Anterior communicating artery aneurysm classification

Ruptured anterior communicating artery aneurysm.

Unruptured anterior communicating artery aneurysm.

Anterior communicating artery aneurysms frequently present wide aneurysm necks and incorporate parent vessels. They are associated with significant variations in vascular anatomy, especially hypoplasia or aplasia of one of the proximal anterior cerebral artery.

Morphological Scoring System of Choi

<table>
<thead>
<tr>
<th>Variable</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN size</td>
<td>Medium</td>
<td>Small or large</td>
</tr>
<tr>
<td>DIA: S ratio</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vessel incorporation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Multiple lobulation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Neck</td>
<td>&lt;4</td>
<td>≥4</td>
</tr>
</tbody>
</table>

The score is calculated by the summation of the all variables. AN: aneurysm size, D: dome, N: neck

Size

see Intracranial aneurysm size.

see Aspect ratio.
see Dome Neck ratio.

see Neck Dimension.

According to 2D-DSA, the points of aneurysm are divided into 5 types $^{1) \ 2) }$.

Chen et al., classified as Type I, II (IIa, IIb), III and IV, based on the various projections and size of aneurysm. The principle for the choice of operative side was designed based on the type of aneurysm and the A2 fork orientation (the interrelations between the plane of bilateral A2, AComA, and mid-saggital plane) $^{3) }$.

Small aneurysms located at the anterior communicating artery carry significant procedural challenges due to a complex anatomy.

**Inferior or downward direction**

![Inferior or downward direction](image1)

**Posterior or backward direction**

![Posterior or backward direction](image2)
Anterior communicating artery aneurysm classification

In anterosuperior-projecting anterior communicating artery aneurysms, the aneurysm dome usually adheres to one or both proximal A2 segment, which may present technical difficulties. A video demonstrates microsurgical clipping of a ruptured anterosuperior-projecting AComA aneurysm. A 52-year-old male presented with a Hunt and Hess grade II subarachnoid hemorrhage (SAH). Computed tomography showed SAH in the basal cisterns, sylvian and interhemispheric fissures. Angiography demonstrated a wide-necked AComA aneurysm projecting anterosuperiorly. Considering the risk of recurrence, the patient decided to accept surgical treatment. The patient was positioned supine and the aneurysm was exposed via the lateral supraorbital approach. The carotid cistern and the optic cistern was opened to release cerebrospinal fluid (CSF) and achieve adequate brain relaxation. A subpial resection of a small portion of the gyrus rectus was performed to visualize the ipsilateral A2, the recurrent artery of Heubner and the base of the aneurysm. A plane was dissected between the anterior aspect of both A2 segment and the posterior aspect of the aneurysm. A straight clip was placed to parallel to the ACoA to completely obliterate the aneurysm. Postoperative angiography confirmed complete obliteration of the aneurysm. The patient recovered well without any complications. Successful treatment requires preoperative surgical planning, precise dissection, and preservation of critical structures. With adherence to these general principles, these aneurysms can be treated safely and effectively 4).

see Wide necked anterior communicating artery aneurysm.

Giant anterior communicating artery aneurysms are rare.

A retrospective analysis was performed of 155 patients with ruptured AComA-located aneurysms. The percentage of difference between both A1 arteries was measured on computed tomography angiography images and neck locations were determined. Accordingly, AComA-located aneurysms were classified into 2 groups. In both groups, A1 and A2 arteries and neck size diameters were measured and their relation with aneurysmal depth was studied. The aspect ratio was calculated.

Eleven patients in which the aneurysm neck originates from the AComA proper with almost equal A1s were classified as the true AComA aneurysm group whereas 144 patients in whom the aneurysm neck originates at the dominant A1 bifurcation into the AComA and A2 with the average difference between
both A1s of about 84.44% were classified as the dominant A1-bifurcation group. There is significant correlation between aneurysmal depth and neck diameter in both groups (P ≤ 0.05, P < 0.001). The aspect ratio was calculated as equal to 1.166.

The dominant A1 bifurcation type is the most common type of AComA-located aneurysm. The present classification provides clinical value in understanding how AComA aneurysms grow and behave. It helps to understand the geometry of multilobulated aneurysms such as ruptured blebs locations during treatment procedures respecting the direction of the dominant A1 axis in group II. Multiple anatomic variations of this complex AComA area can clarify future subtypes of these 2 groups. Thus, further investigation of more patients is needed

Of 2332 intracranial aneurysm patients, 1.76% (n = 41) had a total of 42 A1 aneurysms. Twenty-six of these (62%) were proximal A1 segment aneurysms, 9 (21%) were distal A1 segment aneurysms, and 7 (17%) were fusiform A1 aneurysms. A1 aneurysms can be classified into 3 main types. Types IA and IB originate from the posterior wall of the proximal A1 segment. Type IA projects posterior-inferiorly, whereas type IB projects posterior-superiorly. Type IIA originates from the distal trunk of the A1 artery. Type IIB originates from an angle of an abnormal cortical branch or a ring of an A1 arterial fenestration. Type III consists of fusiform or dissecting aneurysms located anywhere along the A1 segment. After studying the range of treatments and outcomes, when treating these complex morphologies, we recommend clipping type I and II A1 aneurysms and embolizing type III A1 aneurysms.

A1 artery aneurysms are a rare type of aneurysm with unique characteristics. The classification system proposed here accurately summarizes these characteristics to better guide treatment strategies.

Ten aneurysms of the horizontal portion of the anterior cerebral artery (A1) were analyzed. These 10 aneurysms were classified into three types according to the mode of the origin of the neck of the aneurysm from the A1 segment: (a) an aneurysm originating from the junction of the A1 segment and the lenticulostriate artery, (b) one from the proximal end of the fenestration of the A1, and © one from the top of the A1 loop (elongation and kinking of the A1 segment). In these aneurysms, their size, the side of the A1 segment with an aneurysm, the multiplicity of aneurysms, the coexistence of hypertension, the grade of the patients, the laterality of the subarachnoid blood clots (as seen on computed tomography scans) and surgical outcome were analyzed.

**Anterior communicating artery aneurysm and pericallosal artery aneurysm**

**Anterior communicating artery aneurysm and pericallosal artery aneurysm.**

**References**


