

# Cerebral Abscess complicating Embolization and Gamma Knife Radiosurgery for Intracranial Arteriovenous Malformation

Cristo Chaskis MD; Thierry Roger MD; Joseph Masudi MD; Guy Bruninx MD; Paolo Mescola MD; Baudouin Vanderkelen MD  
Centre Hospitalier Universitaire de Charleroi, Charleroi, BELGIUM



## Introduction

We describe an unusual complication of the endovascular treatment of cerebral arteriovenous malformations. Deep-seated AVMs are commonly dealt with endovascular embolization and subsequent radiosurgery on the residual nidus. Postoperative infections are well known but infectious complications following endovascular treatment have been less frequently reported.

Endovascular treatment consisted of Microplex coils embolization during one session in July 2010. A residual nidus was treated with Gamma knife Radiosurgery in March 2011. Six months later, the patient deteriorated suddenly. CT scan and subsequent MR imaging showed strong ring-enhancement surrounding the treated AVM with severe brain edema. We performed a left decompressive craniectomy in emergency as the patient developed sudden coma with temporal herniation. The patient showed no septic symptoms. During surgery, we took bacteriological samples from both the extracerebral space and by aspiration of the brain abscess. The culture of the abscess fluid revealed a Propioni bacterium.

The patient received intravenous antibiotics for 6 weeks and eventually went to rehabilitation. She recovered completely and was discharged home after 2 months.

## Results

Infection was probably introduced at the time of the endovascular procedure as the causative organism was a skin commensal bacterium. The ring-enhancement was located at the level of the embolized AVM. Decompressive craniectomy allowed a rapid control of intracranial hypertension and the performance of bacterial sampling.

Endovascular treatment of AVM may be associated with serious complications although it seems less invasive than surgery. The most common consist on ischemic complications and hemorrhage. However, infectious complications have been seldom reported. Transient bacteriemia has been observed in up to 4% of angiographies. Meyer et al. noted 4 cases of septicemia after 3000 interventional angiography. The duration of the procedure may play a role. Up to 32% positive blood samples have been identified in a series of 25 patients after therapeutic angiography lasting longer than 2 hours.

Brain abscess may exceptionally complicate aneurysm coiling or AVM embolization.

## Conclusions

Brain abscess may rarely complicate AVM embolization. The diagnosis must be evoked in delayed neurological impairment following embolization, with ring enhancement on imaging.

The question of prophylactic intraoperative antibiotherapy in endovascular procedures remains open as complications can lead to significant morbidity. The importance of aseptic technique during endovascular procedure must be underlined as embolized material may represent an infectious source. Antibiotic prophylaxis should be used when performing therapeutic endovascular procedure lasting > 2 hours. In case of associated Radiosurgery, abscess must be differentiated from radionecrosis.

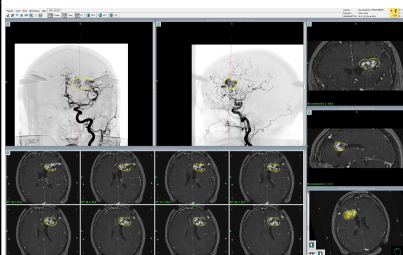
## Learning Objectives

To describe unusual complication of endovascular treatment of AVMs. To discuss the need for prophylactic antibiotherapy in endovascular procedures. To discuss the place of decompressive craniotomy in patients with cerebral abscess and severe brain edema.

## References

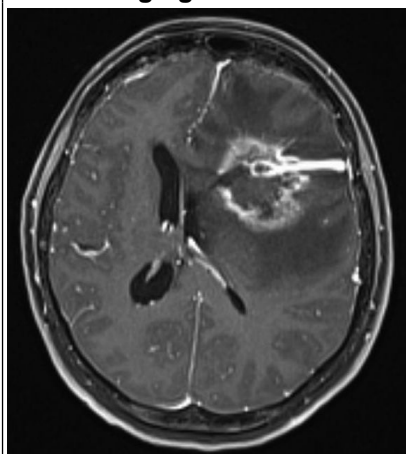
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### Gamma knife planning for intracranial AVM



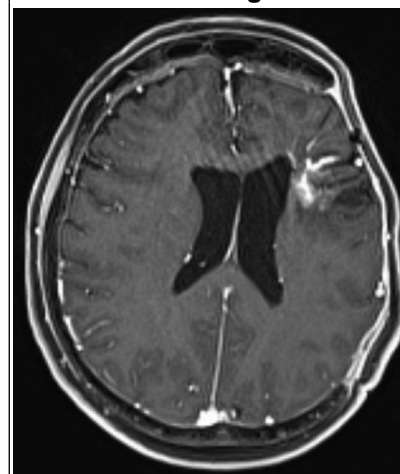
Planning of the Radiosurgery performed 8 months after embolization based on cerebral angiography and MR imaging identification of the residual nidus.

### MR imaging on admission



MRI demonstrating ring enhancement and marked edema around the treated AVM

### MR imaging 6 months after discharge



MRI demonstrating residual Gd enhancement at the level of the embolized AVM.

## Methods

This 55-year-old female was admitted in April 2010 with deep-seated left frontal intracerebral hemorrhage. Imaging work-up revealed a ruptured deep-seated fronto-insular AVM fed by branches of the pericallosal artery and the M1 segment of the Middle Cerebral Artery.