CLINICAL VIGNETTE

Management of Distal Lower Extremity Deep Venous Thrombosis in a Hospitalized Patient

Nathan Cox, MD and Shelley Schwartz, MD

Introduction

Development of deep venous thrombosis (DVT) is a well-known risk factor of hospitalization, given presence of relative immobility inherent to acute illness. Despite appropriate risk factor modification, including pharmacologic and mechanical prophylactic measures, hospital-acquired DVT remains a relatively common clinical challenge.

Anticoagulation appropriate initial medical management of any DVT in absence of contraindications. However, many clinical contexts present possible contraindications, leading to clinical uncertainty. It has also been recognized that not all DVTs pose the same mortality risks. Specifically, isolated distal lower extremity DVT poses substantially less risk for propagation or embolization than those in the proximal leg, and commonly spontaneously resolve without treatment.[1] This leads to a substantial gray area regarding treatment of patients with distal lower extremity DVT, making management challenging.

We present a patient in our acute rehabilitation unit presenting with an acute distal lower extremity deep venous thrombosis with potential risk for anticoagulation, with recent intracerebral hemorrhage. We present the available clinical data and current expert clinical consensus regarding the management of distal lower extremity DVT.

Case Report

A 66-year-old man presented to our acute rehabilitation unit following a prolonged hospitalization for a large left-sided intracerebral hemorrhage resulting in right-sided hemiplegia. His past medical history including paroxysmal atrial fibrillation (with prior use of anticoagulation), stage 3a chronic renal insufficiency, hypertension, and hyperlipidemia. The patient was hospitalized 90 days prior to arrival at our rehab center. He initially presented with acute oncset of altered mental status, right-sided weakness, and dysarthria. A large left-sided intracerebral hemorrhage with midline shift, was found prior to neuro ICU admission. He required endotracheal intubation for airway protection, and extra-ventricular drain placement by neurosurgery. The most likely etiology of the hemorrhage was hypertensive disease. Serial neuro-imaging showed stabilization, and further neurosurgical intervention was not required. Medical management during hospitalization included blood pressure optimization. Paroxysms of atrial fibrillation were noted, but anticoagulation was not given his recent hemorrhagic stroke. He required tracheostomy and percutaneous gastrostomy placement, and was transferred to a long-term acute care hospital for continued management.

The patient exhibited some neurologic recovery at admission to the long-term acute care hospital. He was weaned off mechanical ventilation, and his tracheostomy was decannulated. His dysphagia improved enough to allow resumption of oral nutrition, and his gastrostomy tube was removed. He was able to participate with multidisciplinary rehabilitative services and became appropriate for transfer to an acute rehabilitation center for further care.

On arrival to our rehabilitation unit, the patient was noted to have mild bilateral lower extremity edema, more pronounced in the right leg. He had been maintained subcutaneous on heparin for deep venous thrombosis prophylaxis while hospitalized. Given his limited mobility, bilateral lower extremity (and bilateral upper extremity) ultrasounds were performed and revealed an acute right soleal deep venous thrombosis (DVT).

Based on his clinical context, including distal location of the DVT as well as fairly recent debilitating intracerebral hemorrhage, it was decided to monitor the patient with serial ultrasound, while continuing prophylactic heparin. A repeat ultrasound one week later showed new DVT involving the right peroneal and geniculate veins, in addition to the prior right soleal clot. This shifted the risk/benefit ratio of anticoagulation. Computed tomography of the brain showed continued resolution of the prior intracerebral hemorrhage, with no new worrisome findings. The situation was discussed with the initial neurosurgeon, and therapeutic anticoagulation was initiated with apixaban.

Discussion

The mainstay of treatment of lower extremity deep venous thrombosis (DVT) has been anticoagulation, presuming absence of specific contraindications, to limit symptoms and prevent thromboembolism. However, with additional clinical experience regarding clinical course and prognosis of DVT, not all lower extremity thromboses pose the same symptomatic burden or embolic risk.

Distal lower extremity DVT is defined as clot identified within the veins below the knee, specifically the peroneal veins, anterior and posterior tibial veins, and the muscular veins of the calf. This notably does not include clots involving the popliteal veins, which would be considered proximal.[2]

Investigations comparing proximal and distal DVT have shown some key differences. One prospective cohort trial examined isolated DVT in 6141 patients showed that distal clots were more commonly associated with transient risk factors (such as surgery, immobilization, or travel; vs more chronic risk in proximal clots, such as malignancy). Distal clots were associated with a lower mortality risk.[3] Prospective screening trials done in the immediate post-op surgical setting reported up to half of post-operative asymptomatic DVT recognized in the post-operative period resolve spontaneously within 72 hours. Only one sixth progress to involve proximal veins.[4] While extension to proximal veins is associated with increased thromboembolic risk (in nearly half of patients in some studies), spontaneous resolution or continued confinement to the calf has shown little to no risk for embolism on some series.[5] A meta-analysis estimated risk for proximal propagation from a calf DVT to be in the 8-15% range.[5]

Some patients with distal deep venous thrombosis are felt to have higher risk for proximal propagation or embolization. Factors indicating a greater risk include: extension to within 1-2 centimeters of the popliteal vein, unprovoked clot, extensive thrombus involving multiple veins, persistent risk factors (such as malignancy) or prolonged immobility, associated with COVID-19, and history of thromboembolic disease.[2]

Trials comparing management strategies in isolated distal lower extremity deep venous thrombosis are limited, but evidence does exist. One randomized trial compared warfarin versus none (beyond prophylactic dosing) in 51 patients with calf vein DVT.[6] Of those treated without anticoagulation, 18% developed proximal extension, and 4% developed pulmonary embolism. A larger meta-analysis of 2936 patients showed that, compared with no treatment, anticoagulation lowered the rate of recurrent thromboembolism (odds ratio 0.50), the rate of pulmonary embolism (odds ratio 0.48) without an increase in major bleeding.[7] A 2020 Cochrane review suggested that anticoagulation lowered the risk of recurrent thrombotic disease, but did not show clear benefit with respect to pulmonary embolic risk nor mortality. Major bleeding was not increased with anticoagulation, though clinically relevant non-major bleeding was increased in some trials.[8] This review also noted an overall dearth of larger trials and strength of available evidence.

The most recent American College of Chest Physicians Clinical Guidelines (CHEST) recommend that in absence of severe symptoms and risk factors for clot propagation, clots be monitored via serial ultrasound imaging (over a 2-week period) without immediate initiation of therapeutic anticoagulation.[9] If severe symptoms or risk factors for propagation exist, CHEST recommends immediate initiation of anticoagulation (in absence of contraindication). In patients monitored with serial ultrasound, the recommendation is to continue deferral of anticoagulation if no extension of the clot is noted, but to initiate anticoagulation if the clot extends within the calf with weak, overall evidence, or more proximally, with stronger supporting evidence.[9]

Conclusion

Our patient presented with at worst a minimally-symptomatic deep venous thrombosis involving the distal right leg. He had some risk factors for clot extension, including continued relative immobility of his right leg (due to prior stroke), but he also had a continued relative contraindication for anticoagulation, given his recent intracerebral hemorrhage. After a discussion with the patient of all risks and benefits of the various treatment options, we elected initially to pursue serial ultrasound imaging. We continued prophylactic heparin dosing which had already been in place for much of his prior clinical course.

Report ultrasound one week later showed extension of clot within the distal right leg. We decided the risk for further propagation and potential for proximal leg and pulmonary thromboembolism favored anticoagulation. We thus verified continued resolution of his prior intracerebral hemorrhage, now three months old via head CT, and discussed with his neurosurgery team prior to initiating therapeutic anticoagulation.

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