Intracranial hypertension stent

Clinical Policy ID: CCP.1493

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Next review date: 11/2026

Policy contains: idiopathic intracranial hypertension, pseudotumor cerebri, venous sinus stent.

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Coverage policy

Venous sinus stents for intracranial hypertension are investigational/not clinically proven and, therefore, not medically necessary.

Limitations

No limitations were identified during the writing of this policy.

Alternative covered services

- Diuretic medication therapy (e.g., acetazolamide).
- Shunting (insertion of tube into brain).
- Weight loss support and consultation.

Background

Idiopathic intracranial hypertension, also known as pseudotumor cerebri, is a condition marked by persistently increased intracranial pressure, papilledema, and radiological findings with no known identifiable origin (Wang, 2022). Incidence for all ages is approximately one in 100,000 persons, and is highest in overweight women ages 20 to 44 years, estimated at 19 in 100,000 (Daggubati, 2019).

Common symptoms of intracranial hypertension are often nonspecific and may include headache, transient visual obscurations, pulse synchronous tinnitus, photopsia, retrobulbar pain, diplopia, and visual loss. While the

pathophysiology of idiopathic intracranial hypertension is poorly understood, likely causative factors are cerebral spinal fluid dysregulation and dysfunction and increasing venous sinus pressure (Wang, 2022).

The criteria used to diagnose idiopathic intracranial hypertension include signs and symptoms attributable only to elevated intracranial pressure; cerebrospinal fluid opening pressure of greater than 25 centimeters H_2O; normal cerebrospinal fluid composition; and no evidence after neuroimaging of mass lesion or other structural causes. Fundoscopy, optical coherence tomography, neuroimaging (often magnetic resonance imaging), and lumbar puncture with manometry are used in diagnosis (Friedman, 2013).

Multiple treatment options for idiopathic intracranial hypertension exist. Weight loss remains the only established therapy that changes the disease process typically for patients with a baseline body mass index > 35 kg/m^2 as first line treatment in the absence of fulminant disease (Wang, 2022). Monitoring of psychosocial issues is important, although consensus is lacking in standardized measures. The most common medical treatment is acetazolamide — a diuretic and carbonic anhydrase inhibitor — sometimes combined with other drugs (Thurtell, 2021).

Surgical treatments in cases refractory to conservative approaches include various approaches to shunting cerebrospinal fluid, optic nerve sheath fenestration, and cerebral venous sinus stents (also known as intracranial hypertension stents). The stenting procedure involves cerebral angiography with a guide catheter introduced through femoral artery puncture, while venography and venous manometry are performed under conscious sedation via femoral vein access, with a shuttle catheter positioned at the internal jugular vein.. Venous stents, placed under general anesthesia, span 10 millimeters pre-stenosis and post-stenosis (Daggubati, 2019).

Findings

Guidelines

A consensus guideline issued by four British professional medical societies on management of idiopathic intracranial hypertension does not recommend neurovascular stenting for either visual loss or headache alone, as the role of the procedure is not established. Reasons include observed complications, lack of long-term data on efficacy and safety, and methodological limits, i.e., studies are mostly case series, not randomized, and have small sample sizes (Mollan, 2018).

A guideline from the European Headache Foundation states that, while some institutions employ venous sinus stenting to treat idiopathic intracranial hypertension, “utility is debated.” This guideline also does not recommend the procedure for treating headaches in persons with the disorder (Hoffmann, 2018).

A guideline from the Royal College of Physicians states ventriculoperitoneal shunts can be used to divert cerebrospinal fluid, and that optic nerve sheath fenestration is an alternative to treating intracranial hypertension. However, the ability of endovascular stenting to improve long-term outcomes is uncertain (Wakerley, 2020).

The American Academy of Ophthalmology has not issued professional guidance for idiopathic intracranial hypertension, but a related article on the Academy’s website indicates the general low quality evidence for venous sinus stenting that cannot address the true complication rates and comparative effectiveness relative to more established shunting procedures. The authors agree that a head-to-head controlled clinical trial is necessary to answer these questions. While standard criteria for venous stenting are lacking, there is general agreement that venous sinus stenting may be considered when patients have failed or are intolerant to maximum medical therapy, have a documented venous sinus pressure gradient on manometry, and have failed, refused, or are not an appropriate candidate for cerebrospinal fluid shunting or optic nerve sheath fenestration (Lee, 2024).

Evidence reviews

Patients who fail conservative measures are referred for cerebrospinal fluid shunting or optic nerve sheath fenestration, but venous sinus shunting is increasing in popularity in the United States. From 2016 to 2020, the number of venous sinus stenting procedures increased 80%, while the number of cerebrospinal fluid shunting procedures and optic nerve sheath fenestration procedures decreased 19% and 54%, respectively (Khunte, 2023).

The evidence base reported in the analysisbelow comprises non-randomized and single cohort studies of short duration. Most participants were female and obese. Weight loss, acetazolamide therapy, and surgical interventions prior to venous sinus stenting were reported inconsistently. Venous sinus stenting appears to be efficacious for improving symptoms associated with idiopathic intracranial hypertension in patients who do not respond to medical therapy or have significant neurological or visual symptoms. Major complications and adverse events are infrequent, but rates of treatment failure, recurrence of idiopathic intracranial hypertension, and restenosis are variable.

A systematic review and meta-analysis of 36 non-randomized studies included 1,066 participants with medically refractory idiopathic intracranial hypertension (Azzam, 2024). The mean age at stenting was 33 years (range 13.4 to 41.8 years), and the mean follow-up time was 17.4 months (range three to 49 months). Most participants were female with a mean body mass index of 34.3 kilograms/m^2 (range 24.1 to 41.5 kilograms/ m^2). The meantime to stenting since diagnosis was 22.9 months. Venous sinus stenting was performed as a first-line surgery in 78% (265/341) and as a second-line surgery in 18.9% (71/374). The overall risk of bias in the included studies was graded as moderate.

There was a significant reduction in trans-stenotic gradient pressure and lower cerebrospinal fluid opening pressure following venous sinus stenting. Symptomatic improvement in tinnitus (95% of participants), papilledema (89%), visual disturbances (88%), and headache (79%) occurred following the procedure. Treatment failure, defined as worsening symptoms and recurrence of idiopathic intracranial hypertension, occurred in 8.35%. The major complications and adverse events rate was 3.93%, including subdural hematoma, subdural hemorrhage, worsening of headache, and visual impairment. The minor complications and adverse events rate was 2.72%, including transient headache, retroorbital pain, and neck hematoma (Azzam, 2024).

A systematic review and meta-analysis of 24 studies compared the rates of restenosis and symptom recurrence in 694 participants (781 total venous sinus stenting procedures) with ophthalmological and neurological symptoms refractory to previous therapies. The mean age was 33.9 years, and the mean body mass index was 35.3 kilograms/m^2. After the procedure, 77.7% experienced symptom improvement, and 22.3% had persistent or worsened symptoms. The pooled restenosis rate was 17.7% (Lim, 2024).

A systematic review of 109 studies compared outcomes for various types of surgery for idiopathic intracranial hypertension. Venous sinus stenting improved papilledema, visual fields, and headaches in 87.1%, 72.7%, and 72.1% of patients, with failure and complication rates of 2.3% and 11.3%, respectively. Less efficacy and safety resulted after cerebrospinal fluid diversion (78.9%, 66.8%, 69.8%, 9.4%, and 43.4%), and optic nerve sheath fenestration (90.5%, 65.2%, 49.3%, 2.2%, and 9.4%) (Kalyvas, 2021).

A meta-analysis of 29 studies (n = 410) assessed outcomes of patients who underwent dural venous sinus stenting for refractive idiopathic intracranial hypertension. Technical success was 99.5%, the rate of major complication rate was 1.5%, and repeated procedure occurred in 10% of cases (Leishangthem, 2019).

A systematic review/meta-analysis of 20 studies (n = 474) of intracranial venous sinus stenting for idiopathic intracranial hypertension included 88% females with a mean age of 35 and a mean mass body index of 35 kg/m^2, who were followed for a median of 18 months after treatment. The review reported rates of papilloedema improvement (93.7%), headache improvement/resolution (79.6%), and pulsatile tinnitus resolution (90.3%). The rate of symptom recurrence was 9.8%, and major complications occurred in 1.9% of patients (Nicholson, 2019).

In 2023, we updated the references and added a systematic review of 27 studies with an average sample size of 27 participants that confirmed serious limitations in the evidence base, notably a lack of ophthalmological outcomes associated with dural venous sinus stenting for treating medically refractory idiopathic intracranial hypertension (Kabanovski, 2022). No policy changes are warranted.

In 2024, we removed older references and added two new systematic reviews/meta-analyses to the policy. No policy changes are warranted.

In 2025, we reviewed a case series and systematic literature review that evaluated endovascular stenting for intracranial venous hypertension secondary to meningioma compression or invasion of venous sinuses, synthesizing outcomes from (n = 32) participants across eight publications and four institutional cases. The median age was 47.5 years, with 83.9% female participants. Complete symptom resolution occurred in 25 patients (78.1%) and partial resolution in seven patients (21.9%), while papilledema resolved in 84.4% of cases over a median 27-month follow-up. Stent deployment was technically successful in all patients, with no reported procedural or delayed complications. Clinical recurrence requiring further endovascular treatment occurred in 31.3% of patients, and 12 patients received adjuvant stereotactic radiosurgery. These results support endovascular stenting as a promising treatment option for meningioma-related venous hypertension, although the observed recurrence rate highlights the need for ongoing surveillance and further research (Courret, 2025). No policy changes were warranted.

References

On June 4, 2025, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were “intracranial hypertension (MeSH),” “stents (MeSH),” “idiopathic intracranial hypertension,” “pseudotumor cerebri,” “benign intracranial hypertension,” and “stent.” We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

Azzam AY, Mortezaei A, Morsy MM, et al. Venous sinus stenting for idiopathic intracranial hypertension: An updated meta-analysis. *J Neurol Sci*. 2024;459:122948. Doi: 10.1016/j.jns.2024.122948.

Courret T, Barreau X, Engelhardt J, et al. Endovascular stenting for intracranial venous hypertension caused by meningioma: a case series and systematic literature review. *J Neuroradiol*. 2025;52(3):101335. Doi:10.1016/j.neurad.2025.101335.

Daggubati LC, Liu KC. Intracranial venous sinus stenting: A review of idiopathic intracranial hypertension and expanding indications. *Cureus*. 2019;11(2):e4008. Doi: 10.7759/cureus.4008.

Friedman DI, Liu GT, Digre KB. Revised diagnostic criteria for the pseudotumor cerebri syndrome in adults and children. *Neurology*. 2013;81(13):1159-65. Doi: 10.1212/WNL.0b013e3182a55f17.

Hoffmann J, Mollan SP, Paemeleire K et al. European Headache Federation guideline on idiopathic intracranial hypertension. *J Headache Pain*. 2018;19(1):93. Doi: 10.1186/s10194-018-0919-2

Kabanovski A, Kisilevsky E, Yang Y, Margolin E. Dural venous sinus stenting in the treatment of idiopathic intracranial hypertension: A systematic review and critique of literature. *Surv Ophthalmol*. 2022;67(1):271-287. Doi: 10.1016/j.survophthal.2021.05.002.

Kalyvas A, Neromyliotis E, Koutsarnakis C, et al. A systematic review of surgical treatments of idiopathic intracranial hypertension (IIH). *Neurosurg Rev*. 2021;44(2):773-792. Doi: 10.1007/s10143-020-01288-1.

Khunte M, Chen H, Colasurdo M, Chaturvedi S, Malhotra A, Gandhi D. National trends of cerebral venous sinus stenting for the treatment of idiopathic intracranial hypertension. *Neurology*. 2023;101(9):402-406. Doi: 10.1212/wnl.0000000000207245.

Lee AG, Bindiganavile SH, Smiley H, Al-Zubidi N, Suleiman AO, Bhat N. Venous stenting in idiopathic intracranial hypertension. American Academy of Ophthalmology website. https://eyewiki.org/Venous_Stenting_in_Idiopathic_Intracranial_Hypertension_(IIH). Last edited March 15, 2024.

Leishangthem L, SirDeshpande P, Dua D, Satti SR. Dural venous sinus stenting for idiopathic intracranial hypertension: An updated review. *J Neuroradiol*. 2019;46(2):148-154. Doi: 10.1016/j.neurad.2018.09.001.

Lim J, Monteiro A, Kuo CC, et al. Stenting for venous sinus stenosis in patients with idiopathic intracranial hypertension: An updated systematic review and meta-analysis of the literature. *Neurosurgery*. 2024;94(4):648-656. Doi: 10.1227/neu.0000000000002718.

Mollan SP, Davies B, Silver NC, et al. Idiopathic intracranial hypertension: Consensus guidelines on management. *J Neurol Neurosurg Psychiatry*. 2018;89:1088-1100. Doi: 10.1136/jnnp-2017-317440.

Nicholson P, Brinjikji W, Radovanovic I, et al. Venous sinus stenting for idiopathic intracranial hypertension: A systematic review and meta-analysis. *J Neurointerv Surg*. 2019;11(4):380-385. Doi: 10.1136/neurintsurg-2018-014172.

Thurtell MJ, Kawasaki A. Update in the management of idiopathic intracranial hypertension. *Neurol Clin*. 2021;39(1):147-161. Doi: 10.1016/j.ncl.2020.09.008.

Wakerley BR, Mollan SP, Sinclair AJ. Idiopathic intracranial hypertension: Update on diagnosis and management. *Clin Med (Lond)*. 2020;20(4):384-388. Doi: 10.7861/clinmed.2020-0232.

Wang MTM, Bhatti MT, Danesh-Meyer HV. Idiopathic intracranial hypertension: Pathophysiology, diagnosis and management. *J Clin Neurosci*. 2022;95:172-179. Doi:10.1016/j.jocn.2021.11.029.

Policy updates

7/2021: initial review date and clinical policy effective date: 8/2021

7/2022: Policy references updated.

7/2023: Policy references updated.

7/2024: Policy references updated.

7/2025: Policy references updated.