

# Long-Term Outcome of Endovascular Embolization of Complex Intracranial Aneurysms with Onyx: Experience from a Single Tertiary Center

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## Learning Objectives

Describe the importance of the liquid embolic agent Onyx as alternative of the endovascular embolization of complex intracranial aneurysms.

## Introduction

We present the largest US case series with long-term follow-up using Onyx in the endovascular management of complex intracranial aneurysms with potential high rate of incomplete occlusion and recanalization.

## Methods

Nineteen patients with 22 complex intracranial aneurysms were treated. Fifteen aneurysms were in the anterior circulation (7 ophthalmic sidewall, 6 cavernous ICA, 1 petrous ICA, 1 superior hypophyseal and 1 MCA). Six were in the posterior circulation (4 PICA, 1 vertebral, 1 basilar). Four presented with SAH. **All were complex aneurysms (e.g. wide-neck, large or giant, fusiform, dissecting-type, or associated to an AVM). Four were treated in the past with other materials. Onyx HD-500 was used in 18 aneurysms, Onyx 34 and 18 in 2 patients each.** Coils and stents were used in 5 and 4 patients respectively. Embolization of the feeding vessel was necessary in 2 patients. Clinical and angiographic follow-up was obtained at 2.6 years (6 months – 10 years) and 1.3 years (6 months -5 years), respectively.

## Results

Twenty aneurysms were completely occluded on immediate post-embolization angiogram, 2 had a small residual neck. Onyx migration was observed in 4 aneurysms with no radiographic or clinical consequences. Angiographic follow-up showed recanalization in 1 large aneurysm requiring additional Onyx obliteration of the parent vessel. No peri-procedural mortality was observed. Two patients with cavernous ICA aneurysm had a transient third nerve palsy after embolization. Two patients with SAH died of disease-related complications.

## Conclusions

**Onyx embolization of complex intracranial aneurysms is feasible, safe and effective. Onyx is a good option in the management of aneurysms recurrences, fusiform and dissecting-type aneurysms. Morbidity and mortality rates are similar to other endovascular techniques. Onyx provides durable aneurysm occlusion at mid- and long-term follow-up.**

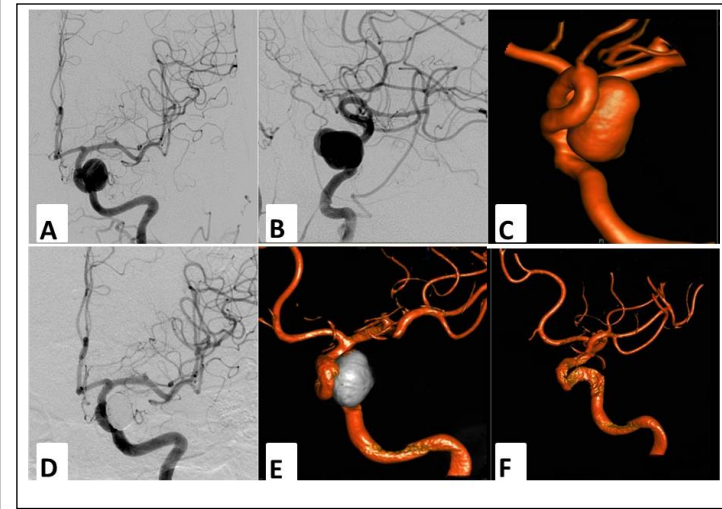
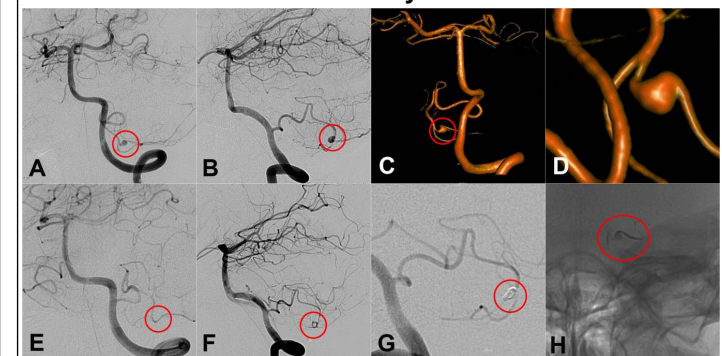


Figure 1. A and B. AP and lateral projections showing a large side-wall cavernous sinus internal carotid aneurysm. C. 3-D reconstruction of the same aneurysm. Patient presented with ophthalmoplegia and double vision. This aneurysm was treated with Onyx 500. C-F. Complete angiographic occlusion of the aneurysm with no evidence of recurrence or recanalization at 2 years follow-up.

Figure 2. Dissecting-type PICA aneurysm embolized with Onyx



A-D. AP, lateral, and 3-D reconstruction of a left distal dissecting-type PICA aneurysm, E-H. Post-embolization angiography showing complete obliteration of the aneurysm at 1 year follow-up.