



# Cavernous Carotid Aneurysms in the Era of Endoluminal Reconstruction: A Need to Revisit Treatment

## Paradigms

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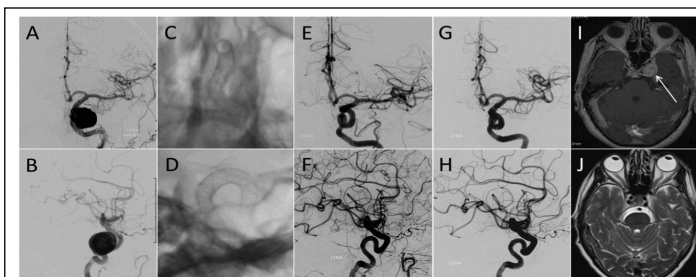
### Introduction

Cavernous Carotid Aneurysms (CCA) are a distinct form of intracranial aneurysms which are extradural. The natural history of CCA's has been studied, with the conclusion that these aneurysms have a low risk of causing major morbidity and mortality. The overall relatively benign natural history has been weighed against traditional treatment options, including surgical clipping, parent artery occlusion with or without bypass, and endovascular coiling, all of which carry varying risks of major morbidity and mortality.

Recent techniques of endoluminal reconstruction with flow diverting stents have not been incorporated into treatment algorithms for CCAs. This study examines the authors' institutional experience as well as a systematic review of the literature for outcomes and complications of using the PED in unruptured CCAs.

### Method

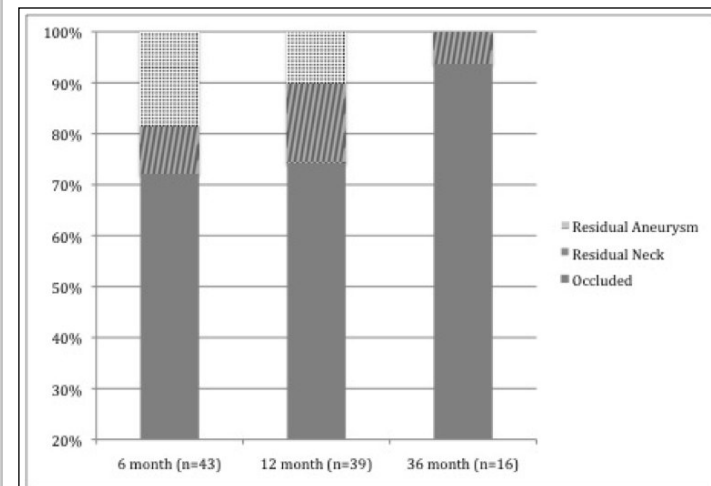
A retrospective search for CCAs from a prospective collected database of aneurysms treated with the PED at our institution was done. Baseline demographic, clinical and laboratory values were collected. Intra-interventional data as well as data at all follow-up visits were also collected. A systematic review of the literature for complication data was performed with inquiries sent when clarification of data was needed.



	n or mean +/- SD
Age (years)	57 +/- 14.2
Female	83.7% (36)
Presenting symptom	
Visual	65.1% (28)
Headaches	16.3% (7)
Thromboembolic event	4.7% (2)
Memory	2.3% (1)
Facial pain/numbness	2.3% (1)
Aneurysm Maximum Diameter (mm)	24.2 +/- 9.7
Small, < 10mm	0
Large, 10 to 25mm	23
Giant, ≥ 25mm	20
Aneurysm Neck (mm)	13.6 +/- 11.6
Dome to Neck Ratio	2.2 +/- .9

### Results

Forty-three CCAs, were included in the study. Our mean radiographic follow-up was 2.05 years. On last follow-up, 88.4% of the aneurysms treated had complete or near-complete occlusion of their aneurysm. Aneurysm complete or near complete occlusion rates at 6 months, 12 months and 36 months were 81.4%, 89.7% and 100%, respectively. Of patients with neuro-ophthalmological deficits on presentation, 84.2% had improvement in their visual complaints. Overall, we had a 0% mortality rate and a 2.3% major neurological complication rate. Our systematic review of the literature yielded 227 CCA treated with PED with a mortality and morbidity rate of, 0.4% and 3.1% respectively.



### Conclusions

CCA's have long been considered benign lesions, but even completely extradural CCA's can have catastrophic complications in a small percentage of patients. Unfortunately, these complications are heterogeneous and difficult to anticipate. Any intervention considered in such a setting must have an even lower risk profile than the natural history of the condition being treated. All previous treatment options for CCA's were clearly shown to be more risky than all but a certain small subset of CCA patients with predictable high-risk profiles. As a result, previous treatment paradigms have been constructed to only address patients at high risk and may fail to offer treatment to patients of moderate risk. We believe that the evidence showing the safety and efficacy of the PED, especially for treating CCA's, merits a reconsideration of this existing treatment paradigm.

### Learning Objectives

Management of Cavernous Carotid Aneurysms