Post Surgical Cerebral Venous Sinus Thrombosis: A Rare Surgical Complication and Challenging Management Case

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Objective:
To report a rare complication of cerebral venous sinus thrombosis associated with surgical resection of acoustic neuroma and highlight the importance of critical care management.

Case presentation:

Presentation: A 21 year-old previously healthy male, presented to the hospital for an elective right cerebellopontine angle tumor resection which was discovered during routine workup of headache.

Surgical procedure: He underwent a prolonged surgery (17 hours) with retrosigmoid craniotomy and resection of an acoustic schwannoma in left lateral decubitus position. He was admitted to the neurological intensive care unit for post operative care.

Post operative complications:

1. Sinus thrombosis:

- Developed on post operative day 1 (POD 1).
- Manifested as a generalized tonic clonic seizure.
- Non contrast CT scan of the brain showed hyperdense transverse sinus (Fig. 1a) and a CT venogram showed an empty delta sign. (Fig. 1b).
- Cerebral angiogram was obtained due to worsening alertness: showed thrombosis of left transverse sinus, superior sagittal sinus and torcula herophili (torcula). (Fig. 2a)

A. Acute management:

- The patient was initialized on heparin drip.
- Endovascular administration of tissue plasminogen activator (rt-PA) bolus (10 mg) combined with thromboaspiration by a penumbra catheter.
- Continuous infusion of rt-PA (0.5-1.0 mg/hr) via microcatheter in the superior sagittal sinus for 48 hours.

B. Outcomes:

- Genetic testing indicated the presence of Prothrombin gene mutation.
- Repeat angiogram showed near complete recanalization of the sinuses. (Fig 2b.)
- Developed ICH with intraventricular extension on POD 7 (Fig 3). Heparin drip was held for two days. He was restarted on anticoagulation without further worsening of his ICH.

C. Long term management:

- Switched to argatroban secondary to Heparin induced thrombocytopenia.
- Discharged on oral Coumadin.

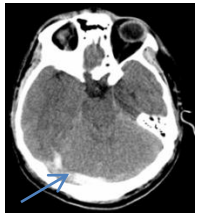

Fig 1a: Initial non contrast brain CT scan showing hyperdensity in the right transverse sinus.

Fig. 1b.
CT venogram showing empty delta sign in the superior sagittal sinus.

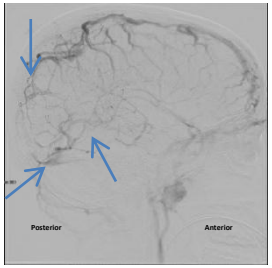

Fig. 2a.
Cerebral angiogram (POD 1) showing occlusion of the torcula, superior sagittal and bilateral transverse sinuses.

Fig. 2b:
Cerebral angiogram (POD 3), post rt-PA infusion showing revascularization of torcula, superior sagittal and bilateral transverse sinuses.

Fig. 3:
CT scan of the brain without contrast on POD 7 showing intracerebral hemorrhage with intraventricular extension which was attributed to the development of Takotsubo's cardiomyopathy on the same day. There is hypodensity in the pontine and right cerebellar hemisphere related to post surgical changes and a small stroke.

2. Takotsubo's cardiomyopathy:

- Developed on POD 7. Secondary to ICH that developed on the same day.
- Manifested as tachycardia, tachypnea and hypoxia.
- Chest x-ray revealed bilateral pulmonary infiltrates (Fig 4).
- Transthroracic echocardiography showed diffuse hypokinesis of the inferior and inferiolateral walls and moderately depressed ejection fraction.

A. Management

- Aggressive diuresis.
- Pressor support.
- Beta blockers.
- Antibiotics therapy for aspiration pneumonia.

B. Outcome

- Normalized ejection fraction by POD 12.

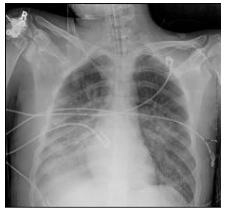

Fig 4: Chest X ray indicative of bilateral infiltrates

Clinical outcome:

- Slowly improved clinically and started to follow simple commands.
- Transferred to a step down unit.
- He was discharge to a rehabilitation facility. He was ambulating with assistance prior to his discharge.

Case Discussion and literature review:

- Cerebral venous sinus thrombosis following retrosigmoid approach for cerebellopontine angle tumor is a rare complication (1).
- We think that the prolonged surgical case, the manipulation of the sinuses, and the presence of prothrombin gene mutation might have contributed to this complication.
- The management of CVST is challenging in post-craniotomy cases since anticoagulation with heparin may increase the risk of ICH in these cases.
- Two randomized clinical trials evaluated the efficacy of anticoagulation in patients with CVST (2, 3). Heparin improves outcome in these cases without a significant increase in the risk of symptomatic ICH. Some patients in these two studies had asymptomatic ICH prior to starting anticoagulation without further worsening of their ICH with therapy.
- Endovascular thrombolysis or thrombectomy are reserved for patients who suffer of worsening despite treatment with heparin or in patients with large ICH (4).
- Our patient had subsequent worsening after treatment with heparin that required endovascular thromboaspiration using penumbra device and continuous infusion of rt-PA via microcatheter in the superior sagittal sinus. This technique has been successfully used to treat CVST before (4).
- These interventions were complicated by development of ICH. His heparin drip was restarted successfully after two days without further worsening of his ICH and with an excellent outcome.

Conclusions:
We report a rare case of CVST following retrosigmoid approach for resection of right CPA tumor. Anticoagulation might be safe and effective in these cases. Endovascular procedures and rt-PA infusion might be lifesaving in cases that do not respond to heparin. However, it carries an increased risk of developing ICH in the post-operative period. Intensive medical care is required in these patients and it may result in improvement of the clinical outcomes.

References:

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