

Risk of De Novo Aneurysm Formation in Patients Before Obliteration of Brain Arteriovenous Malformations (AVMs)



Alice L Hung BA; Taylor Elise Purvis BA; Wuyang Yang MD, MS; Tomas Garzon-Muvdi MD MS; Justin M. Caplan MD; Geoffrey P. Colby MD, PhD, FAANS; Alexander L. Coon MD; Rafael Jesus Tamargo MD; Judy Huang MD
Department of Neurosurgery, Johns Hopkins University School of Medicine

Introduction

The risk of de novo aneurysm formation is presumed to increase because of increased arterial flow in brain AVMs. Little evidence to-date has been presented regarding the risk of aneurysmal formation under the influence of a concurrent AVM. We aim to determine this risk using our institutional data.

Methods

Retrospective review of brain AVM patients evaluated at our institution from 1990-2015 was performed. Demographic and baseline characteristics were examined. De novo aneurysm was defined as new aneurysm diagnosis after initial angiographic characterization of AVM. Exposure intervals were censored until obliteration for treated patients and last follow-up for untreated patients. All de novo aneurysms detected during the censored interval were captured, and the annual rate of de novo aneurysm formation was calculated.

Results

A total of 672 AVM patients with complete information were included. Overall age was 37.3 years (44.5% male), and overall size of AVM was 3.1 cm. Six patients (0.9%) with 8 de novo aneurysms were found in this cohort. In these six patients, the average age was 46.9 years, with 50.0% males. The average AVM size was 4.1 cm (range: 3-8 cm). Two patients had presented with AVM hemorrhage, and the most common presenting symptom was seizure (50.0%). Most patients underwent radiosurgery (83.3%). Four (66.7%) patients were diagnosed with de novo aneurysms after first AVM treatment. Six aneurysms (75.0%) were prenidal in location. The average aneurysm size at detection was 4.66 mm. Only one patient received treatment specifically for the aneurysm, which was surgically obliterated. The total non-obliterated interval for AVM was 3811.47 years, and the calculated annual rate of de novo aneurysm formation was 0.21%.

Conclusions

The annual risk of de novo aneurysm formation was relatively low at 0.21%, despite having concurrent AVMs. Most of these aneurysms were prenidal. Patients developing de novo aneurysms were older in general and more likely to have larger AVMs.

Learning Objectives

By the conclusion of this session, participants should be able to:

1. Appreciate the risk of de novo aneurysm formation in patients with AVMs
2. Understand the baseline factors associated with de novo aneurysm formation
3. Appreciate characteristics of de novo aneurysms