

## Natural History And Surgical Management Of Brain Stem Cavernous Malformations

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Cavernous malformations (CMs) are uncommon lesions occurring in the central nervous system, with an incidence of approximately 0.5% in the general population and constituting 5%-10% of all intracranial vascular malformations. Among CMs, prevalence within the brainstem as reported in the literature has ranged from 4% to 35%. With their precarious location and potentially devastating clinical events, brainstem CMs have attracted attention from neurosurgeons, and with these surgeons' unrelenting efforts, the microsurgical techniques to treat these lesions in the brainstem have greatly improved in recent decades. Although surgical outcomes reported in the literature have been satisfying, surgical intervention has become increasingly contraindicated because of the tendency for a benign clinical course in brainstem CMs, after weighing this fact against the high risk of surgical morbidity. Thus, it is advisable to operate on patients with symptomatic lesions abutting the pial or ependymal surface of the brainstem or where lesions are accessible to safe entry zones, which have caused more than 1 significantly symptomatic hemorrhage and can be defined as aggressive. However, treatment remains controversial for deep-seated lesions away from the surface of the brainstem or lesions that are inaccessible to safe entry zones. Other treatments, such as radiosurgery and medication, are still debatable, which might be as an alternative for lesions amenable to but at high risk with surgery.