Case Report

Hemosiderotic Fibrohistiocytic Lipomatous Lesion

A Clinicopathologic Characterization

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Abstract

Background A hemosiderotic fibrohistiocytic lipomatous lesion, also called hemosiderotic fibrolipomatous tumor, is a rare and recently described fibrolipomatous entity. Initially considered the result of a reactive inflammatory process from trauma or vascular disease, newer evidence suggests it may be neoplastic in origin.

Case report We report the case of a 56-year-old woman with a painful mass in the dorsal aspect of the foot diagnosed as a hemosiderotic fibrohistiocytic lipomatous lesion.

Literature review We reviewed all 31 published cases of hemosiderotic fibrohistiocytic lipomatous lesions looking for common clinical, imaging, and histologic patterns. Hemosiderotic fibrohistiocytic lipomatous lesions occur

predominantly in the fifth and sixth decades of life (average age, 49.5 years; range, 0.67–74 years). Females predominate 22 to 9. Thirteen of 28 patients had histories of trauma or vasculopathy. Twenty-six of 31 lesions were in the foot. The MRI signal of a hemosiderotic fibrohistiocytic lipomatous lesion follows fat in all sequences. Stranding or septations also frequently are seen. Histologically, the lesions are composed of three main elements in varying proportions: mature adipocytes, spindle cells, and hemosiderin pigment. Ten of 27 resected lesions recurred. Resection types are not reported in many cases. Four of 15 lesions recurred after marginal/intralesional excision, whereas none of three lesions treated by wide excision recurred.

Purpose and clinical relevance The high recurrence rate may be related to the difficulty in determining intraoperatively that a resection is complete, secondary to the lack of anatomic boundaries such as a pseudocapsule. Any attempt at wide resection must weigh the morbidity of this surgery against that of a recurrence after a resection which seemed complete intraoperatively. There have been no reports of metastasis.

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Introduction

A hemosiderotic fibrohistiocytic lipomatous lesion (HFLL) is a rare and presumably benign fibrolipomatous entity [9]. Including its first description by Marshall-Taylor and Fanburg-Smith [9] in 2000, a total of 31 cases have been published in the scientific literature, primarily in pathology journals [1, 2, 5, 7–11]. There are no prior reports of HFLL in any of the orthopaedic or major tumor literature. The lesions typically are painful, slow-growing, soft tissue masses in the foot/ankle of middle-aged women [1, 2, 5, 7–11].

Recurrence has been common after surgical excision, but there have been no reports of metastasis [1, 5, 7–10]. Marshall-Taylor and Fanburg-Smith recognized a history of antecedent trauma in their seminal report, prompting them to postulate these lesions were reactive [9]. However, some subsequent authors have questioned this assessment [1, 3, 11]. Believing HFLL to be neoplastic in origin, Browne and Fletcher [1] and others [5, 11] have chosen instead to call this entity hemosiderotic fibrolipomatous tumor (HFT).

Marshall-Taylor and Fanburg-Smith [9] found HFLL/HFT in 10 (0.2%) of the benign lipomatous lesions in the soft tissue registry of the Armed Forces Institute of Pathology. Including our report, there have been 31 documented cases of HFLL/HFT [1, 2, 5, 7–11]. However, the clinicopathologic characteristics of these uncommon and unusual lesions are variably reported.

We report one patient with HFLL/HFT and review the literature on HFLL/HFT and attempt to characterize its clinical, imaging, and histologic patterns.

Case Report

A 56-year-old woman had a 10-year history of a painful right foot mass. On a visual analog scale she reported her pain as 7 of 10 in intensity; the pain was intermittent and dull. She denied fever, chills, night sweats, or weight loss. Her medical history was notable for three prior right foot operations for tarsal tunnel syndrome, all of which were performed more than 10 years before the current presentation.

Physical examination revealed a soft, mobile, and tender mass on the dorsal aspect of the right foot. There was no associated edema, erythema, or increased warmth. Strength, ROM, neurologic examination, and vascular examination were unremarkable.

MRI revealed a 7.0- × 5.0- × 2.0-cm mass in the subcutaneous tissue of the dorsal right foot (Fig. 1) with ill-defined margins. Predominant signal intensity followed fat in all sequences: bright on T1 (Fig. 1A) and intermediate on fat-suppressed T2 (Fig. 1B–C). Internal stranding/separations of low signal intensity were seen. There was no enhancement with contrast. The differential diagnosis at this time included simple lipoma, lipoma variant, and atypical lipoma/well-differentiated liposarcoma.

Given the clinical history and radiographic findings, a benign process was strongly suspected. Surgical removal of the mass therefore was recommended and subsequently performed. Intraoperatively, because the lesion lacked a pseudocapsule and was adherent to the overlying skin, an intralesional excision was required instead of a marginal excision. Small portions of the remaining lesion required piecemeal removal with a rongeur. Grossly, it was a fatty tumor with areas of hemosiderin deposition.

Histologic analysis revealed mature fat and spindle cells, with strands of dissecting fibrous tissue, and abundant macrophage-engulfed hemosiderin (Fig. 2A). Scattered chronic inflammatory cells and rare giant cells were present. The spindle cells were consistent with fibroblasts or fibrohistiocytic cells; no atypia was identified (Fig. 2B). We interpreted these findings as diagnostic for HFLL/HFT.

There were no operative or postoperative complications. The patient was last seen and examined 18 months after surgery. She was doing well clinically, without recurrence or complaint.

Discussion

HFLL/HFT is a rare and presumably benign fibrolipomatous entity [1, 9]. Marshall-Taylor and Fanburg-Smith [9] first described the lesion in 2000 after recognizing its seemingly reproducible clinical and histopathologic

Fig. 1A–C (A) A coronal T1-weighted MR image shows a high-signal mass superficial to the metatarsals that is predominantly fat-intense. (B) A coronal T2-weighted fat-suppressed MR image shows a predominantly fat-intense mass. Also present, as indicated by the

arrows, are unrelated areas of high and low signal intensity that represent postsurgical changes from the patient's prior foot surgeries. (C) A sagittal T2-weighted fat-suppressed MR image again shows a fat-intense mass superficial to the metatarsals.

Fig. 2A–B (A) At low power, fibrous bands course through benign fatty tissue, and dark deposits of hemosiderin are seen (Stain, hematoxylin and eosin; original magnification, $\times 100$). (B) At high power, fibrohistiocytic spindle cells contain engulfed hemosiderin, and giant cells surround dark hemosiderin crystals (Stain, hematoxylin and eosin; original magnification, $\times 400$).

features. In this report, we describe the 31st documented case of HFT in the scientific literature [1, 2, 5, 7–11] (Table 1).

Marshall-Taylor and Fanburg-Smith [9] reported a history of acute or repetitive local trauma in seven of eight patients in their seminal report. This history, their usual superficial location, and several histologic features, including lack of encapsulation, homogeneously sized adipocytes, and inflammatory infiltrates, prompted them to postulate these lesions are attributable to reactive processes. Such an etiology is possible in our patient given that she had HFT develop at a prior surgical site. Kazakov et al. [7] similarly supported this reactive hypothesis by proposing a clinical correlation with tissue injury from venous stasis. Newer studies have not identified a history of trauma or vascular disease as frequently [1, 2, 10], but our review revealed 13 of 28 (46%) reported patients had a history of previous trauma or substantial

vasculopathy [1, 2, 5, 7–11]. The consistency of the lesion's histologic appearance, immunohistochemistry, and cytogenetic analyses revealing clonal translocations between chromosomes 1 and 10 ($t(1;10)(p31;q25)$ and $t(1;10)(p22;q24)$), also prompted some authors to suggest HFT is neoplastic in origin [1, 3, 5, 11].

Our review suggests HFT predominately occurs during the fifth and sixth decades of life (mean age, 49.5 years; range, 0.67–74 years) [1, 2, 5, 7–11]. There is a strong female predilection of 22:9 [1, 2, 5, 7–11]. The lesion typically presents as a painful, slow-growing mass in subcutaneous tissue [1, 2, 5, 7–11]. It most frequently occurs in the foot/ankle (84%). Other sites include the hand, calf, thigh, and cheek [1, 2, 5, 7–11]. The average lesion size is 7.7 cm (range, 0.1–19 cm) [1, 2, 5, 7–11].

Our case is in agreement with the few previous reports of HFT imaging studies describing fatty tumors with ill-defined borders. West et al. [10] and de Vreeze et al. [2] presented cases that were isointense to fat on T1- and T2-weighted sequences. These authors also noted scattered reticular structures of intermediate to low signal intensity, presumably correlating to the fibrous components of the lesion. These basic features also were seen in our case but are not diagnostic of one specific tumor. Given the pathologic presence of hemosiderin deposition in these lesions, a T2* or other susceptibility-weighted imaging sequence is expected to reveal scattered dot-like dark deposits. This feature could be helpful in radiographically distinguishing HFT from other fatty lesions. However, de Vreeze et al. [2] did not recognize such a finding in their dynamic gradient echo sequences and no other T2* or susceptibility-weighted imaging has been published for HFT. MRI appearance after contrast is unclear, as one reported case was enhanced whereas ours was not [2]. West et al. [10] also reported radiographs of HFT with heterogeneous thickening of subcutaneous fat and dystrophic calcification in the lesion area.

Based on imaging alone, the primary differential diagnosis for HFT includes simple lipomas, lipoma variants, and atypical lipomas/well-differentiated liposarcomas. All of these lesions are grossly fatty masses with significant overlap in their range of appearances [2, 4]. Simple lipomas typically have a characteristic appearance on MR images: a discrete, encapsulated, homogeneous fatty mass. However, some simple lipomas can contain muscle fibers, blood vessels, fibrous septa, and areas of necrosis or inflammation that can mimic the findings associated with lipoma variants, atypical lipomas/well-differentiated liposarcomas, and HFT [4]. Imaging features characteristic of atypical lipomas/well-differentiated liposarcomas include: a fatty mass with thickened or nodular internal septa, nonadipose components, foci of high T2 signal, and areas of enhancement [2, 4, 6]. Lipoma

Table 1. Reported clinical characteristics of HFLL/HFT

Study	Patient	Gender	Age (years)	Size (cm)	Location	Trauma history	Treatment	Recurrence	Time to recurrence (months)	Followup (months)*
Marshall-Taylor and Fanburg-Smith [9]	1	Male	51	4.5	Ankle	Yes	Excision	No		48
	2	Female	42		Cheek	No	Excision	Yes	< 36	
	3	Female	42	2.5	Distal calf	Yes	Excision	No		120
	4	Female	47	8	Foot/ankle	Yes	Intralesional excision	No [†]		276
	5	Female			Dorsal foot	Yes		Yes	< 36	
		Female	48	8	Dorsal foot	Yes	Excision	No		156
	6	Female	49	10.5	Dorsal foot	Yes	Excision	No		264
	7	Male	49	3	Finger	Yes	Excision	No		12
	8	Female	57	11	Foot		Excision			
	9	Female	58	17	Foot		Excision			
Kazakov et al. [7]	10	Female	63	5	Foot/ankle	Yes	Excision	Yes	< 36	
		Female			Foot/ankle	Yes	Excision	No		< 252
	1	Female			Dorsal foot	No	Excision	Yes	36	
		Female			Dorsal foot	No	Excision	Yes	12	
		Female	48	6	Dorsal foot	No	Excision	No		12
Browne and Fletcher [1]	2	Female	60		Dorsal foot	No	Excision	No		6
	1	Female	50		Foot	2 of 13 patients				
	2	Male	0.75	0.1	Foot			Yes	24	
	3	Male	57		Hand		Excision, positive margins	No		6
	4	Female	43	4.5	Foot		Excision, positive margins	Yes	11	
	5	Male	67	5	Ankle		Excision, positive margins			
	6	Female	35	12	Ankle		Excision, positive margins			
	7	Male	69	3.8	Foot			No		1
	8	Female	63	10	Foot		Wide resection, negative margins	No		36
	9	Male	41	2.5	Foot		Excision, positive margins	No		3
	10	Female	49	13	Foot		Excision, positive margins			
	11	Female	74	3.4	Ankle		Wide resection, negative margins	No		9
	12	Male	55	4.2	Foot		Wide resection, negative margins	No		12
	13	Female	32	9.5	Foot		Excision, positive margins	Yes	60	
Luzar et al. [8]	1	Female	47	5	Foot/ankle	Yes	Excision	Yes	36	
West et al. [10]	1	Female	38	16	Dorsum	No	Excision	Yes	18	
de Vreeze et al. [2]	1	Male	66	19	Thigh	No	Excision			
Wettach et al. [11]	1	Female	35		Foot		Excision			

Table 1. continued

Study	Patient	Gender	Age (years)	Size (cm)	Location	Trauma history	Treatment	Recurrence	Time to recurrence (months)	Followup (months)*
Hallor et al. [5]	1	Female	40	8	Dorsal ankle		Intralesional excision	No [†]		71
Current study	1	Female	56	7	Dorsal foot	Yes	Intralesional excision	No		18

* Recurrence-free followup since last surgery; [†]patient with residual disease after treatment, but no stated regrowth; HFLL/HFT = hemosiderotic fibrohistiocytic lipomatous lesion/hemosiderotic fibrolipomatous tumor.

variants have an even wider range of appearances, reflecting their pathologic diversity, but often will include thin internal septa and other nonadipose components [4]. High-grade liposarcomas can be excluded from the differential diagnosis of grossly fatty lesions as they generally contain only minimal amounts of macroscopic fat [4].

Grossly, HFLL/HFT is described as dark yellow or yellow-brown fatty tissue [1, 2, 5, 7–10]. Several reports also note areas of macroscopic hemorrhage [1, 7]. Histologically, the lesions are composed of three main elements in varying proportions: mature adipocytes, spindle cells, and hemosiderin pigment [9]. The predominant component in most specimens is mature adipocytes, in correlation with the MRI and gross appearance of most HFLLs/HFTs [9]. The adipocytes are arranged in lobules, with fibrous septae composed of spindle cells and inflammatory cells percolating through in a honeycomb-like pattern [9]. The fibrous septae also can be seen surrounding blood vessels and individual adipocytes [9]. The spindle cells are described as plump, slightly pleomorphic, and fibrohistiocytic [9]. Prominent hemosiderin deposition is present in all lesions, mainly in macrophages but also in the cytoplasm and extracellular matrix of some spindle cells [9].

HFLL/HFT can be confused histologically for several other processes. The literature provides cases of HFLL/HFT mistakenly diagnosed as spindle-cell lipomas, well-differentiated liposarcomas (WDLS), and other lipomatous tumors [1, 9]. Unlike the heterogeneous adipocytes of most lipomatous neoplasms though, the adipocytes of HFLL/HFT are homogeneously sized [9]. HFLL/HFT also lacks the prominent myxoid stroma seen in spindle-cell lipoma, and the lipoblasts and scattered pleomorphic hyperchromatic stromal cells seen in WDLS [1, 9]. Other lesions that HFLL/HFT can be misdiagnosed as include fibromatosis, fibrous histiocytoma, nodular fasciitis, dermatofibrosarcoma protuberans, and pleomorphic hyalinizing angiectatic tumor (PHAT) [1, 5, 9]. The presence and prominence of adipocytes in HFLL/HFT distinguish it from these fibroblastic and fibrohistiocytic lesions [9]. However, some authors still propose HFLL/HFT is an early form of PHAT [3].

Although the paucity of HFLL/HFT cases makes it difficult to establish consensus, the prognosis for these lesions generally is considered good owing to their slow growth and benign histologic appearance [9]. The lack of metastases in any of the reported patients further supports this benign presumption. Of the 27 lesions reported in the literature with followup information available, we found 10 (37%) cases of local recurrence and two (7%) cases of residual disease [1, 5, 7–10]. Recurrences, on average, occurred 28 months (range, 11–60 months) after treatment. The two cases of residual disease appear to have been attributable to partial excisions at the time of treatment.

Of the cases with treatment details and followup information available, four of 15 (27%) lesions treated by marginal/intralesional excision recurred [1, 9]. In comparison, none of three lesions treated by wide excision recurred, although their average followup was only 19 months (range, 9–36 months) [1]. This high recurrence rate may be related to the difficulty in determining intraoperatively that a resection is complete, secondary to the lack of anatomic tumor boundaries such as a pseudocapsule as occurred in our case. Considering the lack of morbidity from recurrent or residual disease and the lack of any known metastasis, we do not believe wide excisions or other aggressive treatments need to be pursued for HFLL/HFT, especially at the risk of major surgical complications. Instead, patients should be educated about the risk of recurrence and consideration given to yearly clinical followup.

HFLL/HFT is a rare soft tissue lesion with unique histologic features and debated etiology. It typically presents as a painful, slow-growing, soft tissue mass in the foot/ankle of middle-aged women. Physical examinations and imaging studies are not specific for these lesions, so histologic analyses are required for accurate diagnosis. Although there is no definitive answer regarding whether it is reactive or neoplastic in origin, we believe HFLL/HFT should be treated by complete marginal/intralesional excision and followed with examinations or imaging until more data are available for these rare and curious lesions.

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