Surgery For Cerebral AVM

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AVMs are abnormalities of the intracranial vessels that constitute a connection between the arterial and venous systems and lack an intervening capillary bed. AVM is associated with significant morbidity and mortality rate. The different management options available for AVMs such as medical management, microsurgical resection, stereotactic radiotherapy, and endovascular embolization. Cerebral AVMs may present with intracranial hemorrhage, seizures, headaches, and long-term disability. However, the appropriate treatment modalities for unruptured AVMs present a challenging clinical dilemma because of a poorly defined natural history and the seemingly low annual hemorrhage rates so the treatment option was led to the development of ARUBA (a randomized trial of unruptured brain arteriovenous malformations) which aims to compare the natural history with modern multimodal therapy especially to evaluate surgical intervention versus medical management for unruptured cerebral AVMs.

Invasive treatment modalities are the reasonable choice for ruptured cerebral AVMs due to the high rate of morbidity and mortality. The factors that dictate treatment options (which may include single or multimodal therapy) are operator skill, AVMs size and location, surgical or endovascular accessibility, venous drainage, and presence of high-risk features, such as a flow related or intranidal aneurysm. The Spetzler-Martin Scale is used to estimate the risk of surgical resection of an AVMs with higher grades being associated with greater surgical morbidity and mortality. Microsurgical excision of the AVMs involves a craniotomy, careful dural opening with circumferential nidus dissection until complete AVMs resection is achieved. The surgical mortality and a permanent postoperative morbidity is associated with an increasing Spetzler-Martin grade. Furthermore, Stereotactic radiosurgery is the treatment option for AVMs smaller than 3.5 cm. The endovascular treatment of brain AVMs involves the delivery of liquid embolics, such as n-butyl cyanoacrylate and ethylene vinyl alcohol copolymer (Onyx) via superselective catheterization with flow-guided microcatheters. Preoperative embolization can reduce the size of an AVMs for microsurgical excision. The advantages of endovascular therapy include a minimally invasive approach and possible immediate occlusion but the disadvantages of endovascular therapy is usually incomplete embolization, intracranial hemorrhage, brain edema or hemorrhage

The increasing use of advance imaging techniques will increase the incidence of asymptomatic AVMs. At the present moment, we do not fully understand the natural history of AVMs to precisely predict which AVMs will likely bleed and what the most appropriate optimal treatment option will be, single or multimodal therapy.