

The Surgical Management of Low-grade Unruptured Brain Arteriovenous Malformations in Non-Neurologically Impaired Patients

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Introduction

The purpose of this study was to identify the outcomes of surgical management in patients with unruptured low-grade bAVMs non-neurologically impaired patients and compare them with the natural history of bAVMs.

Methods

A retrospective review of all patients who underwent surgical resection, with or without preoperative embolization, for unruptured Spetzler-Martin grade I or II bAVMs 2004 through 2014 was performed. Patients with minimal symptoms (headaches and seizures only) and intact neurological presentation were included. Patients with any focalized neurological deficit, hemorrhage, and/or clinical impairment were excluded from analysis. The primary endpoint, identical to the one used in the ARUBA trial, was a composite of stroke or death from any cause. Clinical outcome was evaluated using the modified Rankin Scale (mRS).

Results

Of the 61 patients (17 grade I, 44 grade II bAVM) meeting inclusion criteria, 28 (45.9%) were male, mean age was 38.2 ± 17.2 years old. No patients experienced a major stroke (primary outcome), death, or severe neurological impairment associated with management. Cure was achieved in all patients regardless of grade, and no recurrences were observed at last follow-up (mean 39.8 ± 32.1 months). Immediately after surgery and at last follow-up, all grade I bAVM patients were non-clinically impaired and 94.1% had a good outcome. At last follow-up, 97.7% of grade II bAVM patients were neurologically intact and 97.7% had a good outcome. Seizures completely resolved without further medication in 60.7% of patients. Postoperative and post-embolization complication rate was 6.3% and 4.7%, respectively. At last follow-up, an impaired clinical status (mRS =2) was present in only 1.6% of patients.

Conclusions

Surgical resection of unruptured low-grade bAVMs in non-impaired patients is safe and results in a low rate of clinical deterioration in experienced hands. Patients present improvement from transient deficits following surgery, which could be considered superior than the natural history.

Learning Objectives

Surgical management of unruptured low-grade bAVMs in non-neurologically impaired patients is a safe procedure in experienced hands, with good clinical outcomes and less risk of reaching primary outcome than natural history.