Vascular Leiomyomas in the Hand

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Vascular leiomyomas or angioleiomyomas are benign solitary smooth muscle tumors that occur uncommonly in the hand. The peak incidence is in the third to fifth decades of life, and men are more often affected than women. This tumor is rarely diagnosed before surgery. The usual treatment is simple excision of the mass and ligation of feeder vessels. Although the tumors occur anywhere in the hand, there are only two previous cases of vascular leiomyoma involving the digital artery. A recent case of this tumor involving a digital artery documented by arteriography and treated by excision of the mass and end-to-end anastamosis of the artery is presented. The authors review their experience with vascular leiomyomas in the hand and present four cases along with a review of 105 cases found in the English literature. (J Hand Surg 1994;19A:281–286.)

Vascular leiomyomas or angioleiomyomas are benign solitary tumors of smooth muscle origin and arise from the muscularis layer of vessel walls. The tumor often presents as a slow-growing, firm, mobile, occasionally painful mass in the lower extremities of women. The mass is often misdiagnosed when it develops in the hand. The usual treatment is simple excision of the mass and ligation of feeder vessels. In 1937, Stout[1] presented three cases of angiomatous leiomyoma in the hand and reviewed 95 cases of solitary leiomyoma in the skin. Since then only two case reports[2,3] have documented the tumor arising from a digital artery. Several authors[4–10] have presented case reports of the tumor developing elsewhere in the hand. Weisman,[11] Neviaser et al.,[12] Akizawa,[13] Hachisuga et al.,[14] and Freedman and Metand[15] have all reported several cases occurring in the hand.

We present an unusual case of vascular leiomyoma arising from a digital artery in the hand. An arteriogram of the tumor and an end-to-end anastamosis of the involved artery following excision of the mass is shown. Four additional cases treated by the Roosevelt Hospital Hand Service (New York, NY) over the past 9 years are presented along with a comprehensive review of 105 cases of vascular leiomyoma in the hand reported in the English literature.

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Case Reports

Case 1

A 38-year-old left-handed man presented with a 2½-year history of a progressively enlarging mass on the left ring finger. He sought treatment because he was unable to wear his wedding ring. Prior hand trauma included frequent racquetball playing and a laceration on the radial aspect of this finger at the proximal interphalangeal joint level 17 years previously. The 1.0 × 1.5 cm mass was soft, nontender, and mobile on the anterolateral aspect of the proximal phalanx. Doppler study of the finger showed venous and arterial flow over the mass and good flow distally. An arteriovenous malformation was diagnosed, and the mass was observed. Over 7 months the mass enlarged to 1.5 × 1.5 cm. An x-ray film showed a soft tissue mass on the radial side of the finger with no bone involvement. The patient declined surgical treatment. Two years later the patient returned for further evaluation (Fig. 1). He ob-

Figure 1. A 2.0 × 1.0 cm slow-growing mass on the anterolateral aspect of the left ring finger over the proximal phalanx.

served the mass to fluctuate in size and it had become painful. Two-point discrimination was 5 mm in the left ring finger and 3 mm in the remaining digits. The mass measured 2.0 × 1.0 cm and did not limit mobility.

Since a vascular lesion was suspected, an arteriogram (Fig. 2) was obtained to visualize the arterial and venous anatomy adjacent to the mass. The principal blood supply to this mass came from the distal ulnar artery/superficial palmar arch. The third/fourth common digital artery was enlarged and supplied the ulnar aspect of the middle finger and the radial aspect of the ring finger. It perfused a vascular mass that overlay the proximal phalanx of the ring finger. The mass displaced the radial digital artery anteromedially. A vascular soft tissue mass was presumed; however, a pseudoaneurysm with perianeurysmal inflammation could not be excluded. A patent digital artery on the ulnar aspect of the fourth digit was present.

At surgery a 2.5 × 1.5 cm well-defined mass surrounding the radial digital artery on the left ring finger was excised (Figs. 3–5). An end-to-end microsurgical anastamosis of the radial digital artery was performed. Frozen-section and final pathologic analysis revealed a cystic vascular space occupied with organizing thrombosis. The mass consisted of interlacing bundles of smooth muscle with large vascular spaces (Fig. 6). There was no elastic tissue within the vascular leiomyoma, and the resected proximal and distal portions of the radial digital artery showed no pathologic findings. After surgery the patient was prescribed 325 mg aspirin daily. The wound was immobilized in a plaster cast for 1 week followed by a splint with an extension block for 2 weeks. The digit regained full range of active motion in 4 weeks. The tumor has not recurred and the digital artery remains patent during 2 years' follow-up.

Case 2

A 36-year-old man presented with a painless left index finger mass of 2 weeks duration. Measuring 2.0 × 2.0 cm and lying over the ulnar side of the proximal phalanx, the preoperative diagnosis was giant cell tumor of tendon sheath. Pathologic analysis of the mass revealed an angioleiomyoma, and an incidental ganglion was found over the A2 pulley at the time of operation.

Case 3

A 39-year-old man presented with a soft, nontender mass on the ulnar aspect of the left ring finger distal to the proximal interphalangeal joint present

Figure 2. An arteriogram of the left hand demonstrates a vascular mass at the base of the ring finger.

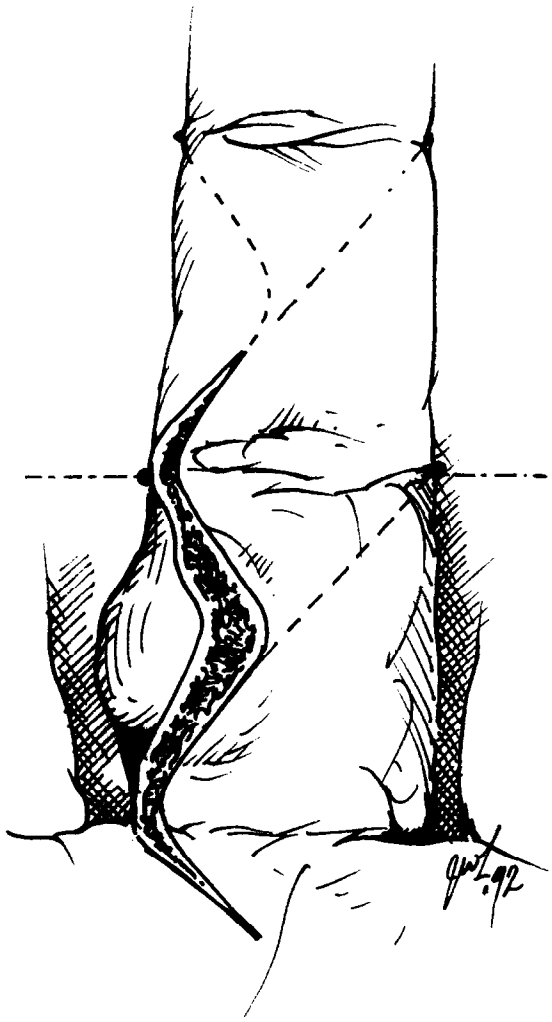

Figure 3. Skin incision used to excise the mass in case 1.

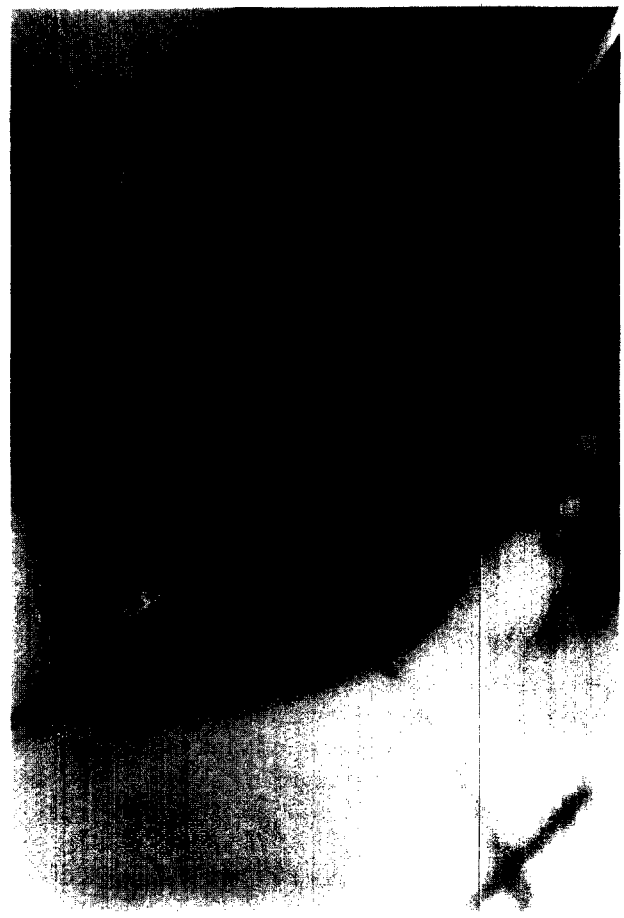

Figure 4. Vascular leiomyoma prior to exposure of feeder vessels.

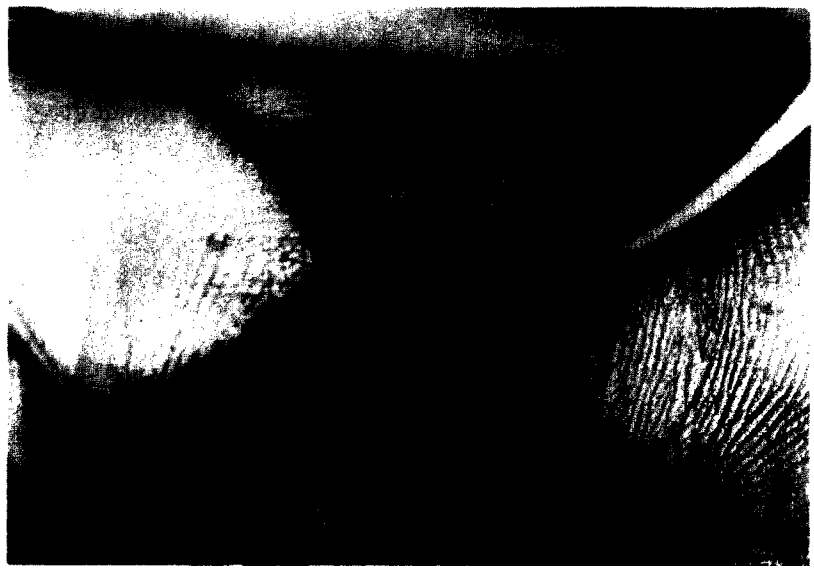

Figure 5. Vessel loop is around the radial digital artery and clamp is attached to the tumor and feeder vessel.

Figure 6. Cystic vascular space occupied with organizing thrombosis, suggestive of solid type vascular leiomyoma.

for 15 years. An x-ray film revealed a soft tissue mass with no bone involvement. The preoperative impression was either a xanthoma or a lipoma. A 1.0 × 0.8 cm mass replacing the ulnar digital artery was excised, and the vessel proximal and distal to the mass was ligated (Fig. 7). Frozen-section and final pathology showed a vascular leiomyoma of the ulnar digital artery.

Case 4

A 47-year-old woman with a history of a prior resected dermoid tumor in the rectus muscle and a hysterectomy presented after slamming her right hand into a door 4 months earlier. She developed a small mobile 1.0 cm mass on the right first webspace superficial to the adductor muscle. It had increased in size and was slightly tender. An organized hematoma was the preoperative diagnosis. The excised mass measured 1.0 cm in diameter and was attached to a single vessel. The final pathologic diagnosis was a vascular leiomyoma.

Case 5

A 61-year-old right-handed man with a history of hypertension, a prior resected abdominal aortic aneurysm, and an old left wrist fracture presented with a mass in the hypothenar eminence fluctuating in size over 2 years. On examination the mass was soft and painless. Allen's test showed symmetric but sluggish perfusion of the radial and ulnar arteries. An arteriogram performed at another hospital revealed a possible vascular tumor. The preoperative diagnosis was a hemangioma. Pathology of the excised mass revealed a vascular leiomyoma measuring 3.0 × 2.5 × 2.5 cm, and supplied by vessels adjacent to the ulnar artery.

Discussion

Leiomyomas are benign soft tissue tumors and are distributed wherever smooth muscle is present. Vascular leiomyomas are only one form of this tumor. Cutaneous leiomyoma or leiomyoma cutis is more commonly seen than vascular leiomyoma. They arise as multiple tubercles in the piloerector muscles of the skin or as solitary tumors in the dartoic muscles of the scrotum, in the labia majora, or nipple. Leiomyomas of the deep soft tissue often present as larger masses and can display a wide spectrum of histologic changes.[16]

Early 19th century literature made little attempt to separate the different groups of leiomyoma. Babes, in 1884, helped classify the tumor into the varieties we know today.[17,18] In 1937, Stout[1] reviewed 95 solitary leiomyomas and found that half of these cases developed on the extensor surfaces of the lower extremity. Weisman[11] referred to Bickel's study of 500 soft tissue tumors in the hand and found 7 painful vascular leiomyomas that were thought to have been initiated by trauma or extremes of temperature. Duhig and Ayer[19] found 6 of 61 vascular leiomyomas arising from either the forearm, wrist, or hand. Neviaser and Newman[12] reviewed 85 cases of dermal angiomyoma in the upper extremity and found 12 in the hand. They concluded that this tumor occurs more commonly than once believed. Akizawa[13] reported 18 cases of angiomyoma in the hand and classified the lesion histologically into solid, ar-

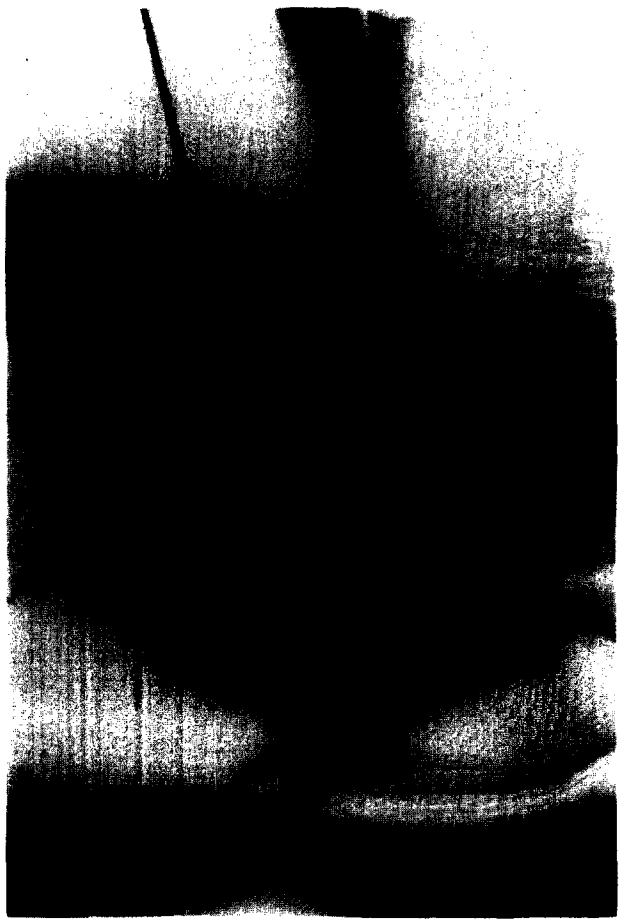

Figure 7. A 1.0 × 0.8 cm vascular leiomyoma supplied by the ulnar digital artery of the left ring finger in case 5.

teriovenous, cavernous, or mixed type. In 1984, Hachisuga et al.[14] found 56 cases of angiomyoma in the hand in a series of 592 angioleiomyomas, and divided the tumor into solid, cavernous, or venous histologic subtypes.

Freedman and Meland,[15] in 1989, documented nine cases in the hand when they reviewed the Mayo Clinic angioleiomyoma patients. They recommended that surgeons consider this tumor when evaluating a nodular lesion in the hand. Incorrect preoperative diagnoses are summarized in Table 1. The treatment has always been simple excision of the mass followed by ligation of any feeder vessels. The color of the tumor has appeared as a brown, pearly grey, yellow-white, tan, red-brown, or blue-pink mass.

Vascular leiomyomas are most commonly found in the lower extremity of women. Of the 105 cases of vascular leiomyoma in the hand we found reported in the English literature, 47 men and 22 women with the tumor were identified. In 36 cases, the sex of the patient was not documented. The tumor first developed at an average age of 39 years

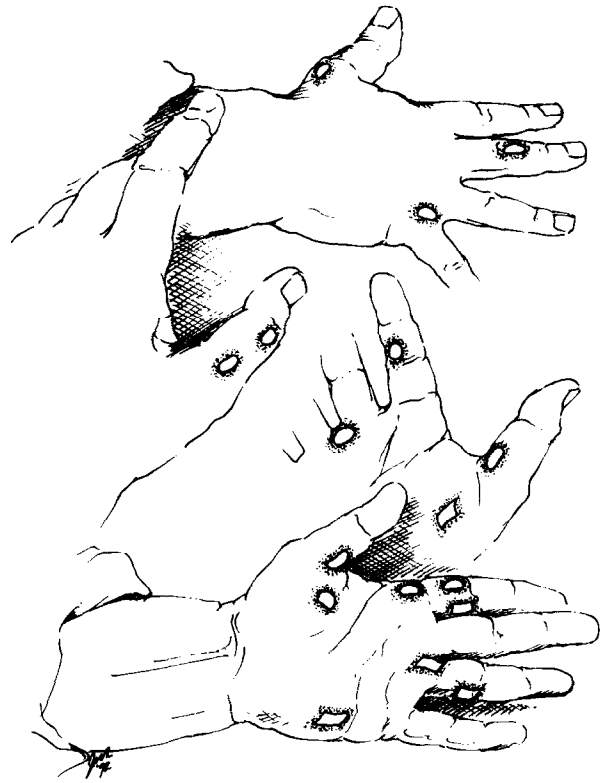

Figure 8. Location of tumors in the hand. The five Roosevelt Hospital Hand Service cases are represented by squares. The 12 cases documented in the literature are represented by circles. Views from top to bottom: left dorsal, right dorsal, right palmar, and left palmar.

in men and 6 years later in women. A history of trauma and a painful mass presented in only half of the cases. The mass has appeared in both hands. Patients waited an average of 11 years before having the tumor excised. Tumors varied in size from 0.5 to 4.0 cm (mean, 1.5 cm) in diameter. Of the 105 cases reported in the literature, only 12 cases reported the exact location of the tumor in the hand (Fig. 8). Only two prior reports place the tumor in a digital artery.

Four of our five cases occurred in men. The tumor first developed at a mean age of 40 years (range,

Table 1. Differential Diagnoses of a Solitary Soft Tissue Mass in the Hand

In the English Literature	*In Our Series*
Vascular aneurysm[3]	Organized thrombus
Epithelial cyst[5]	Hemangioma
Synovial cyst[5]	Giant cell tumor of tendon sheath
Giant cell tumor[7]	False traumatic aneurysm
Schwannoma[9]	Xanthoma
	Lipoma

29–59 years), and was excised from 2 weeks up to 10 years later.

Histologically, vascular leiomyomas are composed of smooth muscle bundles surrounding vascular channels.[14] All of our cases fit the criteria of solid vascular leiomyoma histologically. Hauswald et al.,[7] in 1977, presented an arteriogram that revealed a uniform circular density in the thenar space suggestive of a vascular tumor. In two of our five cases, an arteriogram was performed to help define the vascular anatomy associated with the lesion. An arteriogram should also be obtained when a differential digital Allen's test reveals circulatory insufficiency. Although not absolutely necessary, reconstruction of the digital artery was performed in case 1 because it was both technically feasible and in the best interest of the patient. The patency of the contralateral digital artery often dictates whether simple excision or excision and digital artery repair is necessary. Although the lesion is often well delineated and appears benign when it involves the digital artery, a 2 or 3 mm margin of resection is recommended. There were no recurrences of the tumor in our series with a 3-year follow-up period. No recurrences of this tumor in the hand have been reported in the English literature.

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