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Prenidal Aneurysms and Hemorrhagic Risk of Intracranial Arteriovenous Malformations (AVMs)

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Introduction

Previous reports have specifically indicated an association between hemorrhagic presentation and prenidal aneurysms in patients with AVMs. However, given the competing risk of aneurysm rupture versus AVM rupture, it remains unclear whether these aneurysms truly induce hemorrhage from AVM rupture. In this study we characterize this risk using our institutional experience over 25 years.

Methods

We retrospectively reviewed the electronic records of all patients at our institution diagnosed with AVM between 1990 and 2015. Baseline information, hemorrhage rate, and functional status were assessed. Patients without associated aneurysms and those with feeder aneurysms were compared. Annual risk of AVM hemorrhage was calculated using the birth to treatment approach and compared using Poisson rate ratio test.

Results

Our cohort consisted of 528 patients after excluding those with missing information, including 460 patients without aneurysms and 68 with prenidal aneurysms. Patients were older for those with feeder aneurysms($p=0.006$). AVMs with feeder aneurysms were more likely to be in the cerebellar vermis and hemispheres($p=0.020$ and 0.002, respectively). Presence of prenidal aneurysms increased the risk of presentation with subarachnoid hemorrhage(SAH, $p<0.001$). Interestingly, no significant differences in presenting hemorrhage due to AVM rupture were found($p>0.05$). The majority of aneurysms were untreated(64.4%), and only 12(16.4%) had ruptured presentation. During 5.29±6.98 average years of follow-up, patients with feeder aneurysms were more likely to develop seizures($p=0.004$). The annual risk of AVM hemorrhage was 1.21% and 1.04% for patients without aneurysms and patients with feeder aneurysms respectively ($p=0.492$).

Conclusions

Patients with prenidal aneurysms are more likely to be older and with AVMs in cerebellar location. Despite increased risk of SAH at presentation, we did not observe higher likelihood of rupture in AVM with prenidal aneurysms. More studies are warranted to confirm this finding, as clarifying the competing risk of AVM versus aneurysm rupture may be critical in determining optimal treatment strategy.

Learning Objectives

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

1) Appreciate the baseline characteristics associated with presence of feeder aneurysms.

2) Understand the risk of follow-up seizure and hemorrhage associated with AVMs with feeder aneurysms.