

Intracranial cerebrovascular malformation

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Intracranial [cerebrovascular malformation](#) refers to abnormalities in the blood vessels within the brain. These malformations can affect the arteries, veins, or capillaries and may disrupt normal blood flow. Several types of intracranial cerebrovascular malformations exist, each with its characteristics and potential consequences.

Types

[Arteriovenous Malformation \(AVM\)](#)

[Cavernous Malformation \(Cavernoma or CCM\)](#)

[Venous Angioma \(Developmental Venous Anomaly - DVA\)](#)

[Capillary Telangiectasia](#)

[Intracranial Aneurysm](#)

[Moyamoya Disease](#)

[Dural arteriovenous fistula](#)

[Venous malformation.](#)

Cerebrovascular malformations are a major cause of [intracranial hemorrhage](#) in young adults and children. They are resource-intensive to manage with invasive treatment modalities.

A report addresses the feasibility of virtual injection software based on contrast-enhanced cone-beam CTs (CBCTs) in the context of cerebrovascular lesion embolization. Intracranial arteriovenous malformation (AVM), dural arteriovenous fistula (AVF) and mycotic aneurysm embolization cases with CBCTs performed between 2013 and 2020 were retrospectively reviewed. Cerebrovascular lesions were reviewed by 2 neurointerventionalists using a dedicated virtual injection software (EmboASSIST, GE Healthcare; Chicago, IL). Points of Interest (POIs) surrounding the vascular lesions were first identified. The software then automatically displayed POI-associated vascular traces from vessel roots to selected POIs. Vascular segments and reason for POI identification were recorded. Using 2D multiplanar reconstructions from CBCTs, the accuracy of vascular traces was assessed. Clinical utility metrics were recorded on a 3-point Likert scale from 1 (no benefit) to 3 (very beneficial).

Results: Nine cases (7 AVM, 1 AVF, 1 mycotic aneurysm) were reviewed, with 26 POIs selected. Three POIs were in 2nd order segments, 8 POIs in 3rd order segments and 15 POIs in 4th order segments of their respective arteries. The reviewers rated all 26 POI traces - involving a total of 90 vascular segments - as accurate. The average utility score across the 8 questions were 2.7 and 2.8 respectively from each reviewer, acknowledging the software's potential benefit in cerebrovascular embolization procedural planning.

Conclusion: The operators considered CBCT-based virtual injection software clinically useful and accurate in guiding and planning cerebrovascular lesion embolization in this retrospective review. Future prospective studies in larger cohorts are warranted for validation of this modality ¹⁾.

Diagnosis

Diagnosis often involves imaging studies such as cerebral angiography, magnetic resonance imaging (MRI), or computed tomography (CT) scans.

Treatment

There is no current medical therapy option available for patients.

see [Intracranial arteriovenous malformation treatment](#).

Treatment depends on the type and severity of the malformation. Options may include observation, medication, embolization, surgery, or a combination of these. Management of intracranial cerebrovascular malformations requires a multidisciplinary approach involving neurologists, neurosurgeons, interventional neuroradiologists, and other specialists. The goal is to prevent complications, such as bleeding or neurological deficits, and to provide appropriate treatment based on the individual characteristics of the malformation and the patient's overall health.

¹⁾

Sundararajan SH, Ranganathan S, Kishore V, Doustaly R, Patsalides A. Simulation of superselective [catheterization](#) for cerebrovascular lesions using a virtual injection software. CVIR Endovasc. 2021 Jun 14;4(1):52. doi: 10.1186/s42155-021-00242-6. PMID: 34125300.

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