

Letter to the Editor

Thrombosis of posterior condylar vein with extension to internal jugular vein; a rare radiological finding in traumatic brain injury

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Dear Editor,

The posterior condylar canal is located posterior to the occipital condyle and transmits the posterior condylar vein, one of the largest emissary veins in the retromastoid region.^[1,6] This vein usually originates from the superior bulb of the internal jugular vein or less frequently from the medial side of the distal portion of the sigmoid sinus and connects to the suboccipital venous plexus.^[5,9] We report a patient with occipital bone fracture coursing through the posterior condylar canal causing thrombosis of the posterior condylar vein with extension to the internal jugular vein. To the best of our knowledge, thrombosis of the posterior condylar vein with subsequent extension to the major venous sinuses due to trauma has not been reported yet.

A 50-year-old patient was brought to the emergency department following a fall from 15 steps. Initial head computed tomography (CT) scan demonstrated bilateral inferior frontal hemorrhagic contusions, traumatic subarachnoid hemorrhage in the bilateral frontal and right temporal lobe, and a linear occipital bone fracture extending to the posterior condylar vein on the right side. There was no extension of the fracture line to the major dural venous sinuses. Subsequent CT venography (CTV) demonstrated thrombosis of the right posterior condylar vein with extension to the upper aspect of the right internal jugular vein causing nonocclusive thrombosis [Figure 1]. Given the presence of hemorrhagic brain contusions and the nonocclusive nature of the thrombosis in the internal jugular vein, the patient was not considered an appropriate candidate for anticoagulation and was managed conservatively. Follow-up CTV in 48 h demonstrated stable thrombosis with no extension.

Emissary veins connect the extracranial venous system with the intracranial venous sinuses. Although they are usually small in healthy people, they may enlarge in patients with increased intracranial pressure, in patients with high-flow vascular malformations or severe hypoplasia/aplasia or obstruction of the jugular veins. They may also serve as a conduit for retrograde spread of infection or tumors. Familiarity with the major posterior fossa emissary veins is important to avoid misdiagnosis as abnormal findings and also to prevent surgical complications, which can result in intracranial hemorrhage, air embolism, and fatal increases in intracranial pressure.^[7]

The role of traumatic close head injuries as an important etiology of cerebral venous sinus thrombosis has been demonstrated in multiple studies.^[2] Extension of skull fractures to venous sinuses had been reported in 10.4% and 13% of patients in two recent large studies.^[3,8] Delgado Almandoz *et al.* demonstrated traumatic dural sinus thrombosis in 40.7% of patients with blunt head trauma with skull fractures extending to dural venous sinuses or jugular bulb, and more than half of those were occlusive.^[3] In a more recent study, Rivkin *et al.* found

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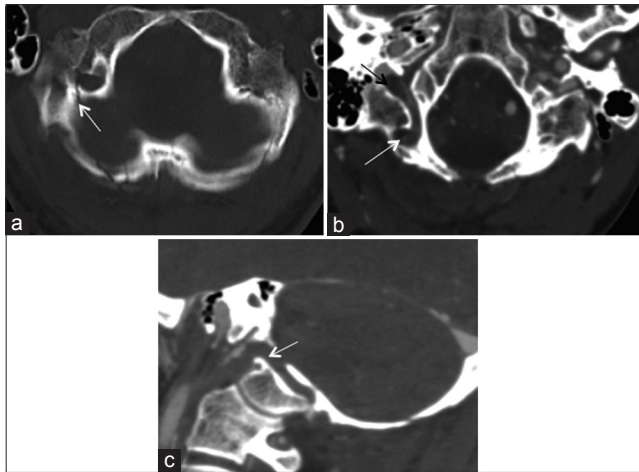


Figure 1: Axial CT scan demonstrates linear occipital bone fracture with extension to the right posterior condylar canal (a white arrow). Axial and sagittal oblique CT Venogram (b and c) demonstrate right condylar vein thrombosis (white arrow) with extension to right internal jugular vein (black arrow)

thrombosis of at least one venous sinus or jugular bulb in 34.9% of patients (20.6% nonocclusive, 14.3% occlusive).^[8] Fujii *et al.* also evaluated 97 patients with skull fractures crossing venous sinuses and found 22.4% of them to have thrombosis.^[4] The indication for performing CTV in all of these studies was extension of skull fracture line to the major dural sinuses including superior sagittal sinus, transverse sinus, sigmoid sinus, or jugular bulb, and, to the best of our knowledge, traumatic thrombosis of posterior condylar vein with subsequent extension to major venous sinuses has not been reported yet. Development of venous sinus thrombosis in the setting of blunt trauma can result in poor clinical outcome resulting from multiple neurological complications including increased intracranial pressure, hemorrhagic venous infarctions, and increase in seizure frequency, with mortality rates as high

as 50% for occlusive venous thrombosis.^[3,4,8] Treatment of dural venous sinus thrombosis in the setting of trauma might be very challenging and only a small minority of patients with occlusive venous sinus thrombosis has been reported in prior studies.^[3]

In conclusion, in the setting of blunt head trauma, extension of the fracture lines to the posterior condylar canal can cause condylar vein thrombosis with secondary extension to major dural venous sinuses. Increase in awareness of this anatomical structure and routine CTV when there is extension of skull fracture line to the major dural sinuses is important for appropriate diagnosis.

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