41209. Incidence and Predisposing Features of Spontaneous Obliteration in Untreated Brain Arteriovenous Malformations

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No Disclosures
Introduction

Spontaneous obliteration (SpO) of untreated arteriovenous malformations (AVMs) is a rare occurrence with fewer than 100 angiographically confirmed cases reported to-date. The incidence and predisposing factors of SpO remain unclear, impeding our understanding of lesion progression in untreated patients. We aim to quantify incidence and identify factors associated with SpO in untreated AVMs in this study.
Methods

We retrospectively reviewed AVM patients evaluated at our institution from 1990 to 2015. For comparisons of angiographic and clinical features, untreated AVMs were divided into two groups: SpO- AVMs and non-SpO-AVMs. For incidence of SpO, all patients including treated patients were counted, and incidence was generated from counts of SpO over the untreated interval in patient-years starting from birth to obliteration or last follow-up.
Results

A total of 154 patients had untreated AVMs, with SpO in 5 patients. Average patient ages were 44.2 ± 26.2 and 42.9 ± 22.4 years in the SpO-AVM and non-SpO-AVM group (n=149) respectively (p=0.607). Average AVM sizes were 2.0 ± 1.8cm (SpO-AVMs) and 3.7 ± 2.6cm (non-SpO-AVMs, p=0.252). All (n=5) SpO-AVMs and 28.6% (n=42) of the non-SpO-AVMs had a hemorrhagic presentation (p=0.002). Single draining vein was observed in 4 (100.0%) SpO-AVMs and 39 (32.8%) non-SpO-AVMs (p=0.014). No significant difference was observed for other features. From an entire cohort of 672 patients, the incidence of SpO during 28961 patient-years was 0.017%.
**Figure 1. Workflow of Patient Selection Process**

1. **All AVM Patients 1990 and 2015**
   - $N = 763$

2. **Patients without follow-up after initial presentation:**
   - $n = 91$

3. **AVM patients with follow-up information:**
   - $N = 672$

4. **Patients who received AVM treatment:**
   - $n = 518$

5. **Untreated AVM patients**
   - $N = 154$

6. **Group 1**
   - (Patients with SpO-AVM)
   - $n = 5$

7. **Group 2**
   - (All other patients)
   - $n = 149$
Figure 2. Comparison of Clinical and Angiographic Features Between Patients With and Without Spontaneous Obliteration

- Male Sex (%): NS
- AVM Size < 3.0 cm (%): NS
- Single Draining Vein (%): p = 0.014*
- Deep Venous Drainage (%): NS
- Hemorrhagic Presentation (%): p = 0.002**
Figure 3. A case of SpO of an arteriovenous malformation (SpO-AVM) in a patient over the course of 8 months.

A, Axial computed tomography (CT) of the head from January 2012 demonstrating thalamic hematoma. B, Anterio-posterior (AP) view of a digital subtraction angiography (DSA) of the left internal carotid artery (ICA) injection at the arterial phase taken in January 2012. No visible AVM nidus is demonstrated at the site of thalamic hematoma, likely from compression effect. C, Lateral (Lat) view of a DSA from the January 2012 ICA injection at the late arterial phase showing an early draining vein (solid black arrow) from the presumed nidus location draining into the internal cerebral vein and then to the transverse sinus. D, Axial CT of the head taken in April 2012 demonstrating resolution of both thalamic hematoma and intraventricular hemorrhage. E, Lat view of an ICA injection on DSA during the arterial phase taken in April 2012 with visualization of a 0.5 cm AVM nidus (dashed black arrow) and early draining vein (solid black arrow). F, Lat view of an ICA injection on DSA from August 2012 with no visible AVM nidus or draining vein.
Conclusions

SpO-AVMs tend to present with hemorrhage and have a single draining vein. This phenomenon is exceedingly rare with an annual incidence rate of less than 0.02%. The expectation of SpO for untreated AVMs is not justified with our study, and untreated patients should still anticipate life-long hemorrhagic risk for sustained presence of the AVM.