

Endovascular Treatment of Posterior Communicating Artery Aneurysms with Third Nerve Palsy: Clinical Outcomes and Predictors of Nerve Recovery

Nohra Chalouhi; Thana Theofanis BA; Pascal Jabbour MD; Aaron S. Dumont MD; L. Fernando Gonzalez MD; Robert H. Rosenwasser MD, FACS, FAHA; Robert M. Starke MD MSc; Stavropoula I. Tjoumakaris MD Department of Neurosurgery, Thomas Jefferson University and Jefferson Hospital for Neuroscience, Philadelphia,



Introduction

Oculomotor nerve palsy (ONP) is a well-known presentation of posterior communicating artery (PCOM) aneurysms. Direct compression of the oculomotor nerve by the aneurysmal mass is thought to be the main mechanism of nerve injury.

Surgical clipping has been the treatment of choice for improved clinical outcome. Reports on recovery of ONP with endovascular coiling have been limited to small case-series.

This is the largest study to date investigating the clinical outcome of ONP with different endovascular embolization techniques and predictors of complete recovery.

Methods

Between 2006 and 2011, a total of 37 patients with ONP and available clinical follow-up underwent endovascular treatment in our institution.

Medical charts, operative reports, and office followup records were reviewed to determine the degree of nerve recovery after endovascular therapy.

ONP was considered complete in the presence of 1) ptosis, 2) fixed mydriasis, 3) diplopia and 4) complete upward, medial, and downward-gaze palsies. Complete ONP recovery was defined as complete resolution of patient's initial signs and symptoms except for subtle ptosis and slight differences in pupillary reactions. Partial ONP recovery was defined as residual diplopia/ophtalmoplegia, residual ptosis, or residual pupillary dysfunction.

A multivariate logistic regression analysis was conducted to determine the predictors of oculomotor nerve recovery after endovascular treatment.

Results

19 patients (51.4%) presented with complete ONP and 18 (48.6%) with partial ONP. 17 patients (45.9%) were treated in the setting of subarachnoid hemorrhage. Mean aneurysm size was 7.6 mm.

Conventional coiling was performed in 31 (83.8%) patients, stent-assisted coiling in 4 (10.8%), and balloon remodeling in 2 (5.4%). There was 1 (2.7%) procedural complication (a transient thromboembolic event).

The interval between the onset of ONP and endovascular treatment was 0 to 3 days in 27 (73%) patients, 4 to 14 days in 5 (13.5%) patients, and >14 days in 5 (13.5%) patients.

Mean follow-up time was 11.3 months. At the last available clinical follow-up, ONP resolution was complete in 14 (37.8%) patients and partial in 19 (51.4%). Only 4 (10.8%) patients showed no signs of nerve recovery.

Complete nerve recovery occurred in 50% (9/18) of patients with initial partial ONP versus 21% (4/19, p=0.01) with initial complete ONP.

In multivariate analysis, a partial ONP palsy was the only predictor of complete ONP recovery (OR= 8.06; p=.02). There was also a trend toward complete ONP recovery with increasing follow-up time (OR=1.2; p=.081). Treatment timing, type of endovascular embolization, subarachnoid hemorrhage, and initial degree of aneurysm occlusion were not predictors of nerve recovery.

PCOM aneurysm causing ONP

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Digital subtraction angiography (left) showing a left 3 x 6 mm PCOM aneurysm in a patient with acute complete ONP. The aneurysm was successfully coiled (right), and the patient recovered completely within 3 months.

Conclusions

Endovascular therapy is a safe and highly efficient alternative to surgical clipping for PCOM aneurysms with ONP.

Partial nerve palsy carries a more favorable clinical outcome. The odds of making a full recovery after endovascular therapy appear to increase with time.

Learning Objectives

By the conclusion of this session, participants should be able to:

1) Discuss the advantages and limitations of endovascular therapy in the treatment of PCOM aneurysms with ONP.

2) Discuss the factors that may influence recovery of ONP after endovascular treatment