

Resolution of Phlegmasia Cerulea Dolens in a Patient with Metastatic Cancer and an Inferior Vena Cava Filter

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ABSTRACT

Phlegmasia cerulea dolens (PCD) is a rare but serious complication of extensive venous thromboembolism (VTE) that can lead to limb ischemia and significant morbidity if not treated promptly. We describe a 69-year-old man with metastatic non-small cell lung cancer and hemorrhagic brain metastases who developed rapidly progressive PCD despite recent negative imaging and an existing inferior vena cava filter. He presented with bilateral lower extremity discoloration, absent Doppler signals, and signs of end-organ involvement. The patient underwent urgent mechanical thrombectomy with rapid clinical improvement and restoration of venous flow. This case highlights how quickly PCD can develop in high-risk patients and supports thrombectomy as a useful option for the resolution of extensive VTE and PCD.

KEYWORDS: phlegmasia cerulea dolens; deep vein thrombosis; thrombectomy; cancer-associated thrombosis; inferior vena cava filter; brain metastases

INTRODUCTION

Phlegmasia cerulea dolens (PCD) is a rare but limb-threatening manifestation of extensive venous thromboembolism, characterized by near-total venous outflow obstruction, severe limb edema, and compromised arterial inflow that can rapidly progress to venous gangrene. It most commonly arises in the setting of massive iliofemoral deep vein thrombosis and carries a high risk of limb loss and mortality if not promptly recognized and treated.

Venous thromboembolism (VTE) is a well-documented complication in patients with malignancy, particularly those with non-small cell lung cancer (NSCLC).¹ The risk of VTE and PCD is further amplified in older patients in the setting of metastatic disease, prior thromboembolic events, and the presence of an inferior vena cava (IVC) filter.^{2,3,6} Management of PCD is especially challenging in patients with brain metastases, where the elevated risk of intracranial hemorrhage limits the use of systemic anticoagulation.⁴ Acute decompensation from extensive thrombosis and PCD can result in hemodynamic instability and multiorgan dysfunction, necessitating urgent intervention.

Mechanical thrombectomy is a highly effective treatment option in such cases, offering immediate clot burden reduction and symptom resolution.⁵ This case highlights the complexities of managing extensive venous thromboembolism resulting in phlegmasia cerulea dolens in a patient with metastatic NSCLC and hemorrhagic brain lesions, underscoring the need for timely recognition and interdisciplinary coordination to optimize outcomes.

CASE PRESENTATION

A 69-year-old male with a history of hypertension, type 2 diabetes mellitus, chronic obstructive pulmonary disease, prior NSCLC treated in 2013, and PE/DVT with an IVC filter placed in 2012 presented to the emergency department for lightheadedness and new right-sided weakness. CT panscan revealed a frontal brain mass and two cerebellar masses as well as a right apical lung mass, concerning for recurrence of NSCLC. There was no evidence of VTE on CT panscan. He was admitted to the hospital for neurosurgical intervention scheduled for the following week.

Five days after admission, the patient acutely decompensated while ambulating, with hypotension (83/59 mmHg) and tachycardia (heart rate 120 bpm). Bilateral lower extremities appeared mottled and cyanotic and pulses were unable to be obtained using doppler, consistent with PCD [Figure 1].

An emergent CTA of the abdomen revealed extensive VTE involving bilateral common femoral, external iliac, common iliac veins and IVC that extended superiorly to the level of the IVC filter that had been placed during his previous treatment for NSCLC [Figure 2].

The venous congestion resulted in bladder hematuria and congestion of the left kidney. The patient was not on anticoagulation at home, and at this time, blood work showed a lactate of 5.2 and a pH of 7.18 on venous blood gas.

Heparin was started after a conversation with the patient's family regarding the risk of bleeding given the hemorrhagic brain metastases. The family consented to treatment with heparin. Interventional radiology was consulted and the patient was taken for VTE thrombectomy. Access was achieved through bilateral popliteal veins with a 16 French sheath. Endovascular thrombectomy was performed using the Penumbra Lightning Flash device. Afterwards, a venogram demonstrated no significant residual stenosis or filling

Figure 1. Presence of PCD in bilateral extremities**Figure 3.** Resolution of PCD in bilateral extremities**Figure 2.** Evidence of VTE up to the level of IVC filter on CT

defects. After the procedure, bilateral lower extremity pulses returned and PCD resolved [Figure 3].

Lactate levels decreased to 1.3, and the hematuria resolved. The patient was wrapped with ACE bandages from toes to upper thighs and was encouraged to ambulate and

use the sequential compression devices (SCDs) as much as possible to prevent future clot formation. The decision was made after communicating with the primary care team and the neurosurgery team to keep the IVC filter in place until after the neurosurgery.

DISCUSSION

This case underscores the importance of rapid diagnosis and intervention in patients presenting with PCD, especially in the context of metastatic cancer. PCD requires evidence of four cardinal signs and symptoms: pain, edema, bluish discoloration, and severe venous obstruction. All of these signs were present in our patient on exam. The characteristic bluish discoloration of PCD indicates severe, often fatal, venous obstruction that can quickly lead to venous gangrene, shock, and death.⁷ Endovascular thrombectomy provided a safe and effective means of restoring venous flow and reversing end-organ congestion, including renal and bladder involvement, without exacerbating intracranial hemorrhage risk. The patient's hemodynamic stabilization and rapid symptom improvement illustrate the value of early interventional radiology involvement.

One striking feature of this case is the rapidity of thrombus formation, with no evidence of VTE on imaging five days prior, followed by the development of extensive thrombosis. This underscores the importance of preventative measures such as ambulation and SCDs in the hospital to prevent blood stasis and the subsequent prevention of VTE. Pharmacological anticoagulation would also be appropriate had the patient not been diagnosed with hemorrhaging

brain metastases. Additionally, the presence of an indwelling IVC filter may have contributed to thrombus propagation, highlighting an important consideration in patients with recurrent or extensive thrombosis.

Despite the unfortunate development of this patient's condition, the patient's care team responded swiftly and appropriately to provide life-saving care. In patients with cancer-associated thrombosis and complicating factors such as brain metastases, a multidisciplinary approach remains essential to balance bleeding risk with thrombotic burden and optimize patient outcomes.

CONCLUSION

In the setting of metastatic cancer and immobilization in the hospital, phlegmasia cerulea dolens can develop rapidly and represent a limb- and life-threatening vascular emergency, even in the presence of recent negative imaging. This case is notable for extensive thrombosis occurring despite an indwelling IVC filter and in the context of contraindication to anticoagulation due to hemorrhagic brain metastases, with associated end-organ dysfunction, including renal congestion and hematuria. Urgent endovascular thrombectomy enabled rapid restoration of venous outflow while minimizing bleeding risk, demonstrating the critical role of endovascular intervention in complex, cancer-related thrombosis. Early recognition and prompt consultation with interventional radiology are essential in similar high-risk scenarios to optimize patient outcomes.

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