Computed tomography venography

- Recurrent syncope after hysteroscopy finally diagnosed as cerebral venous sinus thrombosis: a case report
- Congenital disorders of glycosylation type 1A associated with cerebral hemorrhagic infarction: illustrative case
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- Effectiveness of super-selective digital subtraction angiography and 3D rotational digital subtraction venography for a developmental venous anomaly with an arteriovenous malformation: A case report and literature review
- International practice patterns and perspectives on endovascular therapy for the treatment of cerebral venous thrombosis
- Transarterial embolization for anterior cranial fossa dural arteriovenous fistula based on multimodal three-dimensional imaging
- A novel 3D multimodal fusion imaging surgical guidance in microvascular decompression for primary trigeminal neuralgia and hemifacial spasm
- Post-Traumatic Cerebral Venous Sinus Thrombosis (PtCVST) Resulting in Increased Intracranial Pressure during Early Post-Traumatic Brain Injury Period: Case Report and Narrative Literature Review

A computed tomography venography (CTV) is a medical imaging technique used to visualize the veins, particularly those in the brain or other parts of the body. It involves using computed tomography (CT) technology and contrast dye to highlight the veins and assess their structure and function.

During a CTV procedure, a contrast dye is injected into a vein, typically in the arm, which travels through the bloodstream and highlights the veins as it circulates. The CT scanner then takes cross-sectional images of the area of interest, allowing doctors to visualize the veins in detail.

CT venography can be used to diagnose various conditions affecting the veins, such as deep vein thrombosis (DVT), venous malformations, and cerebral venous sinus thrombosis (CVST). It provides valuable information about the anatomy, patency, and any abnormalities present in the venous system, helping doctors make accurate diagnoses and plan appropriate treatment strategies.

CT venography is a rapid technique which provides an accurate detailed depiction of the cerebral venous system.

Indications

Rapid diagnosis of cerebral venous thrombosis.

Contraindications

general CT contraindications such as pregnancy, claustrophobia, etc. iodinated contrast

contraindications, such as chronic renal failure

Actual procedure will vary depending on institutional protocol/guidelines, but a typical protocol will include:

peripheral venous access (18-20G) in an antecubital vein nonionic contrast material is injected at 4-5 mL/s for a total of 100-120 mL with a 45-second prescanning delay a helical scan is performed by scanning caudally from the calvarial vertex to C1 Data acquisition and analysis

images are analyzed on a dedicated workstation proper evaluation of the dural sinuses indicates proper inspection of the axial thin-section contrast-enhanced source images of a helical CT scan twodimensional (2D) & three-dimensional (3D) multi-planar images, as well as rendering techniques such as maximum intensity projection (MIP), surface shaded displays (SSD) and volume rendering (VR) in a sagittal, coronal, and oblique planes an essential step in CT venography is the removal of bone from the images, by graded subtraction

Findings

Venous sinus abnormalities dural venous sinus thrombosis thrombosis recanalisation, the sinus shows an irregular appearance with multiple intrasinus channels and dural collateral vessels sinus stenosis or occlusion secondary to tumour invasion (e.g. meningioma) vascular malformations (e.g. AVM, dural arteriovenous fistula or developmental venous anomaly) idiopathic intracranial hypertension: bilateral stenoses of the transverse sinuses, without definitive evidence of current or prior thrombosis Parenchymal abnormalities cerebral parenchymal abnormalities such as hemorrhagic infarction Normal variations

sinus hypoplasia and aplasia arachnoid granulations sinus duplication or fenestration variant anatomy of the sinuses (e.g. occipital sinus or persistent falcine sinus)

Limited retrospective data suggest that dural venous sinus thrombosis (DVST) in traumatic brain injury (TBI) patients with skull fractures is common and associated with significant morbidity and mortality. Prospective data accurately characterizing the incidence of DVST in patients with high-risk Traumatic Brain Injury are sparse but are needed to develop evidence-based Traumatic Brain Injury management guidelines.

After obtaining institutional approval, 36 adult patients with TBI with skull fractures admitted to an Australian level III adult intensive care unit between April 2022 and January 2023 were prospectively recruited and underwent computed tomography venography or magnetic resonance venography within 72 hours of injury. When available, daily maximum intracranial pressure was recorded.

Dural venous sinus abnormality was common (36.1%, 95% confidence interval 22.5%-52.4%) and strongly associated with DVST (P = 0.003). The incidence of DVST was 13.9% (95% confidence interval 6.1%-28.7%), which was lower than the incidence reported in previous retrospective studies. Of DVSTs confirmed by computed tomography venography, 80% occurred in patients with extensive skull fractures including temporal or parietal bone fractures in conjunction with occipital bone fractures (P = 0.006). However, dural venous sinus abnormality and DVST were not associated with increased maximum daily intracranial pressure within the first 7 days after injury.

Dural venous sinus abnormality was common in TBI patients with skull fractures requiring intensive care unit admission. DVST was confirmed in more than one-third of these patients, especially patients

with concomitant temporal or parietal and occipital bone fractures. Computed tomography venography is recommended for this subgroup of TBI patients ¹⁾

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McGuckin E, Ho KM, Honeybul S, Stuckey E, Song S. A Prospective Cohort Study Characterizing Incidence of Dural Venous Sinus Thrombosis in Traumatic Brain Injury Patients with Skull Fractures. World Neurosurg. 2024 Jan 30:S1878-8750(24)00154-2. doi: 10.1016/j.wneu.2024.01.132. Epub ahead of print. PMID: 38302002.

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