

# Ultrasonographic Evaluation of Intravenous Lobular Capillary Hemangioma in the Cephalic Vein

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## Abstract

A 60-year-old man presented with focal swelling on the dorsal surface of the left wrist. The sonographic exam revealed the presence of a smoothly rounded hypoechoic mass, with internal blood flow in the lumen of the vein. The histopathological findings led to the diagnosis of intravenous lobular capillary hemangioma (LCH). Here, we reported an intravenous LCH arising from the cephalic vein on the dorsal surface of the left wrist hand and discussed the related ultrasonographic findings.

**Keywords:** Cephalic vein, color Doppler, intravenous lobular capillary hemangioma, superb microvascular imaging, ultrasonography

## INTRODUCTION

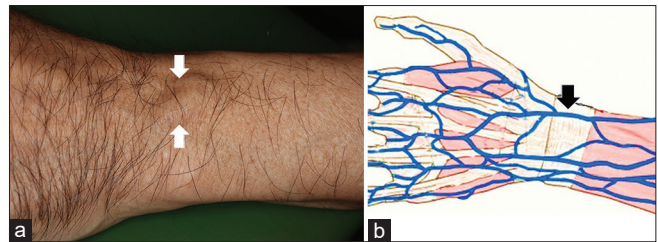
Lobular capillary hemangioma (LCH), also known as pyogenic granuloma, is a relatively common benign vascular tumor that develops spontaneously on the skin and mucous membranes or as a result of trauma or minor surgery.<sup>[1]</sup> Intravenous LCH is a rare solitary form of LCH and usually occurs in the neck and veins of the upper extremities.<sup>[2]</sup> It has been documented as affecting individuals aged 15–66 years, with an average age of manifestation of 38 years and a slight predominance in females.<sup>[1]</sup> Intravenous LCH was previously thought to be a lesion that developed secondary to trauma and pyogenic infection, based on its lobular vascular proliferation that appears to be neoplastic.<sup>[3]</sup> The presence of locules under ultrasonography (US) was a hallmark presentation of intravenous LCH.<sup>[4]</sup>

Here, we reported a rare case of intravenous LCH arising from the cephalic vein on the dorsal surface of the left wrist and utilized US to delineate the nature of the tumor.

## CASE REPORT

A 60-year-old asymptomatic man presented with focal swelling of the dorsal surface of the left wrist that spontaneously appeared

2 months earlier [Figure 1]. The patient had a history of trauma, occasionally bumping of the hand on the corner of a chair. US (Aplio® ultrasound system; Toshiba Medical, Ltd., Tokyo, Japan) using a linear array (18 MHz) transducer was performed. He underwent color Doppler US (CDUS) after gray-scale US, and a sonogram postprocessing technique was used to suppress the received signal clutter (Superb Microvascular Imaging® [SMI]; Canon Medical Systems, Tokyo, Japan).



**Figure 1:** (a) A 60-year-old asymptomatic man presented with a focal swelling on the dorsal surface of the left wrist (white arrows). (b) Anatomy of the veins of the dorsal surface of the left wrist, the cephalic vein runs in the swollen position (black arrow)

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On US, a well-defined nodular lesion measuring 17 mm in length and 5 mm in thickness was found in the cephalic vein on the dorsal surface of the left wrist. The lesion was hypoechoic without acoustic enhancement or edge shadowing [Figure 2a] was adherent to the vein wall and was not compressible [Figure 2b]. CDUS imaging demonstrated prominent hypervascularization within the lesion [Figure 3a] as well as vessel signals with color blooming artifact, which displays color outside of a vessel and makes the vessel appreciable, and color noise. However, SMI revealed the color signal of the microvasculature in the lesion [Figure 3b]. Therefore, through the US, we suspected an endovascular neoplasm such as LCH or angioleiomyoma.

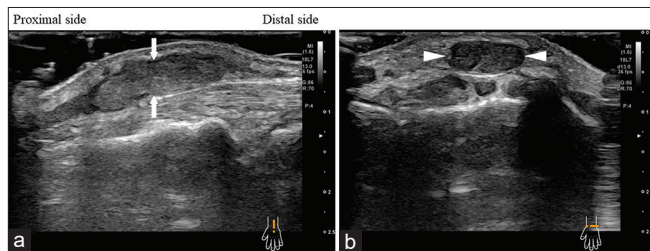
The lesion, a 2-cm long vascular segment containing the mass in continuity with the venous wall, was surgically excised [Figure 4]. Macroscopic examination revealed a solid pink-colored mass that was easily detachable from the surrounding area. On histological examination, it was observed that the tumor cells consisted of hypertrophic capillaries, clustered or lobular. They were lined with lobular structures, and fibrous connective tissue was found in the interlobular area [Figure 5]. The histopathological findings led to a diagnosis of intravenous LCH.

## DISCUSSION

Intravenous LCH most frequently involves the neck and upper extremities.<sup>[1,2]</sup> Clinically, intravenous LCH grows rapidly in

the first few weeks, manifesting with easy bleeding following minor trauma, then stabilizes in size, rarely exceeding 2 cm.<sup>[5]</sup> In our case, localized swelling appeared on the dorsal surface of the left wrist after trauma. In addition, the size of the excised mass was 2 cm. Some studies reporting ultrasonographic B-mode findings of intravenous LCH described LCH as a well-defined echogenic solid nodule or mass with smoothly rounded margins.<sup>[5,6]</sup> They were hypoechoic relative to the subcutaneous fat. In this study, the ultrasound features were similar to those previously reported, and the shape of the mass did not change with the probe's pressure. Histopathologically, LCH is a well-circumscribed round mass that is composed of lobulated capillaries surrounded by a fibromyxoid stroma, and these lobulated capillaries are separated by fibrous septae. The capillaries are lined by flattened or rounded endothelial cells. These feeder vessels were clearly depicted in our cases. LCH is often ulcerated with secondary inflammatory changes, such as edema or stromal infiltration by inflammatory cells and dilated vessels.<sup>[4]</sup>

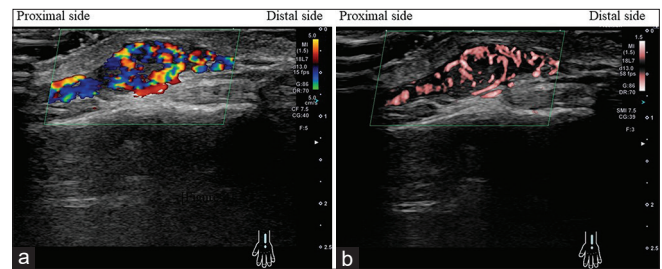
Based on the US findings, venous thrombosis is the primary differential diagnosis of intravenous LCH. Previous reports on US of intravenous LCH identified hypervascularity within the mass, allowing the exclusion of venous thrombosis.<sup>[5,6]</sup> Ghekiere *et al.* reported that a thrombus might show central channels of hypervascularity at the subacute stage but does not show the same nodular pattern with well-delimited and smooth margins as in the current case.<sup>[5]</sup> Furthermore, the US findings for Mondor's diseases showed a noncompressible vein containing hypoechoic material in the subcutaneous fat but actually no flow signal should be detected under UDUS due to its nature of thrombophlebitis.<sup>[7]</sup> On the contrary, CDUS imaging detected hypervascularization within the



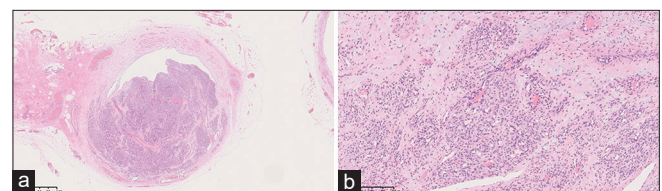
**Figure 2:** Ultrasonographic B-mode images showing a nodular echogenic mass in the cephalic vein on the dorsal aspect of the left wrist. (a) Longitudinal scan showed a homogeneous and hypoechoic mass (arrow). (b) Axial scan showed the same mass (arrowhead)



**Figure 4:** The surgically excised sample was a 2-cm long vascular segment with the mass inside



**Figure 3:** (a) Longitudinal scan color Doppler imaging showed prominent hypervascularization within the lesion. (b) On superb microvascular imaging, fewer blooming effects and less color noise were found



**Figure 5:** (a) Low-power photograph of the lesion showing an intravascular nodule in the lumen of the vein. (b) High-power view showed a tumor composed of bifurcated proliferating vascular endothelium, lumen, and edematous stroma (H and E,  $\times 100$ )

lesion in our case. However, CDUS did not completely rule out subacute thrombus due to artifacts in the vascular signal. Next, using SMI, we detected the color signal of basket-like vascular structures in the mass, suggesting the diagnosis of an intravascular neoplasm.

Moreover, differential diagnoses for masses should include angioleiomyoma and neurogenic tumors. Angioleiomyomas are vascular tumors that appear as a homogeneous solid mass with the abundant arteriovenous flow on CDUS and are primarily observed in the extremities.<sup>[8]</sup> Thus, to differentiate a subcutaneous LCH from angioleiomyoma using US is challenging. Neurogenic tumors, such as schwannoma, have variable ultrasonographic features and pseudocystic appearance with hypervascularization could be found on CDUS.<sup>[9]</sup> Nonetheless, continuity with the nerve is a critical feature to confirm whether the tumor was neurogenic or not.

## CONCLUSIONS

Consequently, in this study, the sonographic findings for intravenous LCH are the presence of a hypoechoic smoothly rounded mass with internal blood flow in the lumen of a vein. The gold standard for diagnosis is histopathology. However, preoperative imaging examination is necessary and, in this context, CDUS of this uncommon tumor provided useful information in making diagnosis.

## Declaration of patient consent

The authors certify that they have obtained patient consent. In the consent form, the patient has consented for publishing his

images and other clinical information in the journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity; however, anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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