

# Acute Superficial Vein Thrombosis of the Upper Extremity: A Case Report

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**Summary:** Superficial vein thrombosis has traditionally been considered a disease of the lower extremity. Less frequently it can affect the breast, chest wall, penis, or upper extremity. Cases involving upper extremities are usually associated with intravascular access, and the vast majority remain self-limiting. This case report presents a 63-year-old patient who had acute extensive thrombosis of cephalic and basilic venous systems following resection of a desmoid tumor from the flank. This was likely related to intraoperative positioning and resulted in severe symptoms mimicking deep vein thrombosis and carpal tunnel syndrome. Additionally, diagnostic tools available to the hand surgeon that allow prompt diagnosis, management, and prevention are discussed. (*Plast Reconstr Surg Glob Open* 2020;8:e3322; doi: 10.1097/GOX.0000000000003322; Published online 21 December 2020.)

Superficial thrombophlebitis is an inflammation of the superficial veins associated with superficial vein thrombosis (SVT). Traditionally, it has been considered a disease of the lower extremity.<sup>1</sup> Less frequently, it can affect the breast, chest wall, penis, or upper extremity.<sup>2-6</sup> Cases involving upper extremities are primarily associated with intravascular access and usually remain self-limiting. This report presents a patient who developed acute thrombosis of cephalic and basilic venous systems, likely related to intraoperative positioning, that manifested with severe symptoms.

## CASE REPORT

This case involves a 63-year-old right-hand-dominant office worker who presented for resection of a right flank desmoid tumor. Her BMI was 21.7 kg/m<sup>2</sup>. Relevant past medical history included hypertension treated with oral lisinopril 10 mg QD, and left greater saphenous SVT following shoulder surgery for adhesive capsulitis 8 years prior, for which she had received a 2-month-long course of subcutaneous enoxaparin 40 mg QD. Past medical work-up was negative for hypercoagulopathy and malignancy. The patient denied a prior history of hand trauma or compression neuropathy. Her Caprini score was 7.

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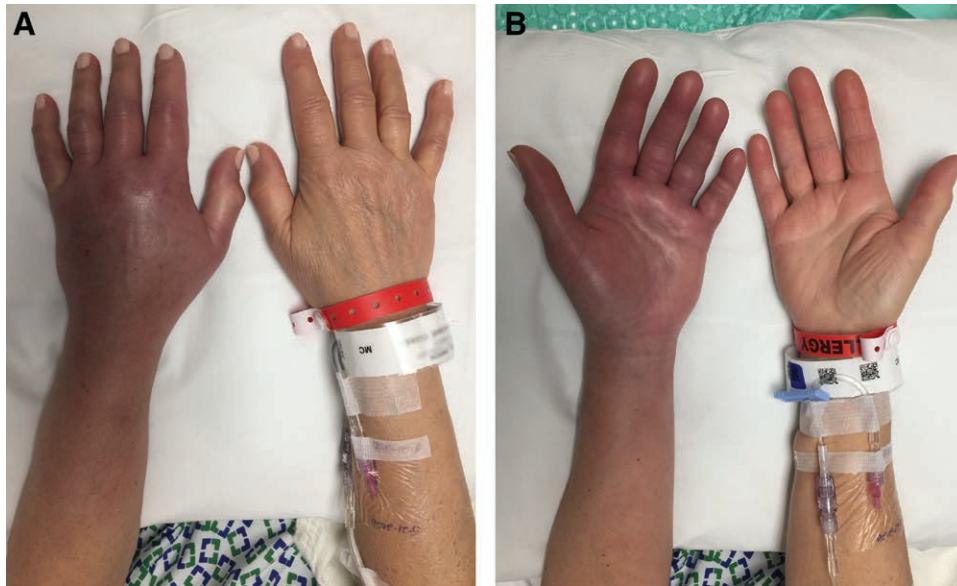
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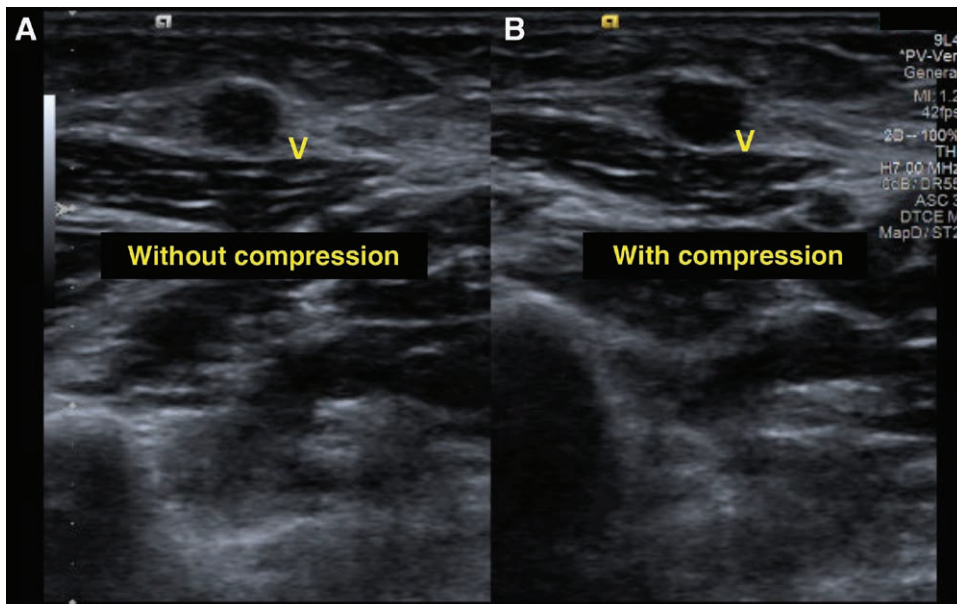
On the day of surgery, a peripheral intravenous line was placed in the left dorsal hand and intravenous normal saline infusion started 2 hours before surgery. The patient was given 5000 IU of unfractionated heparin for deep vein thrombosis (DVT) prophylaxis and was then taken to the operating room, placed under general anesthesia, and positioned in the left side down lateral decubitus position with an axillary roll. The tumor was radically resected and the defect was closed primarily in 87 minutes. Immediately after the procedure, the surgical team noted generalized edema, discoloration, tenderness, and coolness of the left hand with paresthesias in the median nerve distribution. One hour after surgery, swelling and discoloration propagated to the level of the mid-forearm despite extremity elevation (Fig. 1). At that time, differential diagnosis included DVT. A bedside ultrasound performed by the hand surgery team using Sonosite Edge 7-MHz linear transducer (FUJIFILM Sonosite Inc., Bothell, Wash.) and the technique described before revealed thrombosis of the basilic and cephalic veins extending from the level of the proximal arm to the distal forearm (Fig. 2).<sup>5</sup> There were no arterial or deep vein abnormalities noted. A formal duplex ultrasound was then requested and confirmed this diagnosis. The vascular medicine service was consulted and initiated continuous medium-level compression therapy with elastic glove and sleeve, oral ibuprofen 400 mg QID, and subcutaneous enoxaparin 40 mg QD. Hypercoagulability work-up was negative. On postoperative day 1, coolness and paresthesias resolved, and the patient was discharged from the hospital.

At 2 weeks postoperative, repeat left arm duplex showed no propagation of the thrombus and no DVT. Due to patient's preference and persistent swelling and palpable cords along the involved veins, decision was made to switch enoxaparin to therapeutic dose oral rivaroxaban

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**Fig. 1.** Appearance of patient’s hands 1 hour after surgery. Marked venous congestion of the left hand and distal forearm can be appreciated on the dorsal (A) and volar (B) view.



**Fig. 2.** Sonographic visualization of the cephalic vein (V) at the midforearm level. A, Appearance of the thrombosed cephalic vein (V) without compression. B, Appearance of the thrombosed cephalic vein with compression by the ultrasound probe. Inability to collapse the vein confirms the presence of a thrombus within the vessel lumen.

20mg QD. At 8 weeks post-operatively, the swelling and discoloration were minimal but the palpable, tender cords persisted. Ultrasound showed partial resolution of the thrombus, extending from the distal arm to the distal forearm. At the present time, 3 months post-operatively, patient’s symptoms have resolved and she was advised to discontinue compression and anticoagulation.

### DISCUSSION

SVT of the upper extremity is usually a self-limiting condition.<sup>7</sup> Herein, we present a patient with extensive

thrombosis of cephalic and basilic veins, resulting in acute venous congestion mimicking DVT and acute carpal tunnel syndrome.

### Diagnosis

Diagnosis of SVT is usually clinical, especially when tender and inflamed veins can be identified.<sup>2,8</sup> Vascular ultrasound is often performed to confirm the diagnosis and to rule out coexisting DVT or other pathologies—eg, arterial thrombosis, pseudoaneurysm, and venous incompetence, among others. SVT may coexist with DVT in 5%–53% of

patients.<sup>9,10</sup> Furthermore, when it involves veins near the junction with the axillary vein, it is considered an equivalent of DVT.<sup>9,10</sup> Bedside ultrasound performed by a surgeon has been shown to be an efficient tool in diagnosis of numerous conditions of the upper extremity.<sup>11,12</sup> In this case, it facilitated prompt diagnosis without the delay associated with formal ultrasound performed by a technician. This is crucial, as delay in treatment may cause propagation of the superficial thrombus, with progression to proper DVT and pulmonary embolism.<sup>9,10,13</sup> Delayed treatment has also been shown to contribute to permanent skin discoloration and infections.<sup>8</sup> Finally, the patient likely had subclinical carpal tunnel syndrome, which became symptomatic with acute wrist swelling.<sup>14</sup> Bedside ultrasound can be used to evaluate diameter of the median nerve. Although it was not performed in the presented case, an increase in cross-section area of the nerve may guide treatment.

### Treatment

In most cases, SVT is a self-limiting condition and treatment is mainly symptomatic with warm compresses, anti-inflammatory medications, compression, and elevation. When symptoms are severe, the thrombus is extensive, or it is in close proximity of the vessels emptying into the deep venous system, an anticoagulant is usually used to minimize the risk of progression to DVT and subsequent pulmonary embolism. Occasionally, when a patient cannot tolerate anticoagulation, a close follow-up with serial ultrasound or surgical thrombectomy may be indicated.<sup>2</sup> The patient presented was treated with all available non-surgical modalities. Despite aggressive management, her symptoms did not resolve until 3 months after surgery, indicating that SVT can be a debilitating complication.

### Prevention

Understanding risk factors for SVT is a key to prevention.<sup>7</sup> The patient had several risk factors, including intravenous line, age over 60 years, prior history of SVT, and duration of the procedure over 45 minutes. In addition, the lateral decubitus position with an axillary roll likely caused external pressure on the proximal arm that impaired venous outflow, established intravascular stasis, and ultimately predisposed her to thrombosis. Avoiding intravenous lines and pressure cuffs in the extremity in downward position, alternative choice of positioning, use of compression devices or garments, or prophylactic pre- and postoperative anticoagulation in high-risk patients may minimize the risk for both DVT and SVT. Finally, recurrent episodes of SVT, often termed migratory thrombophlebitis, should be investigated for possible underlying malignancy—eg, Trousseau's syndrome.

## CONCLUSIONS

Upper extremity SVT can present with severe symptoms when cephalic and basilic veins are involved. Bedside ultrasound performed by a surgeon is an excellent tool that can provide immediate answers and prevent unnecessary delays in treatment. Despite immediate treatment, symptoms of SVT can persist for months, substantially affecting patients' recovery and satisfaction.

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