# Cerebral sinus venous thrombosis in traumatic brain injury

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## Abstract

A 36-year-old, healthy man was admitted to the emergency department with a traumatic brain injury with an injury severity score of 25 points. The head computed tomography revealed a subarachnoidal, epidural hemorrhage as well as a fracture of the occipital calotte. Intracranial pressure (ICP) management was installed according to the LUND concept. In the following scan an angiography revealed a thrombosis of the sinus sigmoideus and transversus. Located next to the fractured skull, the thrombosis was highly likely traumatic, caused by the head trauma. As there was only a little congestion of the blood flow, no lysis or thrombectomy was performed. To lower ICP, a craniectomy was performed. After seven days, mechanical ventilation was terminated. Four days later the patient was already stable enough to be discharged from the surgical itensive care unit.

## Introduction

Cerebral sinus venous thrombosis is a rare phenomenon and a complication of traumatic head injury. The sufficiency of the collateral blood drainage will determine the symptoms. The cerebral venous drainage and related anatomical structures can be affected. The symptoms may appear in relation to increased intracranial pressure (ICP). When collaterals are insufficient the venous congestion causes ischemia and infarctions. The spectrum can range from venous congestion detectable or not on neuroimaging, to the parenchymal cortical or subcortical ischemic injury. So far, there is no consensus on the treatment of traumatic cerebral venous sinus thrombosis. It is a clinical challenge to balance the appropriate timing for anticoagulant with risk of increased cerebral hemorrhage in a traumatic patient.[1-5]

Here we present a patient with traumatic subarachnoidal, epidural haemorrhage as well as a cerebral sinus venous with a good clinical recovery.

## Case Report

A 36-year-old, healthy man was admitted to the emergency department with a traumatic brain injury (TBI) with an injury severity score of 25 points. Prior to admission he got into a fight with a stranger and fell onto his occiput. With a Glasgow coma scale of 5 points he was intubated on scene and transported to our hospital.

The head computed tomography (CT) revealed a TBI with a subarachnoidal, epidural haemorrhage as well as a fracture of the occipital calotte (Figure 1). No further injuries were found. The patient was directly transferred to the OR to evacuate the hematomas. An ICP-probe was installed for further ICP-monitoring. The patient was consistently in a hemodynamic stable state and was admitted to the surgical itensive care unit, where ICP management according to the LUND concept, as commonly used in our hospital, was installed.

Already after some hours the brain pressure began to rise despite deep sedation with a bispectral index monitor (BIS) under 40 and consistently normothermia normoventilated. Another brain CT was performed, which showed a swelling of the brain with an axis shift of 7 mm. This time additionally an angio-CT was performed as the radiologist had already suspected a dissection of the *Arteria vertebralis* in the first scan. No dissection was found, but a thrombosis of the sinus sigmoideus and transversus was depicted. Located next to the fractured skull (Figure 2) the thrombosis was highly likely traumatic, caused by the head trauma. As there was only little congestion of the venous flow and the contralateral sinus showed a sufficient blood drainage no lyse or thrombectomy was performed. After a multidispliciplinary conference the decision was made to lower the intracranial pressure by perfoming a craniectomy.

In the following therapeutic heparin therapy was induced. After seven days, mechanical ventilation was terminated. Four days later the patient was already stable enough to be discharged from the surgical ICU. Even though, a small ischaemic areal appeared in the follow up scan (Figure 3) the patient did not show any further neurological deficiency besides a neurocognitive deficit. To date he is in a rehabilitation clinic.

## Conclusions

Summarizing, despite the fact that traumatic sinus venous thrombosis is rare, it is treated the same way as non-traumatic thrombosis. Standard therapy is anticoagulation, as early as possible, even if an intracranial bleeding is

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Note: the data was collected during clinical work. Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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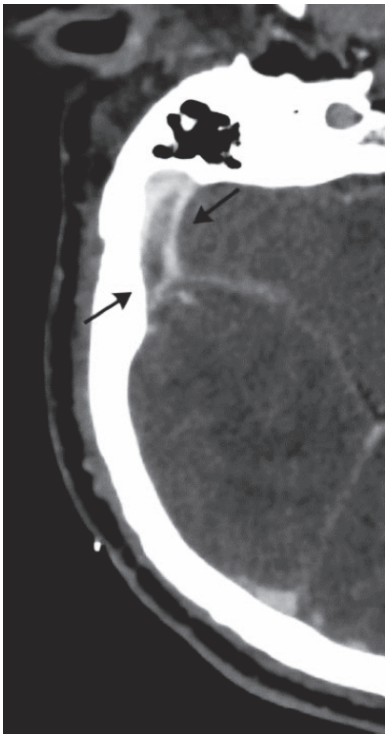

**Figure 1. Partial thrombogenic occlusion of the transvers sinus (arrows).**

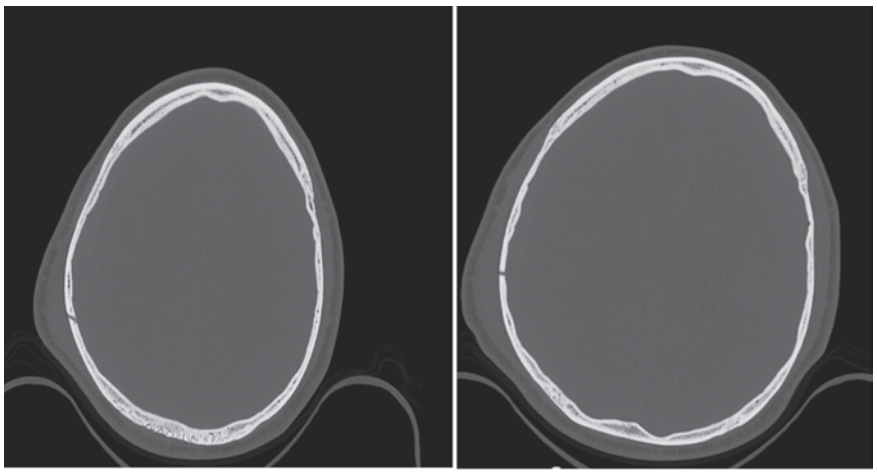

Figure 2. Fracture of the skullcap.

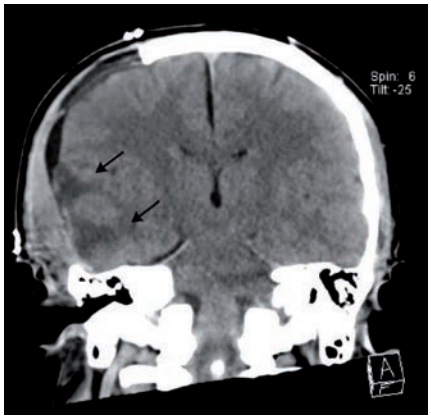


Figure 3. Ischaemic area (arrows) due to the thrombogenic occlusion of the transvers sinus.

apparent.[3,5] To date intracranial lysis or thrombectomy is only chosen in single cases, especially when there is congestion of the blood flow.[5] Ambulant warfarin therapy can range from 3-12 months or longer depending on the etiology and must be chosen individually.

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