# Middle cerebral artery aneurysm endovascular treatment

- Takayasu arteritis with a ruptured intracranial aneurysm in a pediatric patient: illustrative case
- Illustrated step-by-step guide to stent-assisted coiling of wide-neck posterior inferior cerebellar aneurysm via a contralateral vertebral artery approach
- Risk Factors for Unfavorable Angiographic Outcomes after Reconstructive Endovascular Treatments of Unruptured Vertebral Artery Dissecting Aneurysms
- Intracranial Aneurysm Predisposing to Terson's Syndrome: Insights From a Systematic Review
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The middle cerebral artery aneurysm treatment, has been controversial due to the frequency of complex anatomy and relative ease of clipping in this location.

Endovascular treatment of middle cerebral artery (MCA) aneurysms has traditionally been considered difficult due to complex branching patterns, frequent involvement of parent vessels within the aneurysm neck, and a high incidence of thromboembolic complications.

Endovascular treatment (EVT) of middle cerebral artery aneurysms is considered safe and effective [1) 2) 3)].

## Flow Diverter Stent for Middle Cerebral Artery Aneurysm

Flow Diverter Stent for Middle Cerebral Artery Aneurysm

## Case series

### 2017

57 patients with MCA trifurcation wide-necked aneurysms underwent stent-assisted coiling embolization using a solitaire AB stent. All 57 patients completed the surgery successfully. Embolization efficacy was graded according to the modified Raymond scale.

There were 52 cases of complete embolization, 4 cases of residual aneurysm neck, and 1 case of

residual aneurysm body. 50 patients participated in a 6-36-month follow-up. There has not been observed any aneurysm rupture and hemorrhage. 50 patients received digital subtraction angiography (DSA) re-examination; 46 patients presenting complete embolization had no aneurysm relapses; 3 patients had residual aneurysm neck demonstrated; 1 patient had no aneurysm neck and others 2 were in stable condition. Finally, the patient with residual aneurysm body showed no sign during follow-up reexamination.

Stent-assisted coiling embolization of intracranial wide-necked aneurysms using the solitaire AB stent was safe and effective [4].

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The cases of 93 MCA aneurysms treated with endovascular intervention at the Department of Neurosurgery/Interventional Neuroradiology, 159947 Weill Cornell Medical Center/New York Presbyterian Hospital , New York, USA. between 2003 and 2015 were retrospectively reviewed. Demographic, clinical, and radiographic variables were recorded and analyzed.

Immediate complete or near-complete occlusion was achieved in 81 (90%) cases. At the longest follow up of 6 months or greater, 83.3% of the aneurysms were stable-to-improved in the Raymond occlusion classification, 8.3% were found to have minor recanalization not requiring retreatment, and 8.3% required retreatment due to significant recanalization. Thromboembolic events occurred in 18 (19.3%) of cases, but only 1 resulted in permanent vessel occlusion and only 1 resulted in permanent neurologic impairment. Thrombus was resolved with intra-arterial thrombolysis or mechanical thrombectomy in 17 of the 18 cases. There were only two cases resulting in morbidity (2.15%). There was no statistically significant correlation between aneurysm location, size, morphology, or use of adjuvant device with radiographic outcome or thromboembolic event.

While the rate of thromboembolic events in our series was 19%, the overall morbidity was only 2%. This highlights the fact that even complex MCA aneurysms can safely and effectively be treated by endovascular means with or without the use of balloon or stent assistance, as long as the interventionalist is astutely aware of the possibility of thrombus formation and acts accordingly with thrombolytic therapy when necessary [5].

### 2016

From October 2011 to October 2015, 67 patients with 71 ruptured middle cerebral artery aneurysms received endovascular coiling in Yijishan Hospital, Wannan Medical College , Wuhu , Anhui Province , P.R. China.

Of all the 71 aneurysms (67 patients), 42 were treated by coil embolization merely, 27 by stent-assisted coiling and 2 unruptured aneurysms in patients with bilateral middle cerebral artery aneurysms without receiving treatment. Complete occlusion was achieved in 82.6% (57/69) of all the procedures. Each of incomplete and partial occlusion rate were 8.7% (6/69). Intraoperative rupture of aneurysms occurred in 2 procedures (2.9%). Thrombogenesis occurred in 8 procedures (11.6%). Brain infarction occurred in 8 patients (11.9%). Postoperative rebleeding occurred in 7 patients (10.4%). Sixty-three patients were followed at a mean follow-up of 8.24±7.16 months. The mortality and good outcome rate were 3.2% and 90.5%. Aneurysm recurrence occurred in 6 (13.3%) of the 45 aneurysms at a mean follow-up of 8.44±7.83 months.

Endovascular coiling is effective for patients with ruptured middle cerebral artery aneurysms. Individualized treatment should be assessed by experienced specialist. It is essential to perform randomized large trials to confirm the efficiency of endovascular coiling [6].

### 2014

The neurointerventional database at Division of Interventional Neuroradiology, Neuroscience Institute, Abbott Northwestern Hospital, Minneapolis, MN., was reviewed for all endovascular treatments of MCA aneurysms. Demographics, aneurysm characteristics, treatment modality, intraprocedural hemorrhage and thromboembolic events, 30-day neurological events, and follow-up angiographic studies were recorded.

From December 1996 to April 2013, 292 patients underwent endovascular treatment of 346 MCA aneurysms. Of these, 341 were successfully completed (98.6%). Balloon neck remodeling was used in 230 procedures (66.5%). 95 procedures were for ruptured aneurysms (27.4%). The rate of intraprocedural hemorrhage was 2.6% (9 of 346). The overall rate of intraprocedural thromboembolic events was 13.6% (47 of 346), significantly more common in patients with acute subarachnoid hemorrhage (SAH, 27.4%, $p < .001$). The 30-day major (modified Rankin score > 2) neurological event rate was 2.9% (10 of 346), significantly more common in patients with SAH (8.4%) compared to those without (0.8%, $p < .001$). The rate of complete or near-complete aneurysm occlusion at ≥ 6 months was 90.6% and 91.8% at ≥ 2 years, with an average of 24 months follow-up available for 247 procedures.

Endovascular treatment of MCA aneurysms can be safe and effective. However, it is associated with a high asymptomatic thromboembolic event rate that is more frequent in the setting of acute SAH [7].

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