Journal of Case Reports in Practice (JCRP) 2013; 3: xxx

CASE REPORT

Thorough pathological examination is the best practice to examine chronic hematomas suspicious for masquerading cystic soft-tissue sarcomas

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ABSTRACT

Cystic soft-tissue sarcomas have been known to mimic chronic hematomas in clinical and radiological presentation. We report two cases of space-occupying masses previously diagnosed as chronic hematomas, but presenting with recent changes raising concern for malignancy. Preoperative imaging was inconclusive in both cases, leaving biopsy the only possible method of diagnosis. Excisional biopsy of one case confirmed the diagnosis of chronic hematoma. However, in the other case an incisional biopsy was performed and over 90% of the biopsy sample was hemorrhagic and necrotic, resulting in an indeterminate diagnosis. The final diagnosis of high-grade angiosarcoma could only be made after the mass was completely excised and meticulously examined. A thorough specimen sampling technique was used instead of the traditional excisional biopsy sampling techniques. We propose that the best practice to prevent misdiagnosis of a possible soft tissue sarcoma masquerading as a chronic hematoma is to completely excise and thoroughly examine the mass.

Key words: cystic sarcoma, chronic hematoma, excisional biopsy, surgical pathology specimen examination technique

INTRODUCTION

Soft-tissue sarcomas are often difficult to accurately and confidently diagnose due to the rarity of these tumors and a dependence upon clinician experience.[1] In addition, cystic soft-tissue sarcomas can mimic chronic hematomas, occasionally presenting with overlapping clinical and radiographic findings. Diagnosis is thus dependent on thorough histologic examination of the suspected mass. Percutaneously obtaining tissue samples representative of the tumor itself can be difficult, as the tumor cells may only represent a small fraction of the overall lesion in question.[2] As such, we propose thorough histologic examination of the completely excised specimen as the best practice to decrease the risk of misdiagnosing a soft-tissue sarcoma disguised as a chronic hematoma.

CASE 1

A 74-year old Caucasian man presented for evaluation of recent changes associated with a long-standing left thigh mass. He reported having the mass for the last 50 years but could not recall a causal event.

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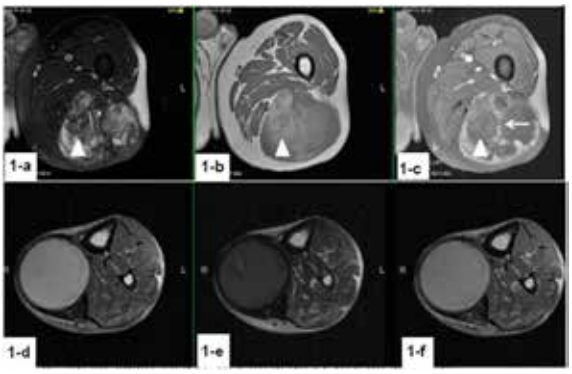

Figure 1, (top row). Axial MRI of the proximal thigh angiosarcoma – (a) fat suppressed T2-weighted, (b) T1-weighted, and (c) contrast-enhanced fat suppressed T1-weighted images demonstrate heterogeneous posterior thigh mass with internal non-enhancing T1-hyperintense hemorrhage/clot (arrowheads) and enhancing mural and septal nodularity (arrows).

Figure 1, (bottom row). Axial MRI of the calf chronic hematoma – (d) T1-weighted, (e) T2-weighted, and (f) non-fat suppressed contrast-enhanced T1-weighted MR imaging demonstrates a well-defined, encapsulated space-occupying mass in the posteromedial calf with internal T1-hyperintense and T2-hypointense signal and a thin smooth non-enhancing rim of hypointense tissue.

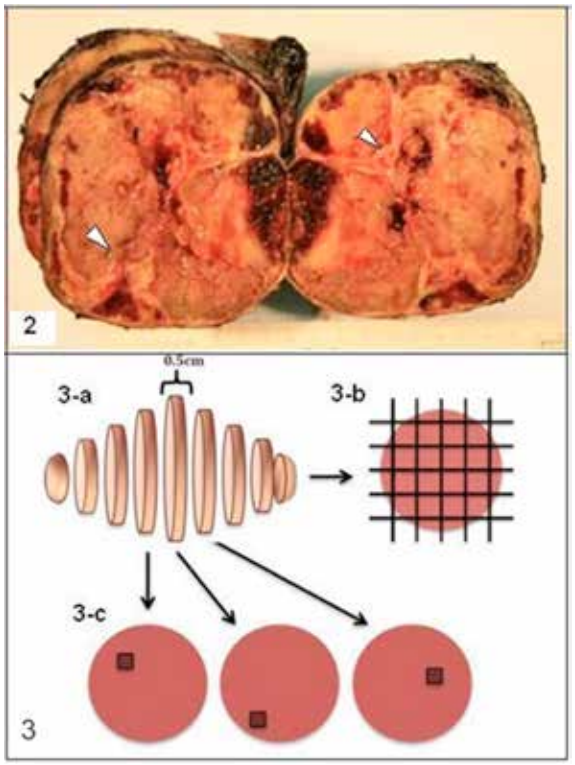

Figure 2, Cut surface revealing an encapsulated, yellow to red-brown, somewhat nodular, hemorrhagic, necrotic mass. The tumor resides in the fibrous/septal areas (marked by arrowheads).

Figure 3, Diagram representing method of histologic examination.
(a) tumor was serially sectioned at 0.5cm intervals
(b) complete cross section of one 0.5cm serial section was entirely submitted for histologic examination in serial blocks.
(c) one area of each remaining 0.5cm section was submitted to include additional hemorrhagic, necrotic, fibrous/septal and most suspicious areas of the tumor. The margin closest to the tumor was examined (not shown here).

The patient stated it was proven benign by a biopsy performed 20 years ago and elected not to have it removed at that time. An MRI performed 19 years ago revealed a multiseptated cystic and necrotic mass in the posterolateral aspect of the left thigh of uncertain etiology. A follow-up MRI performed 10 months later revealed stability of the lesion with no change in size. The patient reported that for 6 months prior to his current presentation, the mass had steadily increased in size and he was experiencing pain in his left thigh and entire left leg. During these 6 months he also noticed gradual increasing left calf tightness, flattening of the arch of his left foot, and impaired left foot dorsiflexion. Physical exam upon presentation revealed a very large, mobile, and tender soft tissue mass on the posterior left thigh with a well-healed incisional scar on the distal portion of the mass. There was atrophy of the left calf and foot, loss of dorsiflexion and non-fixed supination of the left foot. MRI revealed a 13 x 11 x 10 cm, well-circumscribed heterogeneous posterior thigh mass with internal mostly hypointense T2-weighted signal which did not enhance as well as suspicious areas of peripheral mural nodularity and thickened, nodular septations which do enhance following IV contrast administration (Fig. 1-a, b, c). Proximally, the mass was shown to engulf the sciatic nerve (not shown in figure).

Initially, an incisional biopsy was performed. Grossly, the specimen consisted of fragments of soft, red-brown, friable tissue with an aggregate measurement of 5.0 x 4.0 x 3.0 cm. Histologically, the specimen consisted of fragments of fibrin and blood clots with scattered histiocytes, thin-walled vessels, microcalcifications, and scant muscle tissue compatible with an organizing hematoma. However, given the long history of the mass and his current neurologic deficit, a more thorough examination of the mass was deemed necessary to rule out a more aggressive lesion and to help alleviate his symptoms. The patient returned to the O.R. two weeks later for complete excision of the mass.

Grossly, the lesion was a 14 x 10 x 9 cm encapsulated, firm mass with a gray, tan-pink external surface. Cut surfaces revealed an encapsulated, yellow to red-brown, somewhat nodular, hemorrhagic, necrotic mass (Fig. 2), which grossly came within 1mm of the margin of resection. Approximately 90% of the cut surfaces were comprised of grossly hemorrhagic and necrotic tissue. Areas that are firm, fibrous appearing and septal are also seen. The mass was serially sectioned at 0.5 cm intervals. A complete cross section representative of the tumor was entirely submitted for histological examination in addition to other representative sections of different areas of the tumor (Fig. 3). Histologically, the tumor was composed of pleomorphic spindle and epithelioid cells forming rudimentary vascular channels with extensive hemorrhage (Fig. 4). Frequent mitotic activity (up to 20/10 HPF) with atypical mitosis was present. There was abundant associated fibrin and blood clots with focal dystrophic calcification and recanalization of thrombi. Immunohistochemistry stains were performed with appropriate controls. Tumor cells were positive for vimentin, CD 31 (Fig. 5) and CD 34, and were focally positive for AE1/3/CAM5.2, while negative for desmin and actin. Manual quantitative (morphometric) analysis revealed Ki-67 positivity (3+) in 60% of the tumor cell nuclei and P53 positivity (3+) in 20% of the tumor cell nuclei. After further gross, histologic, and immunohistochemical staining, this previously diagnosed hematoma was determined to be a high-grade angiosarcoma. The viable tumor occupied only a small portion of the entire mass and resided in the fibrous septal areas.

The patient recovered well after surgery. Staging chest CT was performed and demonstrated no evidence of pulmonary metastatic disease. His case was discussed at a multidisciplinary tumor board and the decision was made for him to receive adjuvant radi-

ation therapy. He received 66 Gy external beam radiation therapy to the left thigh. Postoperative thigh MRIs have shown no evidence of local tumor recurrence to this point. His foot-drop has persisted; meanwhile he continues to undergo surveillance imaging of the surgical bed for recurrent disease and of the chest for development of delayed pulmonary metastases.

CASE 2

A 64-year old Caucasian man presented for evaluation of recent changes to a chronic hematoma present in his left posterior calf. The patient stated the hematoma had been present for about 15-20 years and was the result of an all-terrain vehicle accident. Results of an MRI performed 7 years earlier suggested the mass was a chronic hematoma with mixed elements. The mass was partially resected at an outside institution a year later. The patient reported recovering well and the mass remained unchanged without pain for 6 years.

Two months prior to his presentation, the mass became softer distally with skin breakdown and eschar formation along the distal aspect of his previous surgical scar, prompting the patient to seek evaluation. Physical exam revealed a hard, non-tender, 10 x 6 cm mass on the posteromedial aspect of the left calf, with an eschar at the distal aspect of the lesion. A new MRI revealed the soft tissue mass was largely homogeneous with increased T1-weighted signal intensity, decreased T2-weighted signal intensity, peripheral hypointense rim of tissue, and no enhancement following intravenous contrast administration (Fig. 1-d, e, f). Excisional biopsy of the mass was scheduled. However, in the week prior to the procedure, the previously intact eschar broke down and the lesion began draining large quantities of serosanguineous fluid. The patient reported fevers, chills, and development of erythema extending up his calf. He was taken to surgery the following day and the mass was excised. Grossly it consisted of a 14.0 x 8.5 x 6.5 cm, roughly elliptical mass with a portion of fibromembranous tissue and an 11.5 x 3.0 cavity with a red-brown hemorrhagic lining. The mass was carefully sectioned and examined following the same practice in Case 1. Histologically, it consisted of organized fibrin and hemorrhage with a fibrous wall. Marked acute inflammation was present involving the hematoma and adjacent fibro-adipose tissue. These histologic changes, as well as the acute onset of physical exam and history changes, were consistent with an infected hematoma. The patient did well after surgery and remained on antibiotics for 4 weeks after the surgery. The incision site healed well without drainage and showed no sign of recurrent hematoma formation

DISCUSSION

In this case series, we present two masses in the lower extremity appearing as chronic hematomas. In both

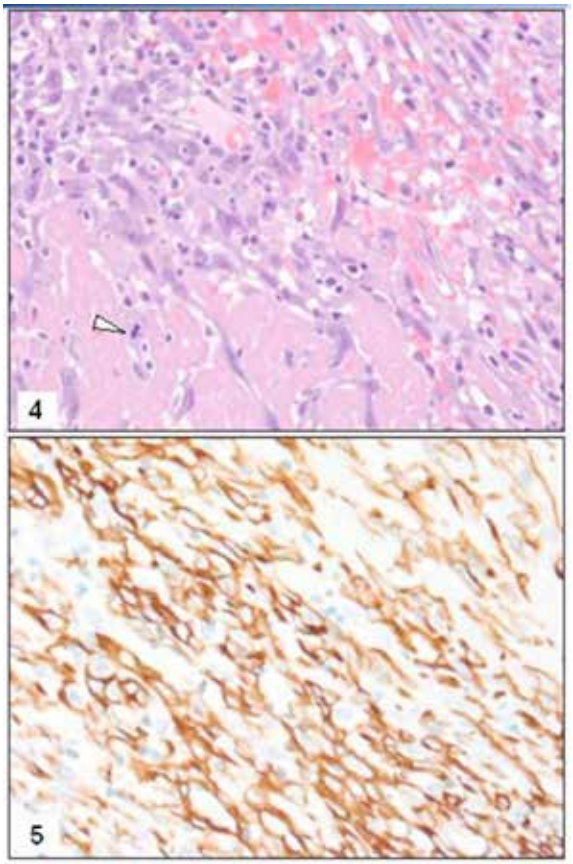

Figure 4, H&E stain showing pleomorphic spindle and epithelioid cells forming rudimentary vascular channels with extensive hemorrhage. Mitotic activity is frequent (arrowhead). Magnification x 400.

Figure 5, Tumor cells are highlighted by positive CD31 immunohistochemical stain confirming it is an angiosarcoma. Magnification x 400.

cases, the masses had each been previously diagnosed as a chronic hematoma based on magnetic resonance imaging findings and biopsies. However, changes to the masses as well recent symptoms associated with the masses prompted both patients to seek further evaluation. Given the fact that chronic hematomas have been known to mimic cystic soft tissue sarcomas, a high index of suspicion was taken with each case.[4, 5]

Clinically differentiating a cystic soft tissue sarcoma from a chronic hematoma proves difficult, as a history of trauma, bleeding diathesis, or anti-coagulant therapy is not an absolute indicator for chronic hematoma and, furthermore, does not exclude the presence of malignancy.[3] MR imaging remains the gold standard for characterizing soft tissue masses and using a systematic approach to interpreting MR images can help construct an appropriate differential diagnosis.[6] Chronic hematomas usually demonstrate increased T1-weighted signal intensity due to acute or subacute hemorrhage and decreased T2-weighted signal intensity due to the presence of chronic blood products.[7, 8] In many cases, a smooth, thin, non-enhancing hypointense peripheral rim of signal will be

seen representing peripheral hemosiderin or a fibrous capsule.[3, 9] Hyperintense signal on T1-weighted imaging may be seen with fat/lipid, hemorrhage, MRI contrast agents, and melanin. 10-13 Hypointense signal on T2-weighted imagine may be seen in the presence of products of chronic degradation of blood including hemosiderin, fibrous tissue as in collagen/fibrous forming benign and malignant neoplasms, calcification, and vascular flow voids.14, 15 Contributing to the diagnostic difficulty, many of these imaging findings and features may be present in both chronic hematomas and various soft tissue neoplasms including highly vascularized, hemorrhagic soft tissue sarcomas.[6] The presence of enhancing soft tissue nodules or thickened, nodular enhancing internal septations must raise concern for a hemorrhagic neoplasm rather than chronic hematoma.

In regards to Case 1, the prior outside MRI reports described the mass as "multiseptated" and "cyst-like" with short-term stability over a period of 10 months. This was felt to support the notion that the mass was benign, most likely a stable, chronic hematoma. However, more recent MRI revealed a posterior thigh mass with internal heterogeneity including non-enhancing hypointense T2-weighted signal consistent with chronic blood products, but also concerning areas of enhancing mural and septal nodularity. Additionally, the mass was seen to engulf the sciatic nerve. These findings, in addition to the history and physical exam findings, suggested a more aggressive neoplastic process. While certain features of a soft tissue mass may strongly suggest a specific diagnosis, soft tissue sarcomas may alternatively have nonspecific imaging characteristics on MRI. Nonspecific findings, including low T1-w signal, high T2-w signal, and contrast enhancement, are typical of most soft tissue masses. Additionally, the presence of heterogeneous signal intensity in the setting of internal hemorrhage of differing stages of hematopoietic cell degeneration may further confound the diagnosis warranting soft tissue biopsy.[7, 8]

Studies have demonstrated the accuracy of limited sampling techniques, such as core needle biopsy and fine needle aspiration biopsy (FNAB), in diagnosing soft tissue sarcomas.[16] However, tumor cells are not necessarily present in the limited samples, especially for cystic soft-tissue masses. Therefore, open biopsy is more commonly preferred over aspiration biopsy cytology or core biopsy to diagnose and differentiate chronic hematomas from soft tissue sarcomas.[2], 4, 5Malignancies largely composed of necrotic tissues, in which the tumor cells only occupy a small portion of a large mass, such as the sarcoma in Case 1, random, limited sections of the tumor for histology review may risk missing the diagnosis of malignancy. Therefore, it was only after the completely excised mass in case 1 was thoroughly sampled by serial sectioning and submitting at least one entire representative cross section of the tumor that the final diagnosis of high-grade angiosarcoma was made. Traditional sampling technique, which requires one random section per 1 cm lesion, would have most likely under sampled this cystic mass and thus missed the tumoral area.

Furthermore, long standing hematoma history does not warrant a benign diagnosis, because a hematoma can be an underdiagnosed benign vascular tumor, which can undergo malignant transformation into a sarcoma over time. We speculate this is what happened in Case 1.

CONCLUSION

In summary, cases of cystic soft tissue sarcomas masquerading as chronic hematomas, clinical presentation alone is not adequate to differentiate a malignancy from a chronic hematoma, as both can present with similar history and physical exam findings. Using a systematic approach to differentiate cystic sarcomas from chronic hematomas including careful analysis of preoperative imaging for suspicious nodules or septae is particularly important as other imaging findings may be present in both chronic hematomas and hemorrhagic neoplasms. Furthermore, one must consider the potential for under-diagnosing a high-grade sarcoma if only a small portion of the tumor is histologically examined. We thus suggest not only having a high level of suspicion for cystic soft tissue sarcomas mimicking chronic hematomas, but suggest the best practice to rule out malignancy is complete excision of the mass for thorough pathological examination.

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