

Aneurysm

# Clinical and anatomic outcomes after endovascular coiling of middle cerebral artery aneurysms: report on 30 treated aneurysms and review of the literature

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Received 21 July 2005; accepted 12 December 2005

## Abstract

**Background:** Endovascular treatment of middle cerebral artery (MCA) aneurysms has not been extensively studied. We report our experience on a select group of patients that underwent coil embolization of an MCA bifurcation aneurysm.

**Methods:** From August 1999 to January 2005, 29 patients harboring 30 MCA aneurysms were treated with coil embolization. These patients were felt to have favorable characteristics for endovascular therapy including absence of thrombus in the aneurysm, absence of an efferent artery off of the aneurysm, and ability to reconstruct the wide neck with stent reconstruction. We retrospectively reviewed their records and angiographic images to evaluate for technical result and complications.

**Results:** The mean age of our cohort was  $59 \pm 13$  years with 19 patients presenting with a ruptured aneurysm. Complete obliteration was achieved in 24 (80%) of 30 of aneurysms on postprocedural angiography and no patient showed aneurysm regrowth at 6-month follow-up. Twenty-seven (93%) of 29 patients had no change in baseline neurological function post-embolization. There were two procedural-related complications: one intraprocedural rupture of an aneurysm and one thromboembolic stroke in the ipsilateral MCA territory.

**Conclusions:** Coil embolization of MCA bifurcation aneurysms has a high rate of complete obliteration with acceptable morbidity in our selected group of patients.

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## Keywords:

Aneurysm; Middle cerebral artery; Coil embolization

*Abbreviations:* F/N, fundus to neck ratio; ISAT, International Subarachnoid Aneurysm Trial; MCA, middle cerebral artery; mRS, modified Rankin Score.

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## 1. Introduction

Since 1994, endovascular therapy for intracranial aneurysms has grown in popularity. The results of the ISAT have done much to make aneurysm coiling acceptable [3]. An important endeavor is to determine which aneurysm subpopulations should be treated using current endovascular techniques. Much of this evaluation revolves around aneurysm morphology that is dependent on aneurysm location. Little has been published with regard to the endovascular treatment of MCA aneurysms. Middle cerebral artery

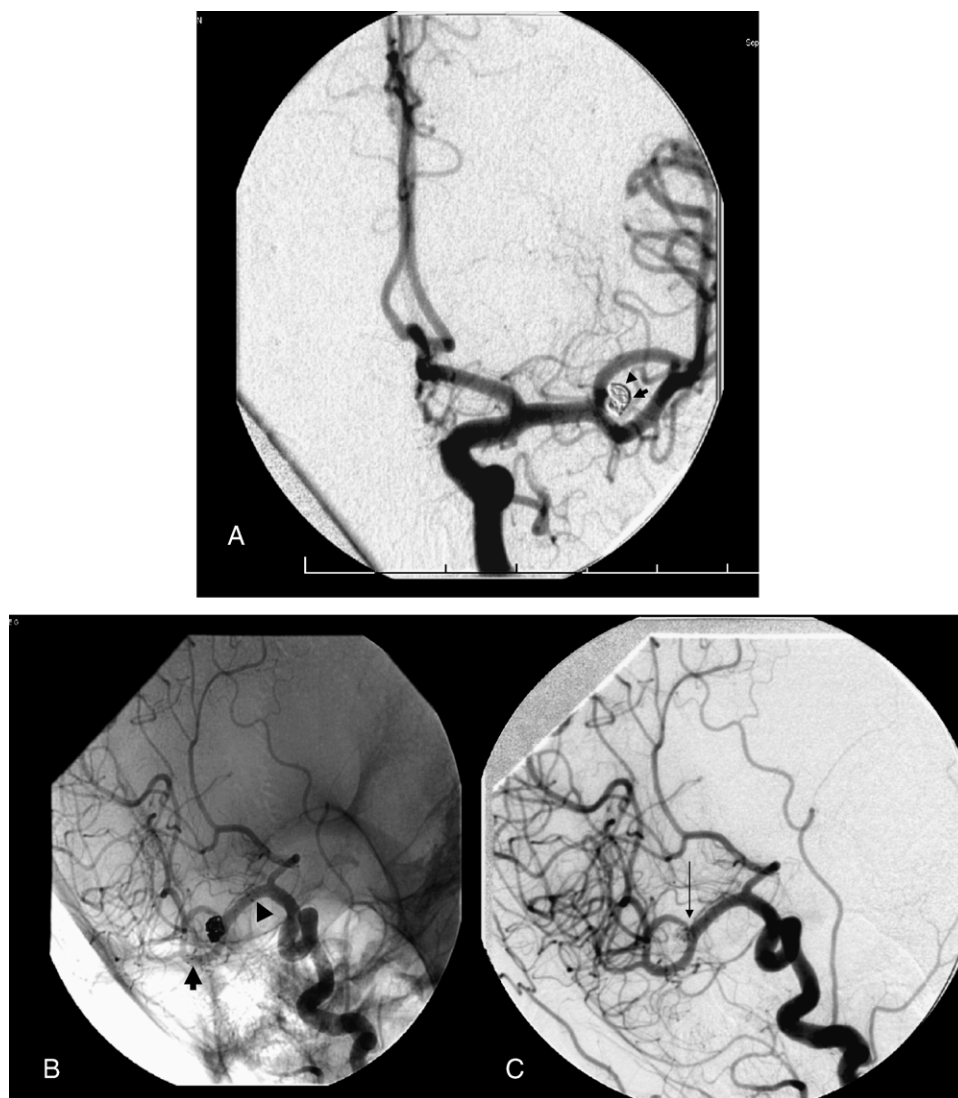


Fig. 1. A: A 45-year-old woman with a Hunt-Hess grade 3 subarachnoid bleed was found to have a 3-mm left MCA bifurcation aneurysm that was completely obliterated with coil embolization (black arrowheads). B and C: A 54-year-old woman who presented with a Hunt-Hess grade 4 subarachnoid hemorrhage was found to have a wide-necked right MCA bifurcation aneurysm measuring 4 mm. A Neuroform stent (black arrowheads) was deployed into one division of the MCA to prevent coil herniation with a partial post-coiling result noted (black arrow).

aneurysms are easily accessible surgically and often have features that may be unfavorable to coil embolization. One of these features is a wide neck, which can now be overcome with Neuroform (Boston-Scientific/Target Therapeutics, Fremont, Calif) assisted stent reconstruction [13] or 3-dimensional coils [14]. Other obstacles such as a partially thrombosed fundus or efferent vessels protruding from the aneurysm are difficult to overcome with current endovascular technologies. We review our technical results and clinical outcomes in 30 patients treated with coil embolization for an MCA bifurcation aneurysm over a 5-year period.

## 2. Methods

From August 1999 to January 2005, 30 MCA saccular aneurysms were treated through endovascular methods in

29 patients at the University of Pittsburgh Medical Center. We retrospectively reviewed the medical records, angiograms, and endovascular procedure reports of these 29 patients to determine the technical result, periprocedural complication rate, Hunt-Hess grade, and clinical outcome defined by the mRS. All surviving patients, except two, were followed with cerebral angiography at 6 months.

Lesions were selected for endovascular therapy based upon the surgeon's (MH and AK) opinion that successful coiling could be achieved and/or the patient was deemed a high risk for open surgical therapy. Patients with a partially thrombosed fundus, efferent vessels protruding from the aneurysm, or giant aneurysms were not selected for endovascular therapy. Wide-necked aneurysms were treated with 3-dimensional coils or Neuroform stent assistance in some patients if the stent could be navigated to the aneurysm.

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