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Case Report

Rapid Growth Progression of an Intracranial Internal Carotid Artery Aneurysm in a Patient with Multiple Inflammatory/Autoimmune Diseases Treated with a Flow Diverter

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Abstract

Background and Importance. Unruptured supraclinoid aneurysms can be treated by surgery or endovascular therapy, but, when individualizing each patient, the associated comorbidities must be considered to select the best approach, follow-up control studies and treatment.

Clinical Presentation: Sudden oppressive headache in the frontal-orbital and right retroocular region.

Conclusion: Given the demonstration of an aneurysmal volumetric growth of 25% in 10 months, we consider that the risk of rupture of an unruptured aneurysms in patients with inflammatory and autoimmune comorbidities is higher than in patients outside of this context. We suggest carrying out a control study at least every 6 months to assess the evolution of the aneurysm and reconsider the possibility of endovascular treatment, with the placement of a flow diverter being an appropriate therapeutic option for its management.

Keywords: Aneurysm; Autoimmune; Flow-diversion; Growth progression

Abbreviation: ICA: Internal Carotid Artery; DSA: Digital Subtraction Angiography; FD: Flow Diverter; IAs: Intracranial Aneurysms; MRI: Magnetic Resonance Imaging; SAH: Subarachnoid Hemorrhage; UIAs: Unruptured Intracranial Aneurysms

Background and Importance

IAs are persistent, localized dilatations of the arterial wall that are found in approximately 3% of the general population. The most severe complication of IAs is rupture which results in devastating consequences such as SAH and brain damage with serious neurological sequelae [1]. Jiang P. et all. suggested that the hemodynamic and morphological characteristics of aneurysm were also important to assess rupture risk [2]. According to the American Heart Association/American Stroke Association (AHA/ASA) Guidelines, "for patients with UIAs that are managed noninvasively without either surgical or endovascular intervention, radiographic follow-up magnetic resonance angiography or computed tomography angiography at regular intervals is indicated. The optimal interval and duration of recommended follow-up are uncertain." The surveillance strategy improves the overall health through disease prevention [3]. Cylindrical stent devices have additional advantages compared to traditional microsurgical or endovascular therapies is that IAs with no neck can be treated efficaciously, and the aneurysm itself, clearly the most fragile part of the vasculature in question, does not need to be manipulated directly [4]. Flow diversion is an endovascular technique whereby a device is placed in the parent blood vessel to divert blood flow away from the aneurysm [5]. The advancement of FD and surface modification will hopefully reduce the risk of thromboembolism and antiplatelet requirements [6]. The mechanism of action of FD can be divided into three stages: hemodynamic, thrombus formation, and endothelialization [7]. Imaging follow-up is relevant due to the risk of recanalization, growth of the aneurysm, rupture, re-rupture, or the appearance of new aneurysms [8].

Clinical Presentation

A 38-year-old right-handed woman with medical history of: rheumatoid arthritis, Takayasu arteritis, autoimmune autonomic ganglioneuropathy and antiphospholipid syndrome; presented with sudden oppressive headache in the fronto-orbital and right retroocular region. DSA was performed, showing an unruptured aneurysm of the left ICA in the paraclinoid segment; 0 points in a PHASES Score is calculated, with a 5-year rupture risk of 0.4%; it was decided to keep in follow-up and surveillance. 10 months later a control DSA, show aneurysm growth, with measurements of 5.5 mm x 3.7 mm. The patient was enrolled in a treatment of FD stent, size 25 x 4.5 mm. 3 days after treatment, the patient was discharged without complications and without neurological deficit.

Discussion

A patient with multiple autoimmune diseases in which we observed the unruptured aneurysm in the supraclinoid segment of the left ICA (Figures 1,2); with a measurements of 4.4 x 3.1 base per height respectively. Previous procedure performance, continuous assessment was required by internal medicine and rheumatology services, to carry out the endovascular procedure in the best possible conditions. According to the 0 score in PHASES; the 5-year rupture risk is 0.4%, that's why the angiography was schedule according to availability, and was performed 10 months later, after autoimmune acute attacks control, we performed the second DSA, finding an aneurysmal volumetric growth of 16 and 25% in its measures (5.5 x 3.6 mm base per height), after angiography, therapeutic management was decided, considering the significant growth of the aneurysm in a relative short period of time between the two studies. We decide to place a flow diverter, that was properly placed without complications (Figures 3-5). In this case, the comorbidities that include genetic connective tissue disorders weaken artery walls count as risk factors for the formation and enlargement of the aneurysm. In addition to the persistent proinflammatory state, according to the acute phase reactants during the control and follow-up. Six months after Flow diverter placement, we performed a control digital subtraction angiography, and observed an 80% reduction of the aneurysm size.

Figure 1: Video of 3D magnetic resonance angiography. Aneurysmal dilatation in the supraclinoid segment of the left ICA.

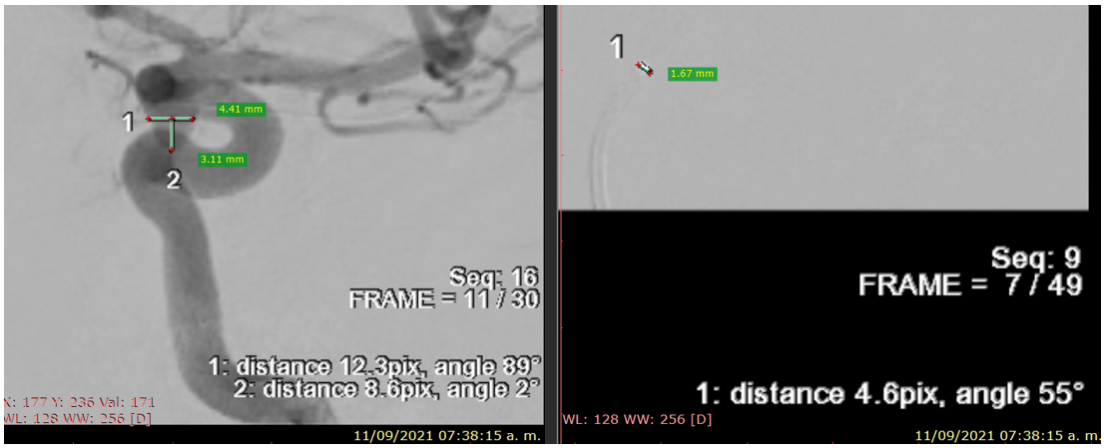

Figure 2: First DSA. Calibration with 5 Fr catheter, base by height 4.4 * 3.1 mm respectively.

Figure 3: Second DSA. Calibration with 8 Fr catheter, base by height 5.5 * 3.7 mm respectively.

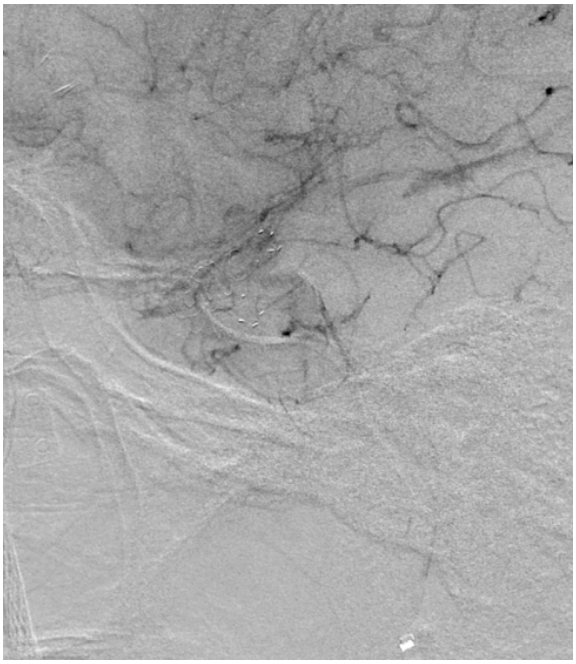

Figure 4: FD 25*4.5 mm adequately deployed covering the base of the aneurysm.

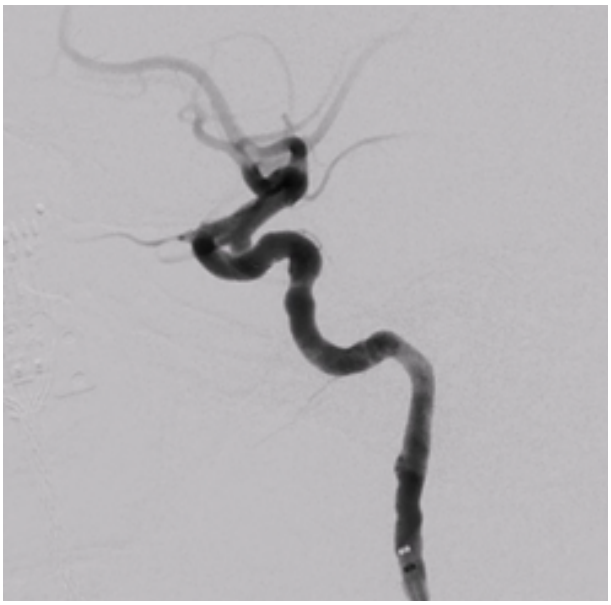

Figure 5: Video of DSA of FD.

Figure 6: DSA, 6 months post-FD.

Figure 7: Video of DSA, 6 months post-FD.

Conclusion

Given the demonstration of an aneurysmal volumetric growth of 25% in 10 months, we consider that the risk of rupture of an unruptured aneurysms in patients with inflammatory and autoimmune comorbidities is higher than in patients outside of this context. We suggest carrying out a control study at least every 6 months to assess the evolution of the aneurysm and reconsider the possibility of endovascular treatment, with the placement of a flow diverter being an appropriate therapeutic option for its management. We suggest that control studies should be done with a periodicity of at least 6 months in patients of unruptured aneurysms with autoimmune or inflammatory comorbidities in

their follow up.

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