Virchow’s Triad In Action
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Abstract

21 year-old man presented with a 2 day history of left leg pain and swelling following recent ad-mission for non-traumatic splenic rupture due to presumed infectious mononucleosis. He had swelling, tenderness and erythema of the left lower extremity, primarily surrounding the calf but was afebrile. Doppler ultrasound revealed non-occlusive deep vein thrombosis (DVT) of the left proximal femoral vein and he was started on apixaban for anticoagulation. Laboratory workup for clotting disorder revealed heterozygous Factor V Leiden mutation. One week later his leg pain and swelling worsened. Repeat Doppler revealed extensive progression of the DVT despite appropriate anticoagulation. CT angiography confirmed the clot and revealed extensive com-pression of the proximal left common iliac vein by the right common iliac artery suggestive of May-Thurner syndrome. Intravenous heparin anticoagulation was initiated and apixaban held, but there was suspicion for development of heparin induced thrombocytopenia so he was transitioned to argatroban for anticoagulation.

To manage May-Thurner syndrome he underwent manual thrombectomy with endovascular stent placement. The following night he developed worsening pain and swelling in his left leg consistent with compartment syndrome. He underwent 4 compartment fasciotomy and was re-started on argatroban. Repeat Doppler ultrasound revealed recurrence of extensive lower extremity DVT. Given multiple recurrent DVTs despite adequate anticoagulation, dedicated peripheral blood smear was obtained and revealed atypical myeloblasts concerning for acute myeloid leukemia. Following confirmatory bone marrow biopsy, he was started on induction chemotherapy for non-malignant causes. Intravenous heparin therapy. At present, he remains in hospital receiving ongoing chemotherapy as acute myeloid leukemia in this case, as a potential cause of unprovoked venous thromboembolism had 3 or more commonly recognized risk factors [3]. In fact, there is often more than one risk factor contributing to the prothrombotic state. Approximately half of all patients with thrombotic events involving inherited thrombo-phillas, such as Factor V Leiden in this case, have the presence of an additional acquired risk factor [4]. One study even showed that 56% of patients with a venous thromboembolism had 3 or more commonly recognized risk factors [5].

This case highlights that identification of a single risk factor should not exclude consideration of other risk factors. A wide range of variably-thrombophilic Virchow’s triad should be considered by the general internist when evaluating patients with venous thromboembolism, especially in low risk patients.

Learning Objectives

1. Identify clinical scenarios where the general internist should consider less common causes of unprovoked venous thrombosis, or the additive effect of multiple risk factors
2. Understand how the anatomic abnormality in May-Thurner syndrome contributes to venous thrombus formation
3. Consider certain malignancies based on demographic specific risk factors, such as acute myeloid leukemia in this case, as a potential cause of unprovoked venous thromboembolism

Discussion

Deep venous thrombosis is a commonly encountered clinical problem by the general internist and the interplay between Virchow’s triad of hypercoagulability, stasis and endothelial injury can manifest from a number of conditions, both rare and common. Malignancy or anatomic abnormalities should be considered in the appropriate clinical context. Approximately 20% of patients with symptomatic deep venous thrombosis have a known active malignancy, and it has been suggested that those with myeloproliferative neoplasms such as AML have a 10% higher risk than other types of cancer [1,2].

While rare as an isolated cause of venous thromboembolism, May-Thurner syndrome is a prothrombotic anatomic risk factor that one study suggested is present in up to 24% of asymptomatic individuals [3]. In fact, there is often more than one risk factor contributing to the prothrombotic state. Approximately half of all patients with thrombotic events involving inherited thrombo-phillas, such as Factor V Leiden in this case, have the presence of an additional acquired risk factor [4]. One study even showed that 56% of patients with a venous thromboembolism had 3 or more commonly recognized risk factors [5].

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References