Endovascular clot retrieval in extensive cerebral venous sinus thrombosis (CVST): a videographic report

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Key Clinical Message

Urgent anticoagulation, despite the presence of acute cerebral hematoma, improves survival as well as the prognosis. Surgical decompression is a life-saving procedure and is required in a selected group of patients with considerable mass effect and elevated intracranial pressure (ICP). Endovascular thrombectomy is a novel approach to reduce the clot burden, achieve venous patency, and reduce ICP.

Keywords

Cerebral revascularization, cerebral venous sinus thrombosis (CVST), endovascular procedures, intracranial hemorrhage (ICH), mechanical aspiration.

Case Presentation

A 57-year-old man, with background history of hypertension, was brought to the emergency department (ED) with two episodes of self-abortive generalized tonic-clonic seizures. He had been experiencing progressive generalized, pressure-type headache for 5 days prior to the presentation. He denied head trauma, vomiting, photophobia, phonophobia, neck pain, or any relation to change in body position. Furthermore, there was no history of recent travel or fever and he had never suffered from seizures in the past. On examination, he was drowsy but orientated to time, place, and person. No focal neurological abnormality was noted, and there were no signs of meningism. However, his level of consciousness deteriorated rapidly during the next one hour. Noncontrast computed tomography (CT) of the brain showed left parenchymal hemorrhage, and CT venography revealed cerebral venous sinus thrombosis (CVST) with extensive involvement of left internal jugular vein, sigmoid sinus, transverse sinus, and the vein of Labbe (Video 1).

Intravenous treatment with unfractionated heparin was commenced. Owing to the mass effect and continued neurologic deterioration, decompressive craniectomy was performed and an external ventricular drainage tube was inserted, which facilitated monitoring of the intracranial pressure (ICP). There was no improvement in his neurologic status, and ICP showed progressive elevation. Therefore, we decided to perform endovascular suction thrombectomy of the occluded sinus via the left internal jugular vein, using 5 max Penumbra catheter. Partial recanalization of left transverse, sigmoid, and jugular veins was achieved, resulting in normalization of ICP (Video 2).

Diagnostic screen for thrombophilia was unremarkable. Heparin was changed to warfarin, and he was discharged to a rehabilitation facility. He made a gradual recovery and was nearly independent of his activities of daily living at 3 months.

Discussion

Cerebral venous sinus thrombosis is an uncommon cause of stroke and accounts for nearly 1% of all strokes [1]. It commonly affects relatively younger individuals and is fatal in up to 15% of patients in the acute phase [2, 3].
Established risk factors include prothrombotic conditions, oral contraceptives, pregnancy and puerperium, paramegal infections and systemic illnesses, drugs such as androgens, danazol, lithium, and vitamin A, and hypercoagulability and mechanical compression resulting from cancers [4–6]. Diagnosis is based on clinical suspicion and radiologic confirmation. Clinical manifestations of CVST are heterogeneous and involve symptoms due to increased ICP and focal neurologic deficit, mainly dependent on the location of thrombosis [7]. Noninvasive diagnostic modalities include computed tomography (CT) with contrast or CT venography, magnetic resonance imaging, and venogram (MRI/MRV), depending on the acuity of symptom onset and logistic attributes of the healthcare facility [8, 9]. Treatment involves initial anticoagulation with intravenous heparin or subcutaneous low molecular weight heparin (LMWH), in the absence of major risk factors [10]. Anticoagulation is not a contraindication in the controversial coexistence of CVST and intracranial hemorrhage (ICH), at the time of presentation [10]. Further treatment modalities are dictated by neurologic progress. Decompressive craniectomy may be considered in the case of development of mass effect or ICH, and endovascular thrombolysis may be performed in their absence [11, 12].

Authorship

MBA: wrote the manuscript. VKS: rendered patient care and performed a critical review of the manuscript.

Informed Consent

Informed consent was obtained from the patient included in the study.

Conflict of Interest

Authors declare no conflict of interest.

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Supporting Information

Additional Supporting Information may be found online in the supporting information tab for this article:

Video S1. Pre-intervention angiography, performed after radiographic contrast injection into the left internal carotid artery, shows no drainage through the ipsilateral major venous sinuses. Contrast shows runoff via the right sigmoid sinus and internal jugular vein.

Video S2. Selective, postintervention angiography shows partial recanalization of the left major venous sinuses.