely compatible with a ganglion cyst arising from an extensor tendon sheath. No evidence of abnormal enhancement. The mass measures approximately 7.8 x 5.8 cm x 2.3 cm" (Figures 5, 6).

Based on the MRI results above, a decision was made to surgical resect the mass. Intra-operatively, the mass was excised in total (Figures 7, 8) using a #15 blade; minimal electro-cauterization was used for hemostasis. An ankle tourniquet was not utilized during the procedure. Primary skin closure was obtained using monocryl. The soft tissue mass obtained was sent to pathology and examined using sectioned slides stained with hematoxylin and eosin. The slides revealed multiple vessels with thickened walls consistent with the diagnosis of a hemangioma versus anterior-venous malformation (Figure 9).

Figure 1. Preoperative anterior view of left foot.

Figure 2. Preoperative medial view.

Figure 3. Preoperative plain radiograph anterior-posterior view of the left ankle.

Figure 4. Preoperative plain radiograph lateral view of the left foot.

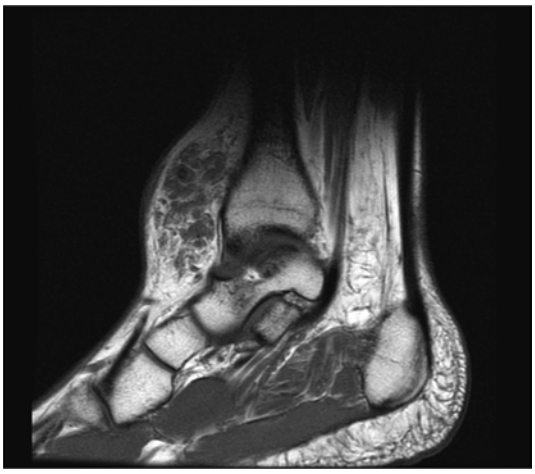

Figure 5. Preoperative T1-weighted sagittal magnetic resonance image.

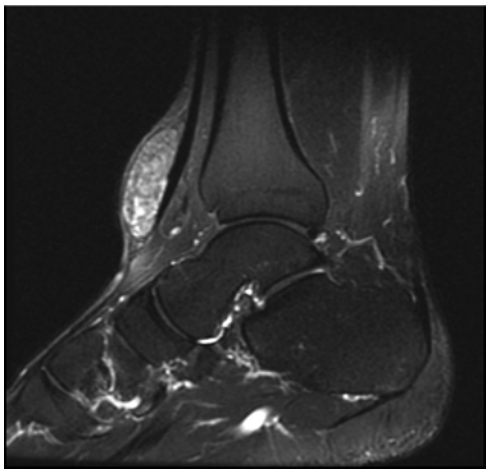

Figure 6. Preoperative T2-weighted fat suppressed sagittal magnetic resonance image.

DISCUSSION

Hemangiomas represent approximately 7-10% of all benign soft tissue masses (4,5). Kransdorf et al studied the prevalence of 18,677 benign soft tissue tumors in 1995. He classified most vascular tumors and malformations as hemangiomas, and found that hemangiomas represented 7.6% (total 1,418) of all soft tissue tumors in the body, of them only 100 (7.1% of all hemangiomas) were located in the foot and ankle (4). Hemangiomas have a slightly higher predilection towards women (6-8). These tumors are more commonly found in young adults (7-9).

Hemangiomas are difficult to distinguish from vascular malformations (10). Hemangiomas are simply defined as very common tumors characterized by increased numbers of normal or abnormal vessels filled with blood (10). Yu et al state that arteriovenous malformations have the component of multiple large feeding arteries (3). To our knowledge, very few cases have been reported. Some authors have adopted the classifications system in which hemangiomas are classified simply as capillary, cavernous, or arteriovenous (10).

Prior to 1982, there was confusion regarding the classification of vascular anomalies (11). Glowacki et al classified these vascular anomalies based on their mitotic activity into hemangiomas and vascular malformations (12). The International Society for the Study of Vascular Anomalies (ISSVA) adopted the system of Glowacki et al and made several modifications since 1982 (11). The current (2014) classification published by the ISSVA classifies vascular anomalies into two categories: vascular tumors, which include hemangiomas, and vascular malformations (13).

Although ganglion cysts are the most common soft

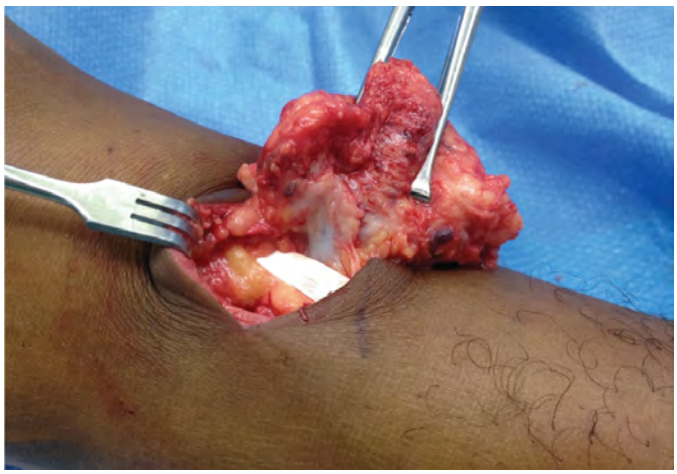

Figure 7. Intraoperative gross image of soft tissue mass.

Figure 8. Soft tissue mass sent for pathologic examination.

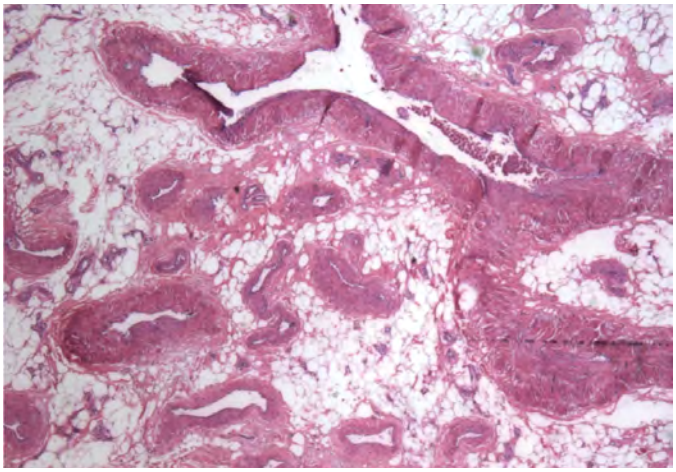

Figure 9. Hematoxylin and eosin stained slide demonstrating thickened vessel walls (x 2).

tissue mass found in the foot and ankle using advanced technology AVHs can be misdiagnosed with these imaging studies and only pathology is definitive (1). In this case, plain radiographs were not helpful in the diagnosis; however they provided valuable information regarding bone involvement of the mass, which was easily ruled out. The MRI failed to diagnose the mass as a hemangioma. Nonetheless, it remains the most accurate noninvasive method to diagnose soft tissue tumors (8), however the MRI was able to classify the mass as benign. Pathology classified the mass in this article as a hemangioma versus arteriovenous malformation, further sub-classification was not pursued.

In conclusion, proper differentiation of the anomaly discussed in this article is difficult, however a few things can be agreed upon based on the clinical, radiographic, and histologic evaluation; it is benign, of vascular origin and not encompassing vital structures. We have decided to classify the soft tissue mass as an arteriovenous hemangioma based on its clinical and histological characteristics as it exhibits characteristics of both a vascular malformation and a hemangioma.

Excision of the tumor should be carefully planned using imaging modalities to avoid damage to neurovascular structures. If an intramuscular hemangioma is presumed, the muscle function, surrounding structures, risks and consequences of damage to the muscle should all be considered.

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