

Cerebral venous sinus thrombosis in a patient with delirium secondary to COVID-19

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■ Cite as: *CMAJ* 2022 January 10;194:E15-6. doi: 10.1503/cmaj.211745

A 46-year-old woman was transferred to an internal medicine ward after a 5-week stay in the intensive care unit, where she was treated for severe acute respiratory distress syndrome secondary to COVID-19. She had no past medical history and had not received a SARS-CoV-2 vaccine.

Her predominant symptoms while on the ward included confusion, fear, paranoia and a fluctuating ability to speak. Our initial diagnosis was delirium secondary to critical illness and prolonged exposure to sedating medications. After a week on the ward, the symptoms persisted, with no improvement. A non-contrast computed tomography (CT) scan of the patient's head identified a small focal high density in the right lateral transverse sinus into the junction of the right sigmoid sinus, which raised concern for an acute dural venous thrombosis (Figure 1A). A CT venogram showed extensive thromboses extending into the right jugular bulb and right internal jugular vein (Figure 1B). We started the patient on therapeutic anticoagulation with low-molecular-weight heparin (planned duration 6 months), and her delirium resolved 5 days later. Four months later, she made a full recovery and was speaking normally.

Our case is an important reminder that cerebral venous sinus thrombosis (CVST) is associated with COVID-19 as well as the AstraZeneca ChAdOx1-S SARS-CoV-2 vaccine.^{1,2} A report from Singapore estimated a 0.005% incidence of CVST in people positive for SARS-CoV-2.³ A systematic review found that, among patients with concomitant COVID-19 and CVST, the most common symptom was altered mental status (39%), 75% of patients had CVST identified in the transverse sinus on imaging, and the mortality rate was about 40%.³ The diagnosis of CVST is often missed because symptoms are nonspecific and often subacute.^{3,4} Guidelines suggest that CVST be considered in patients with focal neurologic deficits with accompanying headache and either seizure or altered mental status.^{3,4} The recommended treatment for CVST is low-molecular-weight heparin for 3–6 months.⁵

References

1. Franchini M, Liunbruno GM, Pezzo M. COVID-19 vaccine-associated immune thrombosis and thrombocytopenia (VITT): diagnostic and therapeutic recommendations for a new syndrome. *Eur J Haematol* 2021;107:173-80.
2. Murk W, Gierada M, Fralick M, et al. Diagnosis-wide analysis of COVID-19 complications: an exposure-crossover study. *CMAJ* 2021;193:E10-8.
3. Tu TM, Goh C, Tan YK, et al. Cerebral venous thrombosis in patients with

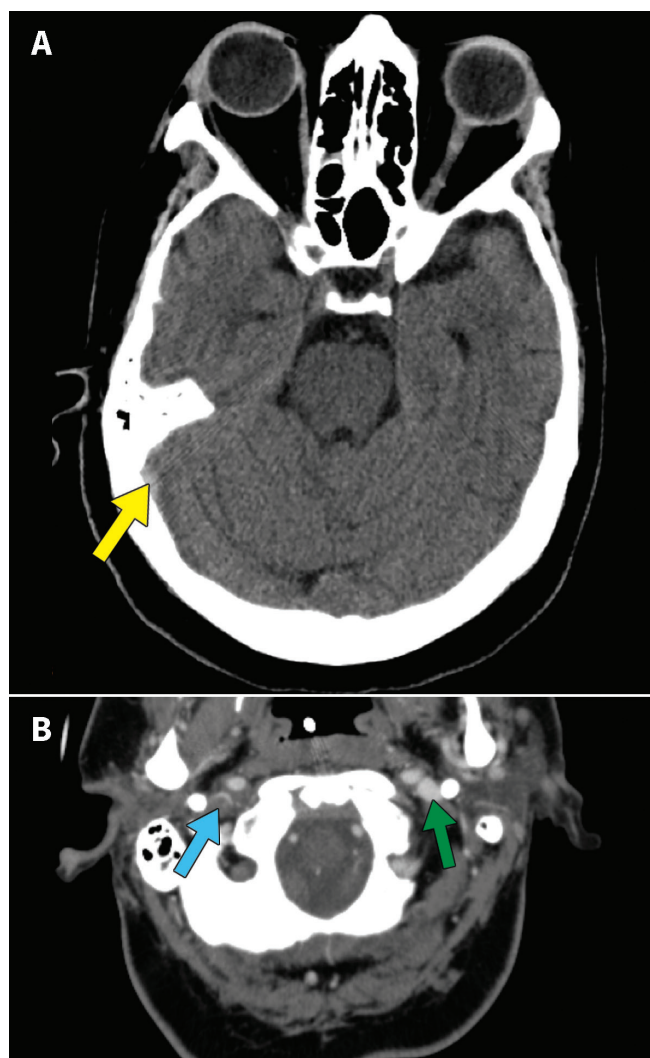


Figure 1: Computed tomography (CT) scans of the head of a 46-year-old woman with cerebral venous sinus thrombosis. (A) Unenhanced CT (axial slice), showing a subtle focal high density in the right lateral transverse sinus into the junction with the right transverse sinus (arrow) and in the right sigmoid sinus (not shown), raising concern for acute dural venous thrombosis. There is no associated edema or hemorrhage. (B) CT venogram, showing near occlusive thrombosis in the right internal jugular vein (dark grey) just below the level of the skull base (blue arrow). Extensive acute thrombosis extended to the right sigmoid sinus and jugular bulb (not shown). Contrast is seen on the contralateral side (light grey), indicating patency (green arrow).

COVID-19 infection: a case series and systematic review. *J Stroke Cerebrovasc Dis* 2020;29:105379.

4. Einhupl K, Stam J, Bousser MG, et al. EFNS guideline on the treatment of cerebral venous and sinus thrombosis in adult patients. *Eur J Neurol* 2010;17:1229-35.
5. Idiculla PS, Gurala D, Palanisamy M, et al. Cerebral venous thrombosis: a comprehensive review. *Eur Neurol* 2020;83:369-79.

Competing interests: Michael Fralick is a consultant for a start-up company, Proof Diagnostics, that has created a point-of-care testing device for SARS-CoV-2. He also holds grants from the Canadian Institutes of Health Research and the Canadian military for clinical trials to identify treatments for COVID-19, outside the submitted work. No other competing interests were declared.

This article has been peer reviewed.

The authors have obtained patient consent.

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