Spinal cord cavernous malformation

- Surgical treatment to resect giant intraspinal epidural cavernous hemangioma of Cobb syndrome: illustrative case
- Guidelines for the Diagnosis and Clinical Management of Cavernous Malformations of the Brain and Spinal Cord: Consensus Recommendations Based on a Systematic Literature Review by the Alliance to Cure Cavernous Malformation Clinical Advisory Board Experts Panel
- Intramedullary Cavernoma with Hematomyelia and Unusual Clinical Findings of Brown-Sequard Syndrome: A Case Report
- Thoracic Intradural Extramedullary Cavernous Malformation Mimicking Meningioma
- A case of spinal cord intramedullary cavernoma
- An Alternative Approach to Surgery or Radiosurgery for Treating Cerebral Cavernous Malformations? A Case Report with Literature Review
- Treatment of Spinal Cavernous Malformations: A Single-Center Case Series
- Surgical versus conservative management of spinal cord cavernous malformations: a systematic review and comparative meta-analysis

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Intramedullary cavernous malformations (CMs) are rare lesions with unclear natural history.

Although rarely symptomatic, spinal cord cavernous malformations can be detected in up to 16% of pediatric familial cerebral cavernous malformation patients using diverse spine magnetic resonance imaging protocols and may appear de novo. intraosseous spinal vascular malformations (ISVM) were instead absent in this cohort. Given the relative commonality of asymptomatic spinal cord cavernous malformations, serial screening spine MR should be considered in familial cerebral cavernous malformation starting in childhood [1)].

A cohort of conservatively managed patients with symptomatic, intramedullary spinal cord cavernomas was clinically stable throughout the follow-up period. In the series of Zhang et al, patients harboring symptomatic spinal cord cavernous malformation did not have significant, permanent neurological decline during the follow-up period when treated with the conservative approach of observation. This data provides additional information for determining the appropriate treatment strategy for patients with intramedullary spinal cavernomas [2)].

Clinical features

see Spinal cord cavernoma clinical features.

Diagnosis

MRI still represents the gold standard, showing a typical hyperintense lesion on native T2-weighted sequences, usually surrounded by a hypointense hemosiderin rim after hemorrhage

Differential diagnosis

Cavernous angiomas of the spinal cord exhibit imaging characteristics that may overlap with those of hemorrhagic ependymoma.

Treatment

see Spinal cord cavernoma treatment.

Outcome

Spinal cord cavernous malformation outcome

Systematic review and metaanalysis

Badhiwala et al performed a systematic review and metaanalysis of the literature. In addition, they included their single-center series of ISCCMs.

The authors searched MEDLINE, EMBASE, CINAHL, Google Scholar, and The Cochrane Library for studies published through June 2013 that reported cases of ISCCMs. Data from all eligible studies were used to examine the epidemiology, clinical features, and neurological outcomes of patients with surgically managed and conservatively treated ISCCMs. To evaluate several variables as predictors of favorable neurological outcomes, the authors conducted a meta-analysis of individual patient data and performed univariate and multivariate logistic regression analyses. Variables included patient age, patient sex, lesion spinal level, lesion size, cerebral cavernomas, family history of cavernous malformations, clinical course, presenting symptoms, treatment strategy (operative or conservative), symptom duration, surgical approach, spinal location, and extent of resection. In addition, they performed a meta-analysis to determine a pooled estimate of the annual hemorrhage rate of ISCCMs.

Eligibility criteria were met by 40 studies, totaling 632 patients, including the authors' institutional series of 24 patients. Mean patient age was 39.1 years (range 2-80 years), and the male-to-female ratio was 1.1:1. Spinal levels of cavernomas were cervical (38%), cervicothoracic (2.4%), thoracic (55.2%), thoracolumbar (0.6%), lumbar (2.1%), and conus medullaris (1.7%). Average cavernoma size was 9.2 mm. Associated cerebral cavernomas occurred in 16.5% of patients, and a family history of cavernous malformation was found for 11.9% of evaluated patients. Clinical course was acute with stepwise progression for 45.4% of patients and slowly progressive for 54.6%. Symptoms were motor (60.5%), sensory (57.8%), pain (33.8%), bladder and/or bowel (23.6%), respiratory distress (0.5%), or absent (asymptomatic; 0.9%). The calculated pooled annual rate of hemorrhage was 2.1% (95% CI 1.3%-3.3%). Most (89.9%) patients underwent resection, and 10.1% underwent conservative management (observation). Outcomes were better for those who underwent resection than for those who underwent conservative management (OR 2.79, 95% CI 1.46-5.33, p = 0.002). A positive correlation with improved neurological outcomes was found for resection within 3 months of symptom onset (OR 2.11, 95% CI 1.31-3.41, p = 0.002), hemilaminectomy approach (OR 3.20, 95% CI

1.16-8.86, p = 0.03), and gross-total resection (OR 3.61, 95% CI 1.24-10.52, p = 0.02). Better outcomes were predicted by an acute clinical course (OR 1.72, 95% CI 1.10-2.68, p = 0.02) and motor symptoms (OR 1.76, 95% CI 1.08-2.86, p = 0.02); poor neurological recovery was predicted by sensory symptoms (OR 0.58, 95% CI 0.35-0.98, p = 0.04). Rates of neurological improvement after resection were no higher for patients with superficial ISCCMs than for those with deep-seated ISCCMs (OR 1.36, 95% CI 0.71-2.60, p = 0.36).

Intramedullary spinal cord cavernous malformations tend to be clinically progressive. The authors' findings support an operative management plan for patients with a symptomatic ISCCM. Surgical goals include gross-total resection through a more minimally invasive hemilaminectomy approach within 3 months of presentation [3].

Case series

Spinal cord cavernoma case series.

Case reports

Spinal cord cavernoma case reports.

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Geraldo AF, Luis A, Alves CAPF, Tortora D, Guimarães J, Reimão S, Pavanello M, de Marco P, Scala M, Capra V, Rossi A, Schwartz ES, Mankad K, Severino M. Spinal involvement in pediatric familial cavernous malformation syndrome. Neuroradiology. 2022 Apr 22. doi: 10.1007/s00234-022-02958-1. Epub ahead of print. PMID: 35451625.

2)
Kharkar S, Shuck J, Conway J, Rigamonti D. The natural history of conservatively managed symptomatic intramedullary spinal cord cavernomas. Neurosurgery. 2007 May;60(5):865-72; discussion 865-72. PubMed PMID: 17460522.

3)
Badhiwala JH, Farrokhyar F, Alhazzani W, Yarascavitch B, Aref M, Algird A, Murty N, Kachur E, Cenic A, Reddy K, Almenawer SA. Surgical outcomes and natural history of intramedullary spinal cord cavernous malformations: a single-center series and meta-analysis of individual patient data: Clinic article. J Neurosurg Spine. 2014 Oct;21(4):662-76. doi: 10.3171/2014.6.SPINE13949. Epub 2014 Jul 25. Review. PubMed PMID: 25062285.