

Visual Diagnosis in Emergency Medicine

INTRACRANIAL HEMORRHAGE WITH CEREBRAL VENOUS SINUS THROMBOSIS

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INTRODUCTION

Cerebral venous sinus thrombosis is a rare entity that has variable presentations. This image submission represents an extreme example that has an associated hemorrhage showing a characteristic pattern specific to cerebral venous sinus thrombosis. When flame-shaped hemorrhages are detected, an emergency physician can consider cerebral venous sinus thrombosis as a potential etiology of the intracranial hemorrhage.

CASE PRESENTATION

A 59-year-old man with no past medical history presented with altered mental status and right-sided neglect after a witnessed seizure. The patient was uncooperative and combative on presentation, thereby requiring endotracheal intubation for airway protection and facilitation of diagnostic testing. Noncontrast computed tomography of the head was immediately obtained and revealed a characteristic flame-shaped hemorrhage in the left frontoparietal lobe (Figures 1 and 2). Computed tomography angiogram demonstrated occlusion of the anterior two-thirds of the sagittal sinus, partial defect posteriorly (Figure 3), and poor filling of the right transverse sinus. Throughout his hospital course the patient underwent endovascular mechanical venous sinus thrombectomy multiple times, local infusion of tissue plasminogen activator into the sagittal sinus, and a left hemicraniectomy

for malignant cerebral edema. Ultimately the patient expired after terminal extubation per his family's request 2 weeks into his hospital course.

DISCUSSION

Cerebral venous thrombosis is an uncommon disease with varying presentations. Due to its spectrum of nonspecific clinical findings, it is a challenging diagnosis. The most common presentation is headache, though seizures are seen more frequently in cerebral venous thrombosis than other forms of stroke (1). Risk factors are similar to those of deep vein thrombosis and include prothrombotic conditions, oral contraceptives, pregnancy, malignancy, infection, and mechanical head injury (2). The diagnosis is established by magnetic resonance imaging and, to a less sensitive and specific extent, computed tomography (3). Parenchymal hemorrhage is visualized in up to 30% of cases (4,5).

Flame-shaped irregular zones of lobar hemorrhage in the parasagittal frontal and parietal lobes, as illustrated in our patient (Figure 2), are typical radiological findings seen in superior sagittal sinus thrombosis (5). The pathophysiology of venous sinus thrombosis leading to hemorrhage is largely due to increased venous pressure. In a study with animal models, as the sagittal sinus and diploic veins were occluded, venous and capillary pressures increased proximally, leading to increased intracranial pressure, increased intracranial cerebral blood volume,



Figure 1. Computed tomography of the head with flame-shaped hemorrhage (arrow) in axial view.

and decreased regional cerebral blood flow. The additional occlusion of cortical veins produced hemorrhagic infarcts, suggesting that involvement of cortical veins in addition to dural and diploic thromboses would increase risk of hemorrhage (6).

Management of cerebral venous thrombosis includes anticoagulation or thrombolytic therapy in the setting of thrombosis without hemorrhage, whereas mechanical endovascular intervention is indicated in the setting of thrombosis with hemorrhage (1). According to the International Study on Cerebral Vein and Dural Sinus Throm-

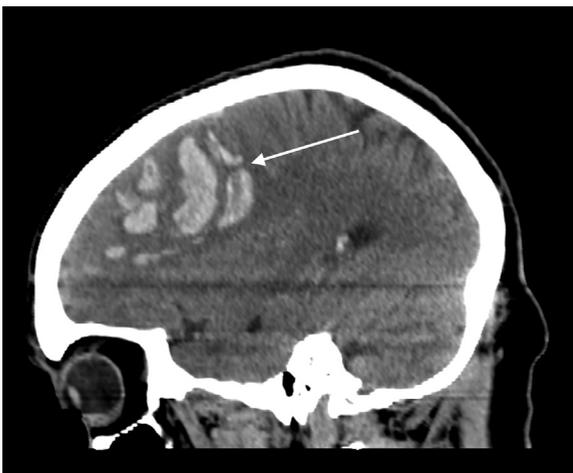


Figure 2. Computed tomography of the head with flame-shaped hemorrhage (arrow) in sagittal view.



Figure 3. Axial view of computed tomography angiogram depicting venous sinus thrombosis in the sagittal sinus (arrow).

bosis, which evaluated 624 patients in 21 countries across 89 centers, mortality is below 5% within 30 days of symptoms onset (2). At the end of their follow-up (median 16 months), 57.1% were asymptomatic, 22% had mild residual symptoms, 7.5% had mild impairments, 2.9% were moderately impaired, 2.2% were severely handicapped, and 8.3% had died (7). Associated risk factors for increased mortality in a patient with cerebral venous sinus thrombosis include coma, altered level of consciousness, thrombosis of the deep venous system, right hemisphere hemorrhage, and posterior fossa lesions (8). The patient in this case presented with altered level of consciousness, which placed him at a higher risk of mortality.

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