

Complications of Endovascular Treatment of Cerebral Arteriovenous Malformations: A Multi-center Experience with Onyx

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Introduction

Some reports suggest that the use of Onyx (ev3, Irvine, CA) for treatment of cerebral arteriovenous malformations (AVMs) has increased complications. In 2004, a review of 201 AVM patients undergoing embolization resulted in 9.0% permanent neurologic deficits and 2.0% death; Onyx was used in only 1.5% of procedures.

Methods

A retrospective review of all patients with AVM undergoing endovascular treatment at University of Iowa, University of New Mexico, and UT Southwestern between 2006 and 2014. Demographic, anatomic and procedural variables were collected. Complication and death rates were compared to the 2004 study using chi square analysis

Results

Two hundred seventy five AVM patients were identified with a mean age of 41 years, (range 6 to 87); women were 52%. AVMs were located in eloquent brain tissue in 142 (51.6%) patients. The mean size was 3.2cm in greatest diameter. Two hundred forty three (88.4%) patients were symptomatic with hemorrhage, neurologic deficits, seizure, and/or other (including headache) occurring in 38%, 28%, 27%, 31%, respectively. Embolization was performed 248 times, and Onyx was used in 215 (86.5%) cases. Detachable coils, polyvinyl alcohol particles, and n-BCA were used 21.8%, 18.6%, and 5.8%, respectively. Total permanent neurologic deficits occurred in 20 patients (13%), and death occurred in 4 cases (3%) with Onyx being used in 16 of 20 patients with permanent neurologic deficit and 4 out of 4 patients with death as a complication.

No significant difference was found between death rates and neurologic complications from the present study as compared to rates from 2004 for all embolized patients (p-value 0.77) and for all onyx embolized patients (p-value 0.81).

Conclusions

In this multi-center study of 248 endovascular embolizations of patients with AVM, Onyx was used in 86.5% of cases. Permanent neurologic deficits and death occurred in 13% and 3% of patients embolized, respectively. Compared to an earlier study in which Onyx was used in only 1.5% of AVM embolizations there was no significant difference in the risk of major complication or death.

Learning Objectives

Evaluate the complication rate of Onyx for the treatment of cerebral AVMs as compared to other embolic agents.

References

Taylor et al, Complications of preoperative embolization of cerebral arteriovenous malformations. J Neurosurg 100:810-812, 2004