Cerebral venous sinus thrombosis

Cerebral venous sinus thrombosis (CVST) is the presence of thrombosis in the dural venous sinuses. see Dural venous sinus thrombosis.

Epidemiology

The incidence of cerebral venous thrombosis (CVT) varies between studies, but it is estimated to be between 2 and 5 per million per year. A recent study in the Netherlands with comprehensive ascertainment suggested a much higher incidence. It is uncertain whether these differing estimates reflect the quality of ascertainment or true variation.

Devasagayam et al., retrospectively identified CVT International Classification of Diseases-coded cases from all Adelaide public hospitals from 2005 to 2011. They also searched all neuroimaging studies (259,101) from these hospitals for text variations containing venous thromb. All potential cases were reviewed, and cases of incident CVT ascertained. Associations and outcomes were determined.

Of 169 possible cases, 105 cases of CVT were confirmed (59 cases by both coding and neuroimaging, 40 from neuroimaging alone, and 6 from coding alone). In a population of 953,390 adults, this represented an incidence of 15.7 million per year (95% confidence interval, 12.9-19.0), the highest incidence reported. Of these cases, a possible procoagulant predisposition was identified in 48%. Fifty-five of 105 cases occurred in females. Relative risk of CVT in females of reproductive age was insignificantly higher than in males (1.18 [95% confidence interval, 0.94-1.48]).

Cerebral venous sinus thrombosis in the study was more common than previously reported, perhaps because of more complete ascertainment. Future CVT incidence studies should include comprehensive capture and review of neuroimaging.

Superior sagittal sinus thrombosis is the most common type of dural venous sinus thrombosis and is potentially devastating.

Etiology

It is a rare form of stroke found most often in young women of reproductive age, often associated with oral contraceptive use, genetic or acquired thrombophilia, pregnancy, dehydration, or infection.

One factor can be retractor over the falx in interhemispheric approach.

Posterior fossa dural venous sinus thrombus is a well-described complication of head trauma, especially when fracture crosses the dural sinus grooves or in association with epidural hemorrhage. We have found that post-traumatic posterior fossa epidural hematoma compressing a dural venous sinus can mimic dural venous thrombus.

In four children in whom a posterior fossa epidural hemorrhage mimicked dural venous sinus thrombus. Routine CT head and CT venography were obtained on Toshiba volume and helical CT scanners. MRI and MR venography were performed on a Philips scanner.
In all cases there was medial displacement and compression of the posterior fossa dural venous sinuses without intraluminal thrombosis. The epidural hemorrhage was seen tracking along sinus grooves in the occipital bone, peeling the dura containing the sinuses from the calvarium and compressing the sinus, simulating thrombosis on axial CT views.

Both venous sinus thrombosis and posterior fossa epidural hemorrhages in children are well-described complications of head trauma. Posterior fossa epidural hemorrhage can mimic a sinus thrombus by compressing and displacing the sinuses. It is important to recognize this pitfall because treatment of a suspected thrombus with anticoagulation can worsen epidural hemorrhage.

**Pathogenesis**

see Cerebral Venous Sinus Thrombosis Pathogenesis.

**Pathophysiology**

see Cerebral Venous Sinus Thrombosis Pathophysiology.

**Clinical**

Cerebral venous thrombosis (CVT) is a rare cerebrovascular accident that can present with headache, seizure, and focal neurological deficits. Approximately 30%-40% of patients with CVT also present with intracranial hemorrhage.

**Diagnosis**

see Cerebral venous sinus thrombosis diagnosis.

**Treatment**

see Cerebral venous sinus thrombosis treatment.

**Outcome**

Cerebral venous sinus thrombosis (CVST) can have devastating results, with mortality reported in 44% of cases.

**Case series**

**2016**

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Three consecutive patients treated with heparin who suffered both clinical and radiographic deterioration, and went on to have endovascular therapy. Each patient was successfully recanalized by placing a 0.027-inch microcatheter at the proximal portion of the thrombus and infusing 20 mg of alteplase dissolved in 1 liter of normal saline infused at 100 ml per hour for an infusion of 2 mg of alteplase per hour for ten hours.

Monocentric cohort of 41 consecutive CVT admitted in a French ICU tertiary hospital (National Referent Center for CVT). Data collected are as follows: demographic data, clinical course, incidence of craniectomy and/or endovascular procedures and outcome in ICU, after 3 and 12 months.

47 years old (IQ 26-53), with 73.2 % were female, having a SAPS II 41 (32-45), GCS 7 (5-8), and at least one episode of mydriasis in 48.8 %. Thrombosis location was 80.5 % in lateral sinus and 53.7 % in superior sagittal sinus; intracranial hematoma was present in 78.0 %, signs of intracranial hypertension in 60.9 %, cerebral edema in 58.5 % and venous ischemia in 43.9 %. All patients received heparin therapy, and 9 cases had endovascular treatment (21.9 %); osmotherapy (53.7 %) and decompressive craniectomy (16 cases, 39 %) necessary to control intracranial hypertension. Ten patients/41 (24.4 %) died in ICU and 18/31 (58.1 %) were discharged from ICU with outcome 0-3 of mRS. After 12 months, 92 % of survivors (23/25) had a mRS between 0 and 3. The proportion of death was 31.7 % at 1 year.

The large proportion of acceptable outcome in survivors, which continue to functionally improve after 1 year, motivates the hospitalization in ICU for severe CVT. For similar CVT severity, craniectomy did not improve outcome in comparison with the absence of craniectomy.

2015

In 332 patients with CVT, 33 (10 %) presented with subarachnoid hemorrhage SAH, associated in 11 cases with hemorrhagic infarct or intracerebral hemorrhage.

22 cases of CVT presenting as SAH in the absence of hemorrhagic brain lesion. Diagnosis of sinus thrombosis was established on T2* and magnetic resonance venography and that of CoVT on T2* sequence. Diagnostic of SAH was based on fluid-attenuated inversion recovery (FLAIR) sequence.

CVT involved lateral sinus in 18 patients, superior sagittal sinus in 16, and straight sinus in 1. Cortical veins were involved in all patients, in continuity with dural sinus thrombosis when present. SAH was circumscribed to few sulci in all cases and mainly localized at the convexity (21 cases). CoVT implied different areas on the same side in four patients and was bilateral in seven. There was no perimesencephalic or basal cisterns hemorrhage. Cortical swelling was present in 12 cases, associated with localized edema. All patients except one had a favorable outcome.
This report shows that the incidence of CVT presenting as isolated SAH is evaluated to 6.4 % and that SAH is, in all cases, in the vicinity of CoVT and when dural thrombosis is present in continuity with it.

Case reports

2015

Cerebral venous sinus thrombosis after mild head trauma without skull fracture or intracranial hematoma is exceptionally rare. We describe an unusual case of progressive intracranial hypertension due to superior sagittal sinus thrombosis following mild head trauma. A 17-year-old boy presented with nape pain a day after a head blow during a gymnastics competition (backward double somersault). On admission, he showed no neurological deficit. CT scans revealed no skull fractures, and there were no abnormalities in the brain parenchyma. However, his headache worsened day-by-day and he had begun to vomit. Lumbar puncture was performed on Day 6, and the opening pressure was 40 cm of water. After tapping 20 mL, he felt better and the headache diminished for a few hours. MR venography performed on Day 8 revealed severe flow disturbance in the posterior third of the superior sagittal sinus with multiple venous collaterals. Because of the beneficial effects of lumbar puncture, we decided to manage his symptoms of intracranial hypertension conservatively with repeated lumbar puncture and administration of glycerol. After 7 days of conservative treatment, his symptoms resolved completely, and he was discharged from the hospital. Follow-up MR venography performed on Day 55 showed complete recanalization of the superior sagittal sinus. The exact mechanism of sinus thrombosis in this case is not clear, but we speculate that endothelial damage caused by shearing stress because of strong rotational acceleration or direct impact to the superior sagittal sinus wall may have initiated thrombus formation.

2013

A 30-year-old woman developed a cerebrospinal fluid fistula after lumbar spinal surgery. The treatment included rest, hydration, caffeine, and continuous external lumbar drainage. After closure of the fistula, the patient complained of severe orthostatic headache. Thrombosis involving the superior sagittal sinus, the right transverse sinus, the right sigmoid sinus, and the right jugular vein was diagnosed after neurological deterioration.

A few reports have associated CVT with various forms of spinal meningeal injury. However, it has been rarely documented following spinal surgery complicated by accidental durotomy and/or external lumbar CSF drainage. CSF hypovolemia may precipitate CVT in patients having prothrombotic risk factors. Patients who have or had CSF leaks and/or lumbar CSF drains who present with symptoms of intracranial CSF hypotension should remain in the horizontal position to prevent CVT. In that context, the diagnosis of CVT depends on a high degree of suspicion.

3) Ziu E, Haley O, Ibrahimi M, Langan S, Simon S. A Series of Cerebral Venous Sinus Thromboses Treated with Intra-Arterial tPA infused over Ten Hours with a 0.027-inch Catheter and Literature Review.

https://operativeneurosurgery.com/

